

NUMBER SENSE – MENTAL MATHEMATICS

A Chronology of the Texas University Interscholastic League Number Sense Contest

by Larry White,
UIL State Number Sense Director

It is often pointed out that nine-tenths of the arithmetic used in life situations is mental arithmetic. One does not carry around a deaf-man's pad and pencil to figure out change, or comparative prices of oranges by the dozen with oranges by the basket, nor the number of miles he gets from a gallon of gasoline. "Numbers" is a language, and the development of the "number sense" is an essential part of learning to talk effectively.

Preface:

I am not a writer, I am a mathematician, a retired math teacher, a retired math team coach, and the current UIL Number Sense contest director and UIL Mathematics contest assistant director. Hopefully, the syntax, punctuation, spelling, grammar, etc. used in this project is not too awful bad. My goal for this project was to create a chronological history of one of the oldest Texas University Interscholastic League's contest, NUMBER SENSE. The amount of sources and information, sketchy at times, was limited to the bounded volumes of the UIL archives at the UIL headquarters, the archive search available on the UIL webpage (<https://www.uil texas.org/>), the UIL Leaguer (stored on DVDs), past directors, past/present coaches, and my 45 years associated with UIL in one form or another. There are holes that I could not fill due to lack of information. There are items that may or may not be able to be verified due to the lack of sources. If an error is found or added information is known feel free to contact me and I will do my best to correct the issue(s).

This project is broken up into two major parts and an appendix of related material.

Part 1 is the early years, 1917-1943. Contests during this time were the County Arithmetic contest, the THREE-R's contest, and the Number Sense contest.

Part 2 is the years 1943 to the present time. The format of the Number Sense contest that began in 1943 is the same format being used at the present time.

The emphasis of all of these contests was on developing mental math skills in hopes of increasing speed and accuracy.

I love mathematics, especially mental mathematics. The ability to attempt 80 problems in a 10 minute time period is phenomenal. The amount of time and effort it takes to develop such skills is almost breathtaking. Kudos to all those students, teachers, and coaches that took the challenge over the years to attempt to master this contest. None of this would have been possible if it had not been for the efforts and hard work the Texas University Interscholastic League and the contest directors and writers put forth.

I thank all of those past coaches, teachers, and students that helped me to become a "number sener" and help me with this project. I thank the University Interscholastic League for allowing me to be part of their fantastic organization both as a teacher/coach and as one of the directors of number sense and mathematics. I thank God for giving me the math talents and skills I have, for continually helping me to further develop these skills, and for being my greatest math teacher.

NOTE:

">>> ... " denote my personal comments and/or observations.

"*** ... " denote items taken from sources such as the UIL Leaguer and archives.

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UIL Mental Math Contests The Early Years 1917- 1943

County Arithmetic contest - THREE-R's contest - Number Sense contest

*** December, 1922 ... **WHAT CONSTITUTES GOOD ARITHMETIC**

Speed and Accuracy, Authorities Agree Most Important

By Professor John W, Calhoun

(In the November issue we published a letter from Principal R. L. Paschal, of the Fort Worth High School, entitled "Practical Methods in the Teaching of Arithmetic." The following article was suggested by that letter. Next month, we shall publish an article on the same subject by Dean H. Y. Benedict, of the University of Texas.—Editor's note.)

Arithmetic has long held primacy among the subjects taught in the elementary schools. A student is classed as "good" or "poor" in the mind of his teacher largely on his record in arithmetic, His parents are pleased or disappointed in the matter of his progress in learning largely on the ground of his showing in arithmetic.

The old curriculum was the Three R's: Readin', Ritin' and 'Rithmetic—and the greatest of these was 'Rithmetic. Anybody could learn to read, nearly anybody could learn to write, but it took brains to acquire proficiency in "cypherin"—or so the common belief had it.

But the things in the old arithmetics that made them feared and respected were, for the most part, not the useful or practical problems in the ordinary sense of those words. The thing that "amazed the astonished rustics ranged around" was the fact that a boy good at cyphering could get the answer to problems like the following:

1. If the velocity of sound is 1142 feet a second and the number of pulsations 70 per minute, what is the distance of a cloud if 20 pulsations are counted between the time of seeing a flash of lightning and hearing the thunder?
2. John Jones divided his estate among two sons and three daughters, the latter sharing equally with each other. The younger son received \$2,200.00 which was $\frac{5}{11}$ the share of the elder who received $\frac{11}{36}$ of the whole estate. Find the share of each daughter.
3. If a blacksmith gets 1 cent for the first nail used in shoeing a horse, 3 cents for the second, 9 for the third, and so on, what will he get for shoeing the horse if he uses 32 nails?

Now whatever one may think of the mental improvement that may result from wrestling with such problems, (And they are real book problems that the writer still recalls after an absence from them of more than thirty years.) and the high grade of cleverness shown by the ability to solve them, most people will agree that they are not the sort of calculations that a boy will be called on to make when he tackles the matter of earning his bread and butter.

Since arithmetic is considered, and correctly considered, a "practical" subject, it may be well to inquire what are its practical uses and how facility in the use of its operations may be secured. It is undoubtedly true that by all odds the most numerous of its applications have to do with the buying and selling operations of business, the handling of money by banking institutions, and with statistical investigations and tabulations. In these activities it rarely happens that the worker does not know what operation to perform. He does not wrinkle his brow in an effort to find some way to begin to unravel the problem. He is not generally puzzled as to what is the method of procedure. The only uncertainty that confronts him is the question of how long it will take him to do the work and will it be accurate when done.

This brings us to the question of what the arithmetic training should give the student. It should give him *speed and accuracy*.

He should learn to perform the fundamental operations rapidly and in a manner that would cause him to have confidence in the result secured. But to give training of this sort is not so easy as it sounds. One may drill on addition to the end of his days and never add correctly. One may practice multiplication to the end of the chapter and repeat the experience of the poor man in the story who went mad repeating "once one is two." Practice is not the whole story. It will help but there is a thing more important. That is getting a "number sense" or a "number instinct" or simply an acquaintance with numbers as such. And—"there's the rub."

This can only be taught by keeping this end in view. It is not a by-product.

To show what I mean, take an illustration: A student should be taught to think of a rate per cent as a fractional part of something and to think of it instantaneously. 20% should mean $\frac{1}{5}$ as soon as the student sees or hears it. Then if asked to find 20% of \$763.59 he should be taught to think of it as about equal to $\frac{1}{5}$ of \$750.00 and to know at a glance that the answer is slightly more than \$150.00. His written calculation (if, indeed, he finds it necessary to make one) will be only a refinement on this rapid approximation. He should be trained in the solution of all arithmetic problems (with the possible exception of those requiring long additions) by making a rapid mental estimate as to the approximate value of the result. If asked to find the interest on \$650.00 for 1 year, 5 months, and 20 days at 8%, he should be taught to regard the time as about 1 and $\frac{1}{2}$ years, 8% for 1 and $\frac{1}{2}$ years is 12%, 12% is about $\frac{1}{8}$, $\frac{1}{8}$ of \$650.00 is about \$80.00. Now when he puts pencil to paper and finds the result is \$76.56 he will have confidence in his work and he *will not misplace the decimal point*. Having found that \$80.00 is about right, \$7.65 or \$765.60 would be grotesque.

Briefly stated then arithmetic teaching should result in enabling the student to perform the fundamental operations quickly and correctly. He should have large practice on the sort of problems that are met in the ordinary occupations. He should be so taught that he will have reason to place confidence in the results of his work. He should be schooled in the practice of checking his work to test its accuracy rather than to resort to a table of printed answers. Puzzles of the sort mentioned should be omitted so long as arithmetic is confined to the elementary schools.

Let us strive for speed, accuracy, number sense, and they are listed in climacteric order.

*** January, 1923 ... **WHAT CONSTITUTES GOOD ARITHMETIC**

Writer Emphasizes Differences Between Arithmetic and Algebra

By Dr. H. Y. Benedict

(The following is the third article which has appeared in the *Leaguer* on teaching arithmetic. The first was by Principal R. L. Paschal, of Fort Worth, and the second was by Professor John C.

Calhoun of the University of Texas. The *Leaguer* will be glad to consider for publication other articles from teachers of arithmetic dealing with any phase of the subject.—Editor's Note)

Principal R. L. Paschal of the Fort Worth High School has recently written an article on the teaching of arithmetic which first appeared in the *Dallas News* and in the November, 1922, . *Interscholastic Leaguer*. The teaching of arithmetic is in such wretched condition, that Principal Paschal's article shines like a good deed in a naughty world, advocating as he does, a very desirable reform.

It seems therefore, worthwhile to expound a little more explicitly what I take to be his view.

The chain of reasoning that leads to the solution of any problem in arithmetic is at bottom algebraic and the way to solve the problem invariably appears as an algebraic formula. The cost of 2 chickens at 75 cents each is reached so far as the reasoning is concerned by means of the formula $C = np$ where C is the cost, n the number of chickens, p the price of an individual chicken. More complicated problems of course lead to more complicated formulas, for example the formula $P = A (R^n - 1) / (R^n (R - 1))$, which gives the present value P of an annuity A which is to run for n years, $(R - 1)$ being the rate of interest.

Principal Paschal's point is this — to make use only of simple problems requiring simple formulas during the earlier school years, but to drill thoroughly in the arithmetic that arises when particular numbers replace the letters in the algebraic formula. Drill and yet more drill is his idea until the child can substitute rapidly and accurately in formulas, that is, until he can add, subtract, multiply and divide with speed and precision.

The truth is that this is all there is to arithmetic. There are no principles of arithmetic, no different kinds of *arithmetic*. There is in ordinary arithmetic, only addition, subtraction, multiplication and division, only these and nothing more as the Raven said, only beans for supper and breakfast and dinner as the Confederates had in the Civil War.

In algebra, on the contrary, there is great variety, all sorts of different problems call for solution and the algebraist is often forced to invent new algebraic methods in order to reach solutions. It is, let me add, not quite fair to call every hard problem a puzzle. Newton and Gauss and Poincare were not puzzle solvers but explorers of the unknown using algebra as a torch in the darkness. When the problem is solved, however hard it was to solve it, the result is always a formula whenever there is a numerical application. Putting numbers for the letters brings us back to arithmetic, to numerical addition and subtraction and multiplication and division.

It comes to this, therefore: in the early years, deal only with simple problems and their solution formulas, but drill in the numerical application of the formulas until the youngsters can perform the four arithmetic operations with speed and accuracy. Then begin algebra, after its particular technique has been a little learned, solve some problems a little more complicated, arriving at a little more complicated formulas. But don't forget to continue the arithmetic drill, keeping the children "fit" arithmetically by frequent numerical substitutions in the new formulas. How complicated the problems eventually solved algebraically in the high school may become is of course a question of how much algebra may be taught in the high school in the time allowed and of how much time ought to be allowed.

Since many of the secrets of the Universe are hidden behind algebraic formulas I don't believe that one can really love God and really hate algebra at the same time.

>>> Note: I could not find the November, 1922 Leaguer or any Leaguers from September, 1923 to August, 1926.

*** SEPTEMBER, 1926 ... **THE THREE-R CONTEST** is open only to contestants from one- and two-teacher rural schools. It is a contest in three subjects: reading, writing, and arithmetic. The reading event tests the pupil's ability in speed and comprehension. The writing event is judged by the Ayers Writing Scale. And, the arithmetic contest involves speed and accuracy in the four fundamental operations: addition, subtraction, multiplication, and division. It will be a

matter of determining which contestant can in a given time do the most "sums" and make the fewest mistakes.

The general rules governing this contest are printed on page 43 of the Constitution and Rules, Bulletin No. 2622. The more specific rules for this contest are being printed in a separate folder, which will be ready for distribution by November 1. It is unnecessary, however, to delay training for this contest until that time..

--- Three-R Contest - In the schedule of points to be awarded at the County Meet published on page 20 of the Constitution and Rules (Bulletin No. 2622) there is an obvious misprint in points awarded for second place in the Three-R contest. Instead of reading "15," it should read "10," and all county committees should see that this error is corrected in the schedule by which they compute county championships.

*** 1926 ... **"Developing Number Sense"** No. 2638, 30 pages, 10 cents.

Written by John W. Calhoun. Professor of Applied Mathematics, University of Texas.

This bulletin is an enlargement of the bulletin issued by the League under the same title in 1925. It contains directions to the teacher and to the student for developing "number sense," that is, an ability to quickly solve arithmetical problems, with a fair degree of accuracy without the use of pencil or paper. It is old-fashioned "mental" arithmetic systematically presented. This bulletin is used as a basis for county contests in arithmetic. It contains more than a thousand test-problems from which list the problems at the county meets will be selected. One free copy is available for each member-school expecting to enter the arithmetic contest. Extra copies 10 cents apiece, 75 cents per dozen, \$5 per 100. (see appendix)

*** JANUARY, 1927 ... NOTICE was given in the Official Notice column of the November LEAGUER concerning the representation in the regular county arithmetic contest. This, of course, is not to be confused with the arithmetic contest which is a part of the Three-R contest. It is entirely, distinct. Judging from the number of letters received concerning "Representation in Arithmetic" within the past two weeks, we feel that many readers are passing up the Official Notice column. The notice follows: Through an error, the paragraph entitled "Representation" was omitted from the rules governing the regular county arithmetic occurring on pages 41 and 42 of the Constitution and Rules, Bulletin No. 2622. Representation in this event is the same as that provided last year, and is identical with representation provided in Music Memory, for which See Rule 3, page 36, Constitution and Rules, Bulletin No. 2622.

*** MARCH, 1927 ...

Question: In the manner described for the determining of the beginning point in arithmetic, suppose that number drawn for the beginning point should be the last number (1180), then should the contestant work backward from this number? Should they draw, say, No. 1170, should they continue forward until the last number is solved and then go back to the first problem or beginning at 1170, and then to 1171, etc.?

Answer: Work on to the end of the list of problems, and then turn back to Problem No. 1 and continue until time is up.

Question: In Bulletin No. 2622 it states to write the problem and give solution on blackboard and this may be done in the final contest before visitors, while Bulletin No. 2638, "Developing Number Sense," states to not write the problem, but give the number of the problem and the answer. Does Bulletin No. 2638 have reference to the preliminary contest, and Bulletin No. 2622 have reference to the final contest?

Answer: You have correct interpretation.

Question: Is a team determined before the final contest?

Answer: Yes.

***** APRIL, 1927 ... TRAINING NEEDIN "NUMBER SENSE"**

Questions Raised About Problem No. 21 Demonstrates This, Says Author

WE REFERRED a letter of inquiry concerning problem 21 of "Number Sense" to Prof. John W. Calhoun, author of the bulletin. The problem is stated as follows:

"A man bought goods for \$3.82, sold them, and lost 100 per cent. What did he get for the goods?"

The inquirer 'lowed he'd like to know how one could "sell" anything for nothing.

Professor Calhoun replied to the League office not with asperity but with firmness and conviction as follows:

Nothing could better illustrate the lack of a development of "number sense" among the school teachers of the State than the questions that have arisen on account of this problem in which a man sold goods at a loss of 100 per cent. The fact that people are confused about the selling price shows clearly the effect of having been brought up on and nourished by problems that had nice smooth answers of some sort that could be gotten mechanically, but when you get round to a question of using the word sold and then it appears that the price received had no financial value, the average school teacher immediately scents something wrong and is entirely unwilling to rely upon plain judgment and simple sense of the problem. I regard it as very fortunate that this problem was included in the list. It would be hard to point out a better illustration of the need of doing just what this little bulletin is trying to encourage people to do.

***** SEPTEMBER, 1927 ... Praises Arithmetic Bulletin**

Mrs. W. L. Billingsley, teacher of arithmetic, Masonic Home and School, Fort Worth: Please send the bulletin, "Developing Number Sense," as soon as it is available. I have never found anything that is as good as the plan laid out in these bulletins for developing number sense. I used it in all of my classes last year and find it very helpful. Am very anxious to get the new bulletin.

***** NOVEMBER, 1928 ... PRACTICE TEST-SHEETS** are available from the League office for teachers who are preparing pupils for the Three-R contest. It will be found desirable to accustom your pupils to the use of the test-sheets before the county meet. In the Number Sense contest, also, we shall prepare and have for distribution practice test-sheets, although these are not yet ready.

Arithmetic Contest

Attention is called to the rather radical change this year in the regular county arithmetic contests, instead of using the text, "Developing Number Sense," as a source for the contest problems, the contest problems will be furnished by the State Office. The problems furnished will be of the same general nature as those confined in the Number Sense bulletin. Note, too, that contestants will not be allowed to use pencil and paper in solving the problems. Under the current rules, it will be found that the contest will test the students' power in "mental arithmetic."

***** FEBRUARY, 1929 ... NUMBER-SENSE TESTS**

A SAMPLE Number-Sense Test Sheet will be mailed free of charge to any teacher who is preparing pupils for the Number-Sense Contest. This sheet contains fifty number sense problems and the time limit on it is ten minutes. The pupil who solves most problems correctly in ten minutes, and has fewest penalties for skipping, wins the contest. You will want to try these sheets out on your pupils before the county meet. In quantities, we are able to furnish them for 10 cents per dozen, or 75 cents per hundred.

NUMBER-SENSE TEST-SHEET'S are now available, and those teachers who wish to try out their pupils with tests of the same nature as those which will be furnished for the regular county contest may do so. Fifty problems are printed on this sheet, and it is believed they will keep the amateur lightning-calculators busy for the ten-minute period allotted to the test. In ordering, please be careful to distinguish them from the Arithmetic Test-sheets issued in the Three-R contest, by specifying "Number-sense Test-Sheet A." A set of answers goes with each order. These sheets are sold for one cent apiece, ten cents per dozen, seventy-five cents per hundred.

***** OCTOBER, 1929**

PHENOMENAL growth of the number-sense contest has been observed this year. No statistics have been collected on the number entering this event, but judging from the demand for the number-sense bulletin and for test-sheets, the use of this contest has become quite general over the state. Three editions, or fifty thousand copies, of the bulletin were ordered by member-schools, and forty thousand copies of practice test-sheets were distributed.

Coaching "Number Sense"

JUDGED by the performance of her contestants in the Williamson county Meet, Mrs. C. A. Waddill of the Taylor public schools is one of the best "number sense" coaches in the State. We asked her, therefore, to prepare in one-two-three order suggestions for other arithmetic teachers. She replied as follows:

General

1. Emphasis on accuracy and speed throughout the year.
2. Individual ability and work is noted from beginning of school for possible contestants.

First Term

1. Drills on fundamental operations.
2. Test by graphs made in class.
3. Learn the multiplication table to 25. Use every available minute for drill.
4. Learn and practice all rules of short methods of multiplication and division.
5. Learn and practice at least forty aliquot parts.
6. Learn formulas for finding the three cases of percentage.

7. Drills in finding third case if any two are given.
8. Practice carefully the applications of percentage to Profit, Loss, Commission, Discount, Interest.

Second Term

1. Select team immediately after mid-term examination.
2. I permit all eligible volunteers to enter the contest but I always include a number of those who not only have the ability, but are willing workers.
3. After final elimination, I keep an extra pupil on team, in case of sickness or accident.
4. I attempt in every way possible to keep them in happy state of mind, as this is conducive to best work.
5. I drill again with fundamentals *intensively*, at least twice a day, from 7 to 8:30 a.m., and 3:30 to 5 p.m.
6. The last-few weeks, four or five, I drill exactly as the final contest will be conducted.
7. I keep their record daily, to note improvement in speed and accuracy, endeavoring to correct their weaknesses as they become apparent.
8. There is no intrusion on regular school work or time.

*** DECEMBER, 1929 ... **NUMBER SENSE** test-sheets meeting the new requirement for a ten-minute test are now available at one cent per copy. Each test-sheet contains one hundred number-sense problems, and a key is furnished with each order. If you want the new sheets, ask for Series 30. There are ten different tests in this series, the first of which will be sold for practice purposes and the remaining five issued to county meets. Last year the tests were of five minutes duration, and test-sheets so-far distributed this year have been of this length. However, many teachers expressed the opinion that a test of five minutes duration is not long enough to test the speed and accuracy of contestants in number-sense and hence longer tests have been prepared for use this year. It will-be well for those ordering test-sheets to specify Series 30 and start with Test A.

*** MARCH, 1930 ... **Number Sense**

Exact answers in the number-sense contest are required in simple additions and subtractions, and also in other problems the exact answers to which may be readily seen. The key by which the test is judged is final authority, except, of course, in cases where the key is in error. We think few misprints -will be found in the keys

*** OCTOBER, 1930 ... **THE NUMEBER SENSE** bulletin has been enlarged this year by the addition of about one hundred problems. This little bulletin has proved to be very helpful in coaching pupils for the Number Sense contest. New sample tests are being prepared, although the old tests are good for schools that have not yet used them.

*** FEBRUARY, 1931 ... **ARITHMETIC** teachers who are coaching pupils for taking part in the Number Sense contest will do well to note that the short methods for multiplying and dividing by aliquot parts of 100 may be found in the state-adopted text for the sixth grade (*The*

Stone Arithmetic) on pages 9, 10 and 13, and will serve well in preparing pupils for this contest. On pages 61 and 70 will be found treatment of the use of aliquot parts in working problems in percentage. These short methods of computation prepare pupils not only for successful competition in the Number Sense contest but for meeting practical situations in every-day life.

***** MARCH, 1931 ... Number-Sense Grading**

A key is furnished graders, and all papers are graded by the key. A problem, the exact answer to which is readily discernible, requires the exact answer. Answers to others may vary as much as 5 per cent either way. The contestant is instructed in the test-sheet to put down the exact answer if he can otherwise to approximate it as closely as possible.

***** JANUARY, 1932 ... Number-Sense Grading**

We give question and answer concerning grading of "Number-sense Tests:"

Question: In the rules governing the "Arithmetic" contest it is not clear to me what is considered an unsolved problem. If the contestant solved correctly the first five problems and skipped the remainder of them I take it that he would make the same score as the contestant who skipped the first problems and solved correctly the last five on the list. Am I correct in this assumption?

Answer: Those problems occurring after the last "problem solved or attempted are not considered "skipped;" only those occurring above or before the last problem solved or attempted are considered "skipped." Those problems which the contestant does not attempt or solve following the last problem which he attempts or solves are not considered at all.

In the first example you furnish the contestant would make a grade of 25, there being no deductions; but in the second example, while the contestant's *gross* grade would be the same (25) his paper is subject to deductions of 5 x 95 for the 95 problems which he skipped, or 475, making his net grade minus 450. This rule works against the pupil who skip around trying to find easy problems and forces him to take the problems as they come.

***** MARCH, 1932 ... Suggestions for County Officers in Conducting Events of Meet.
ARITHMETIC**

Furnish your Director General accurate estimate of number of number-sense test sheets required. He should have them on hand if given proper advance notice. Don't break seal on envelope until ready to begin contest. See that sheets are numbered to correspond to names of contestants. Do accurate timing. Grade papers by keys. Be careful to avoid any confusion that tends to excite contestants.

*** FEBRUARY, 1933 ...



Santa Anna Arithmetic Teams Win 7 County Championships

Front row, left to right:

1932 team Jeanne A Verner and Emma John Biake;

1931 team Bess Inez Shield, Dosh T. McCreary, and Eddie Vaughn Mills.

Middle row, left to right:

1929 team Ruth Niell and John David Harper;

1930 team Clifford Wheeler, Edwin Niell and Clifford Oder.

Back row, left to right:

Mrs. Chas W. Evans, teacher and coach for all teams, ,Eddie Paul Voss, member of 1926 and 1927 teams; 1928 team Carl Flores, Woodrow Niell, and Emmett Stiles. Absent from 1926 team: Buster Turner and Afton Pieratt. Absent from 1927 team: Irene McCreary and Wilburn DuBois, Jr. Absent from 1930 team: Freda Brusenhan. Absent from 1929 team: Deggs Traylor.

SEVEN YEARS consecutive championships in "Number Sense" contests is the remarkable record of the seventh graders of the Santa Anna Elementary School. J. C. Scarborough, superintendent of the Santa Anna schools, took the trouble to get the above group together, although some of them have already been graduated from high school. He couldn't get all members of championship team's together, but he secured a goodly portion of them. It will be noted that there are three Neills in the group. These Neills are all from the same family, and this might be a note of interest for students of heredity. Number Sense" seems to "run in the family." Mrs. Charles W. Evans, whose picture appears in the group, left end of back row, has taught and coached each of these teams. Mrs. Evans says that preparing the pupils for the arithmetic contest is a simple task. "They use the booklet 'Developing Number Sense' and all the test sheets available. The key to the undertaking is *work*, and the pupils enter into it whole-heartedly and enthusiastically since they have been habituated to plenty of work in our school."

*** MARCH. 1933 ... **Official Notice: Number Sense**

In the test-sheets issued for county contests those problems requiring exact answers will be starred. Others, that is, those not starred, will be graded correct if the answer given is within five per cent of the exact answer.

(Note. Correction: In the test-sheets issued for county contests those problems requiring only approximate answers will be starred. Others, that is, those not starred, require exact answers. New tests now available for practice.)

***** APRIL, 1933 ... Taylor Catches Up With Santa Anna On Arithmetic Winnings**

The Taylor seventh grade, which claims some distinction in arithmetic (number sense), congratulates Santa Anna on seven consecutive arithmetic championships, recorded in February issue of the Leaguer, and reports at the close of the Williamson County meet this year that it, also, now has seven consecutive championships. Mrs. C. A. Waddill, seventh grade arithmetic teacher of the Taylor schools: "I am now ready to hear from Santa Anna. Note that this is our seventh victory also. Our team this year consisted of two girls: Edith Mae Hawkins, who scored 285 in the county meet, and Hertha Tschoerner, who scored 310; team grade, 297 ½.

***** SEPTEMBER, 1933 ...**



Bobbie Woodham (left) and Weldon Ashworth established a new state record in Interscholastic League arithmetic contests when they made a team score of 372 at the county meet held here recently. Bobbie's individual score, 400, also sets a new state record for individuals. The arithmetic contest was won by French school for the fourth consecutive year. Bobbie was also winner in the essay contest.

Taylor, Santa Anna, and French (Jefferson County) seem to be the outstanding "number-sense" schools in the State, so far as records reported to the State Office of the League are concerned. The trouble with comparative scores from different counties is that identical tests are not used. One test may be easier than another, and conditions under which tests are given are not always the same. So far as the number of county championships is concerned, this criterion is also faulty, for the reason that competition in one county may be strong and in another weak. Clipping from a Beaumont paper of March 30, last, the following account indicates high accomplishment of French Independent school team:

"Establishing a new state record for high score arithmetic contests conducted by the interscholastic league, French grade school team won first in the Jefferson County meet with a team score of 372, according to announcement yesterday of W. H. Randolph of China, director of arithmetic in the contest.

"Last year the highest score made in the state was 340, the honor going to a seventh grade team from Taylor. "French school team was composed of Bobbie Woodham, son of Mr. and Mrs. R. E. Woodham, 525 Prince street, whose individual record was 400, setting a new state record for individual; and Weldon Ashworth, son of Mrs. Myrtle Ashworth, 3165 Magnolia avenue, with 345. Both were seventh grade students coached by Miss Katherine Bailey. "In the contest, pupils are given 100 problems to solve in 10 minutes. All work is mental and the contestants are not allowed to use paper in working out their solutions, except for writing the answer. "Second place went to Edwards school with a team score of 245. The team was composed of Robert Gary, Jr., son of Mr. and Mrs. R. W. Gary, 1833 Broadway, and Mary Spencer, daughter of Mr. and Mrs. Don A. Spencer, 760 Riverside. Port Neches placed third scoring 162. Lorraine Winters and M. S. Moore composed the team."

*** DECEMBER, 1933 ...



Denison Number Sense Team Sets High Mark in 1933 Meet

Helen Louise McDaniel and Louis Henry of Denison, composing the Central Ward Arithmetic Team, made a score in the District Meet of the Interscholastic League at Paris (1933) of 405. Helen Louise McDaniel made an individual score of 410 and Louis Henry 400. This team won first place and made an individual score of 410 and 370 respectively at the County Meet in Sherman in the same year.

*** January, 1934 ...



Winning Arithmetic Team of Merkel Grammar School

Sylvan Mellinger (left) and Robert Grimes

This was the sixth consecutive county championships in the Number Sense contest. Mrs. Len Sublett, principal, said Sylvan Mellinger is the third and last of the Mellinger family who have finished grammar school here and all of them have been members of winning Number Sense teams. .

*** March, 1934 ...

ARITHMETIC: Furnish your director general accurate estimate of number of number-sense test sheets required. He should have them on hand if given proper advance notice. Don't break the seal on the envelope until ready to begin contest. See that sheets are numbered to correspond to name of contestants. Do accurate timing. Grade papers by keys. Be careful to avoid any confusion that tends to excite contestants.

THREE-R CONTEST: Furnish director general in advance an estimate of number of sheets necessary. Number sheets to correspond to names of contestants. Be sure to get post office and name of school of each contestant. It should not take longer than one hour to hold this contest. Give a short rest period between the events. Have graders ready to grade results immediately.

*** September, 1934 ... THE WIDE USE of the Number Sense contest for the seventh grades is attested by the fact that county meet reports show that 2,400 contestants were entered in this contest in the various county meets held last spring. Someone has suggested a simpler or less difficult contest for the fifth grade in number sense. Such a contest might be undertaken if it is in sufficient demand as a motivation for number sense work in the fifth grade.

TEST-SHEET CLEARANCE SALE

Number-Sense

Number-sense test sheets issued in 1930, 1931, and 1932, each sheet containing 100 problems with key, are available as follows:

A, C, D, I, J 1930

A, C, D, F, G, H, I, J 1931

A, B, D, E, F, G 1932

Twenty copies of any one of these tests with key, ten cents, **as long as they last**. Postage stamps not accepted.

Address Interscholastic League,
P. O. Box 1930, University Station,
Austin, Texas.

*** January, 1935 ... The county superintendent of Anderson county reports the organization of and Interscholastic League for Negro schools in that county with virtually all the Negro schools members. The Negro County leagues us spelling lists, number sense bulletins, debate bulletins, etc. issued by the Bureau of Public School Interests.

*** April, 1935 ... E. O. Rogers, of Waxahachie, believes in the Number Sense test sheets. He says "I have use the 300 that I ordered last fall. I want to have some to carry over and begin to train my sixth grade. These sheets have put more pep in my classes than anything I have ever used. The average score for the class has increased from 20 to about 200.

***** October, 1935 ... Trail Blazers: Number Sense Contest**

The Interscholastic League presented the first organized effort to correct the too widely prevailing over emphasis placed on written calculations in arithmetic at the very regrettable neglect of mental arithmetic. The life situations which call for pencil and paper computations are comparatively few, while the demands for rapid mental calculations are numerous indeed. About ten years ago the League sought to correct this deficiency and organized and sponsored the arithmetic contest, calling for rapid mental solutions of problems of a very practical nature. Teachers who have coached pupils for this contest will recall with what uncanny accuracy and astounding speed children learned to solve difficult problems without benefit of pencil and paper.

Just what place mental arithmetic will find in the new curriculum remains yet to be seen. But, teachers familiar with the more practical skills presented in the arithmetic contest will agree that the League took the first step in the right direction.

*** October, 1935 ... The "Number Sense" contest is really more original. In the November issue of the LEAGUER (1922) appeared a letter from R L Paschal of Fort Worth, clipped from the *Dallas News*, in which the shortcomings of the arithmetic texts were sharply criticized. The December issue contained; an article by Professor John W. Calhoun entitled, "What Constitutes Good Arithmetic," concluding as follows:

"Let us strive for speed, accuracy, number sense, and they are listed in climacteric, order." In the January (1923) issue, Dr. H. Y. Benedict, now President of The University of Texas, contributed an article differentiating arithmetic from algebra. The upshot of the discussion was the introduction of the "number sense" contest based upon a bulletin which Professor Calhoun was prevailed upon to prepare, and which is still in use, some half a million copies having been distributed in the meantime, to say nothing of two or-three million test-sheets based upon" the bulletin.

Three-R Contest

Rule 2, page 60 -- Two entries per school allowed.

Rule 5, page 60 -- Provides change in grading to avoid ties.

*** November, 1935 ... **Number Sense**

Only seventh graders are eligible in Number Sense. Paragraph 2, page 59, prescribes the same numerical method of representation as is used in Music Memory, but does not include the same grades that are eligible in Music Memory. Rule 3 clearly states that only seventh graders are eligible.

*** December, 1935 ... **Three-R Test-sheets**

Reading and arithmetic test-sheets for familiarizing contestants with the nature of the tests in the Three-R contests and for giving practice tests. These are published in different series (A, B, C, etc.). After a given school has tested its pupils with copies of one series, it should order tests in another series which contain different material, and so on. The sheets are sent prepaid to any address in Texas for one cent per sheet. No order filled for less than ten sheets. In ordering be careful to specify which series, if any, you have already used in your school this year.

*** April, 1936 ... Some complaint comes from arithmetic teachers occasionally concerning the difficulty of the Number Sense tests furnished the county meets. "The test you sent our county last year was too difficult," says one teacher. "my team had been making as high as 180 on the practice tests, while at the county meet my team and our opponents made negative scores. The average seventh-grade pupil is now younger and it discourages them if the tests are too difficult." We are always glad to have suggestions of the nature. It is quite true that the Number Sense tests are of uneven difficulty, in spite of all our efforts to keep them uniform. However, no teacher should expect a seventh-grade youngster to do as well under the excitement of county competition as in practice tests. A deal of art is necessary to keep young pupils from becoming unduly nervous and excited. It takes a cool and calm head to solve mathematical problems quickly and accurately. Perhaps more depends on mental attitude in this contest other than in any other.

*** September 1936 ... **"Number Sense is Best Event Yet"**

Ward School Principal Says It Makes School "Arithmetic Conscious"

(by Jack Rogers, Principal, Bogata Ward School)

I noticed an article in the April Leaguer criticizing the arithmetic tests. I'll agree with this teacher on one point. Last year the tests were harder than the practice tests sent out. Our county last year had only two positive scores, the highest, from this school, being 67 1/2 and the second highest was 2 1/2. All the others were negative.

Valuable Contest

In spite of this I think the arithmetic contest is one of the most valuable of all the contests if handled and promoted from the right standpoint. I have no criticism at all to offer. In a recent letter, in answer to one of mine in regard to scores on this year's tests, you asked if 10 minutes was a sufficient length of time for the test. In my opinion it is. In fact I think the tests and contests are perfect, except for the occasional errors in the keys. It is only natural for all tests not to be of the same difficulty. I can't and I'd like to see one who can.

6th Graders Want It

More arithmetic consciousness have been built up in our school in this contest than could be built up by any other similar movement. Our present sixth graders already want to get in on the material we used in the seventh grade this year, and they all want to be on the arithmetic team. They not only want to be, but are willing to put out the effort and work necessary to get there. It will just be a case of the best man winning, for all work equally hard the preparation necessary.

*** October, 1936 ... **Three-R Arithmetic**

Rule 4 of the Three-R Folder (Bulletin No. 2639) has been altered to read as follows:

"The contestant shall take the problems in their regular order beginning in the upper left-hand corner of the test-sheet, and proceeding left to right, back and forth across the page, in the same order as one reads ordinary printed matter."

"The graders shall credit the contestant with five points for each problem correctly solved, and deduct five points for each problem either skipped or missed. The term 'skipped' shall not apply to any problem occurring after the last one solved or attempted."

"Example: Suppose test-sheet contains 18 problems. Last problem attempted is fifteenth. Nine are correctly solved, two are skipped, four are missed. Credit 45 points for nine correctly solved, deduct 10 points for two problems skipped, deduct 20 points for four problems missed, net score, 15."

*** January, 1937 ... Only seventh graders are eligible in the number sense contest. Note that there is a special division for rural schools, hence no rural pupil has to compete with the ward school pupils.

*** April, 1937 ... "I am inclosing the League Number Sense test sheets, series 37, of our two county contestants," writes John C. Marr, superintendent of Gulf schools. A Mexican boy, Edmond Sanchez, thirteen years old, made the score of 330. Ralph Callihan made the score of either 215 or 205. "I believe these scores are unusually high --- at least they are the highest ever made in this county. Please notify me if they are high for the state. If either or both of the boys

have set any kind of a record, I will be glad to cooperate with the League in making an announcement in the Leaguer. The boys were coached by Mr. E. J. Myers."

***** March, 1937 ... 3-R Winner 1935 Meet Now Pupil Cooper High**



Harold Nell Walker representing Cross Roads Rural School, who won second place in the Three-R contest in 1935 is now a senior in Cooper High School. Her name appears on the honor roll and she is listed with the "Humor and Feature Writers" on the staff of the high school paper.

***** September, 1937 ... Runs in the Family --**

Dusek and Two Schlakes, Three Cousins Strong in League Contests

Three cousins made winning the rural division of the Region 2, University Interscholastic League meet at Abilene last April a family affair. They are Ralph Dusek, winner of junior boys' declamation; Cleo Schlake, junior girls' declamation; and Leona Schlake, senior girls' declamation. Leona was third in the State Meet Saturday.

Young Dusek, 11, placed first in four literary events in county meet in addition to being a member of the winning team in junior track. First in number sense contests, he had a grade of 240, one of the highest ever scored in the county, and his spelling contest paper graded 100. He was also winner in the Three "R" and junior boys' declamation contests. In the district meet at San Angelo he placed second in the Three "R" and first in declamation.

He is the son of John J. Dusek of Lowake.

Cleo Schlake's extracurricular activities have extended over a period of years. Last term she was a member of the winning number sense team and she has won the state certificate for perfect papers in each of the three spelling divisions and the state award for a perfect paper in music appreciation.

Representing the Lowake school in declamation for five years, Leona Schlake has come home winner five times in the county meet and four times in the district meet. Other than this work, she has been active in the choral club and received a state award for a perfect music appreciation paper.

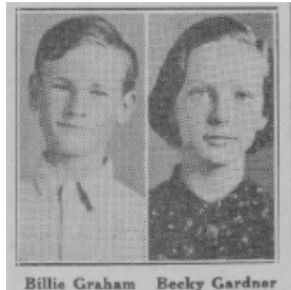
The Schlake girls are daughters of Mr. and Mrs. B. H. Schlake of Lowake.

Jessie N. Yarbrough is principal of the Lowake school. --- San Angelo *Morning Times*.

***** October, 1937 ... Letter Box and Personal Items**

We propose the Sunshine School Number Sense team of Wichita County for the honor roll on basis of the following information: Lou Ella Beck and Asia McDaniel made a total score of 745 points or a team grade of 375 1/2 points. Lou Ella Beck, age 12, made a score of 445 points and Asia McDaniel, age 13, made 300 points.

***** October, 1937 ... Straight Wins in Number Sense for Merkel Grammer**



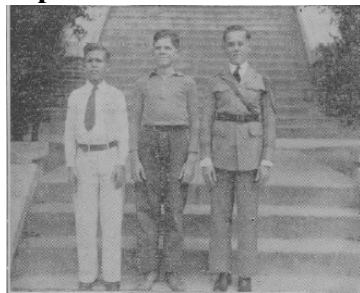
Writes Mrs. Len Sublett, Merkel Grammer School:

Becky Gardner and Billie Graham compose my tenth consecutive Number Sense team to win the Taylor County Contest.

Becky Gardner is the daughter of Dr. C. B. Gardner and is twelve years old. She was valedictorian of our seventh grade class with an average of 96.4. She was neither tardy nor absent during the entire school year and was on the honor roll for each grade period during the year. She was also a member of our Interscholastic League Choral Club and of the girls' playground ball team. She is very gifted in music and is a Girl Scout.

Billie Graham who is thirteen years of age is the son of E. B. Graham. Billie is a typical freckled-face country boy. He is not the star pupil that Becky is, but seems to be especially good in arithmetic (number sense). He was a member of our boys' playground ball team.

***** November, 1937 ... Champion "Number Sense" in 1937 Falls Co. Meet**



Marlin Elementary School has won the "Number Sense" contest nine times in a row. The above picture was made available for publication here through the courtesy of the Marlin "Democrat" and the engraver, Roy Eddins. Left to Right --- Warren Wolf, John Peevey and Jack Owen. The team, coached by Mrs. A. C. Dunn, made the highest score ever made in the county. Jack Owen won high score of the three and was awarded the B. C. Bratton Memorial Prize, a memorial to B. C. Jr., who was an outstanding member of his team in other days.

***** September, 1938 ...**



Mary Belle Stoltzfus and Idella Nelson won the 1938 Bee County Championship in the Number Sense contest.

*** October, 1938 ... **Developing Number Sense (1938), No. 3827, 32 pages, 10 cents.**

Written by John W. Calhoun, Professor of Applied Mathematics, The University of Texas. This bulletin is an enlargement of the bulletin issued by the League under the same title in 1925. It contains directions to the teacher and to the student for developing "number sense", that is, an ability to solve quickly arithmetical problems with a fair degree of accuracy without the use of pencil or paper. It is old-fashioned "mental" arithmetic systematically presented. This bulletin is used as a basis for county contests in arithmetic. It contains more than a thousand problems. One free copy to each member-school expecting to enter the arithmetic contest. Extra copies, ten cents a piece, fifty cents per dozen, \$3 per 100.

*** March, 1939 ... **How to Teach Number Sense**

This is the title of a new bulletin now available for distribution from the League State Office for twenty-five cents per copy. The author of the bulletin, Mrs. C. A. Wadill, has had years of successful experience teaching seventh graders number sense. It is intended as a help for the teacher giving many practical suggestions and devices for presenting the subject.

*** April, 1939 ... **Number Sense Team**

We are a two-teacher rural school with about fifty enrolled. We attempt to teach through the ninth grade, but this year we do not have a single pupil in the seventh grade. Now the footnote on page 62 of the 1939 Interscholastic League Bulletin states, "In case a school has only one pupil in the seventh grade, the team may be completed by a pupil from the next lower grade." It appears to me that it is understood to follow that in case there is no seventh grade enrolled in the school, a team may be chosen from the next lower grade. I contend that this footnote was inserted to assist such rural schools as our own in giving us a fighting chance at the All-round Championship."

How would you answer this?

We think, that by implication, at least, the rule permits under the conditions stated, a team of two from the lower grade.

*** December, 1939 ... **3-R Group Assembled for 1939 State Meet**

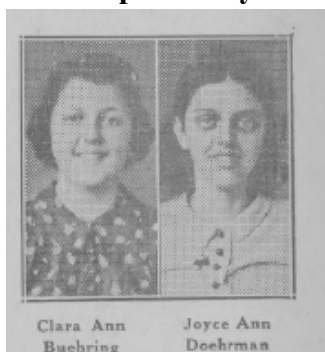


FRONT ROW (left to right): Mattie Ellen Hand, Cross Springs School, Jacksonville; Jeannette Freasler, Mikaska School, Mikaska; Dorrace Dunsiney, Riverside School, Riverside; Mary Nan Smithbart, Algerita School, Algerita; Mary Helen Mickey, Sand Hill School, Floydada; Bobby Lou Vincent, Cross Roads School, Hughes Springs; Jean Britten, Yarrulten School, Cameron.
MIDDLE ROW (left to right): Leon Quisenberry, Friendship School, Quanah; Genevieve School, Smithson Valley School, New Braunfels; Helen Shawcross, Laguna School, Laguna; Rosalee Peveto, Bancroft School, Orange; Rosalind Gillespie, Mt. Joy School, Cooper; Imogene Standefer, Leonora School, Stanton; Faye Gale, Ramadell School, Shamrock; Roland Hill, Moravia School, Schulenburg.
BACK ROW (left to right): Doris Kelley, Riverland School, Henrietta; Denny Brisson, Tulgar School, Cooper; Mary Louise Piek, Middle Well School, Channing; Rosie Morgan, Sebula School, Van Alstyne; Ardie Blomquist, Cadillac School, Kennedy; Fannie Carter, Balch School, Weatherford; Erdene Reynolds, Loyd Mountain School, Hermleigh; Martha Ellen Winkler, Evergreen School, Llano; Ellen Smyth, Post Oak School, Lenders.

Each of the pupils in the above group first qualified by winning in the local school, next in the county meet, and finally in the district meet.

The State contest was won by Roland Hill, Moravia School, Schulenberg. Second place was won by Mary Helen Mickey, Sand Hill School, Floydada. Third place went to Mary Nan Smithhart, of Algerita School, Algerita.

*** September, 1940 ... **Distinguished Pupils of Myersville School**



Clara Ann and Joyce Ann have been a winning Spelling team for four successive years --- two years in the 4th-5th grade division and two years in the 6th-7th grade division. In the past year Clara Ann did not enter Spelling, but Joyce Ann together with Virgie Ideas were again a winning team. This time in the 8th grade and above division.

Besides the spelling, Joyce Ann has been on two winning Picture Memory teams, made a perfect paper in Music Memory, and has been a member of the Choral Club and Volleyball team for the past year. Clara Ann has been on a winning Picture Memory team, on a winning Number Sense team, took a second and a third place in Junior Girls' Declamation, a third in 3-R, has been on the Volleyball team for two years and on the Choral Club for one year. She was a member of a Music Memory which placed second. Both students have excellent grades in the school work and have led their classes throughout their entire school work.

*** September, 1940 ...

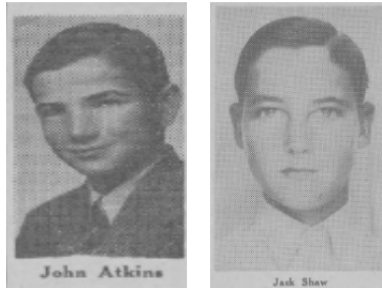
Speaking comparatively of the various programs of state high school leagues, Charles E. Forsythe, State Director of the Michigan High School Athletic Association, says in a book recently published:

"Texas is the most inclusive in its program, and it holds contests annually in the following activities: Baseball, Basketball, Choral Singing, Debating, Declamation, Extemporaneous Speech, Football, Journalism, Music Memory, Number Sense, One-Act Plays, Picture Memory, Playground Ball, Ready Writers, Rural Pentathlon, Shorthand, Spelling and Plain Writing, Story-Telling, Tennis, Three-R, Track and Field, Typewriting, and Volleyball.

As compared with this broad range of activities found in Texas, there are those state associations strictly athletic in nature. Ohio, Louisiana, Michigan, California, Oregon, Wisconsin, Connecticut, Pennsylvania, Oklahoma, and Alabama are examples of the large group. In Minnesota debating and declamation, in addition to athletics, are under the supervision of the state high school league. Nebraska calls its organization an activities association, and it embraces declamatory, one-act play, debate, music, and commercial contests as well as athletics in its

activities. Kansas has just recently become an activities association; and, in addition to athletics, it directs contests in music, forensics, and debate. The activities of these three state associations, as well as that of Texas, are examples of a type of service rendered to their schools which seems destined to receive more attention from other states in the next few years. The states that have adopted this plan have felt that they had the machinery to set up in the athletic associations whereby they could efficiently handle these other activities. There would seem to be logic in the claim; and, provided sectional or state contests in these activities are desired, such organizations may well provide services broader in scope than athletics.

***** September, 1940 ... Team Sets Record in Tom Green County**



The Christoval School has won the Number Sense Contest in Tom Green County consecutively for the past six years. John Atkins has made the highest grade ever recorded in the Tom Green County League meet in the past ten years, and, as far as knowledge obtainable, it is the highest ever in the county. His grade was 175. He is the son of Mr. and Mrs. C. L. Atkins of Christoval. Besides Number Sense he is a member of the baseball team and a declaimer. The other member of the Number Sense team is Jack Shaw. The team average was 115.

Jack won first place in Grammar School Declamation, first in Number Sense with John Atkins as his partner, and third in Ready Writers. He also entered track and field events. School. Clyde R. Nail is the superintendent of the Christoval Schools.

***** April, 1942 ... Callahan County Has Fine County Meet**

From Lee Varner, Supt. Cross Plains:

Enclosed under separate cover are the 100 per cent spelling papers for this county. All necessary information is contained on each paper. Baird won the Picture Memory Contest and is entitled to a certificate denoting such. Send it to Olaf G. South, Superintendent at Baird. Cross Plains won the Number Sense Contest with a score of 94. Send the certificate to Hubert Kelly, Cross Plains. We had a great meet, good crowds, and excellent interest. It is better to have these than to do without a County Meet as it is good for morale.

***** January, 1943 ... Speech Teacher Now in Army Flying School**

The following letter comes from John W. Watson, formerly in Speech Department of Texas Tech.

1. Many times in the past I have found myself in need and have called upon you and now, when I am in a situation where I have not one right in the world to call upon you, I find myself doing just that.

2. Here at the Lubbock Army Flying School I have developed a school for under-privileged men who were denied the opportunity of getting an education when they were youngsters in civilian life. At the present time our Special Training Unit has seven instructors and over 400 men as students. We are instructing in the basic principles of education and the thought came to me that you might be able to provide us with copies of the *Developing Number Sense* and *Spelling List* pamphlets.

3. This would be a helpful favor if your Department can afford to accommodate us. As all poor schools the country over, we have no money to offer to pay. We have the men, but little or no materials except what we are able to pick up in just such methods as these. If we could receive enough of these to use in class and then take up to use in a following class, we would be most grateful. Our classes range in numbers from 20 to 45. Could we have as many as 45 of these lists for use?

4. Good luck to your work and to you. Wars may come and wars may go ... but the need for the Interscholastic League Activity goes on forever. We will be thinking of you when Spring rolls around again and we miss the excitement and the fun of judging in contests.

5. This enclosed envelope is for use in returning the pamphlets to us in case you can spare them.
(signed) John N. Watson, Sgt., Director---Special Training Unit, Special Service Association, L.A.F.S, Lubbock, Texas.

*** February, 1943 ... **League Bulletins in Flying School**

Instructor Finds Number Sense and Spelling List Valuable Helps

From Sgt. John N. Watson, Special Training Unit, Lubbock Army Flying School, who is teaching illiterates, the following much-appreciated commendation:

Your ideas about the use of the Number Sense and the Word Study sheets have been put into operation here. I wish you could see the Negro boys 'shine' on some of the words. We gave each boy of the group, 47 of them, a copy of the word list, clipped into the front their Class Work Books. Honestly, I think that a dollar bill would not have pleased those Black Boys more. We learn ten words at each class meeting and they are slowly learning to spell them. I consider these Word Lists are a means for a scientific approach to learning to spell. Our Commanding Officer is most pleased with the progress his boys are making. He joins me in thanking you for this "swell" co-operation on your part. I notice those pamphlets are each marked as costing five cents. We won't ever be able to pay you for these, as you well knew before you sent them to us, but I feel that one of the finest things in the Interscholastic League has ever done, in the 17 years I have been working with the organization, is to help out in this particular situation and these men will never forget what they are learning through the League's efforts.

We are going to try out the idea of the Inter-Squadron Spelling match just as soon as these poor men learn to spell enough that such an experience won't prove to be an embarrassment to them. Mr. Bedichek you might be astonished to know how little some of these underprivileged men know.

UIL Number Sense Contest

===== The Beginning years Fall, 1943 – Spring, 1946 =====

INTERSCHOLASTIC LEAGUER - Vol. XXVII, December 1943, No. 4

" In CASTING about for a contest in mathematics especially suitable for wartime, we engaged in much correspondence and in many conferences with teachers of mathematics both in college and in high school. We also got opinions from instructors in the armed forces, especially from those in charge of recent inductees. It developed that the arithmetical drill most needed in the opinion of all was that of handling numbers easily without the use of pencil and paper. In various situations in the armed services, facility of calculating rapidly with at least approximate accuracy was found to be extremely important. Teachers, as a whole, approved of a contest in "number sense" and one in the use of the "slide rule". Many wanted an algebra or a geometry contest, but the different years in which these subjects are taught in our school system made the organization of a contest in them impracticable. It was decided to take the contest a little out of the regular curriculum and dramatize by its means the importance of developing a "number sense" and also the use of the slide rule which is as necessary in engineering and in many other military services as an ordinary rule or compass. It was pointed out that these two contests will provide a proper outlet for the time and energy of those pupils who have mathematical talent a little out of the ordinary, and will bring merited awards and distinction to a subject that has been too long neglected. Hence these two contests are duly incorporated in the League's regular schedule, and it is hoped that they will show such promise that further extension of mathematics contest may be justified."

Items of interest 1943-1946

>>> Note: 1943-44 was the beginning of the UIL number sense contest written in the same format as the present day (2022-23) format. The slide rule contest took place this year as well.

>>> Note: Information as to who the state director, contest manager, and/or test writer was in 1943 through 1946 could not be found in the archives. Also, it is assumed that the number sense tests were labeled as the A-series in 1943-44, B-series 1944-45, and C-series 1945-46. Mentioning of the labeling of these tests was not found in the archives.

*** First in First State Number Sense Contest



The first number sense champion in Spring, 1944 was Carrol Trail, a Forney High School student. He was considered an "all-round" boy, who not only had a 93.5 scholarship average, but won second place in declamation in the regional meet, and was on the winning debate team in the district meet. On the athletic side, he lettered in football in his junior year. He was sixteen years old and graduated from Forney High School. His parents, Mr. and Mrs. Neute Trail, resided in Forney.

Note: The 1945 March issue of the UIL LEAGUER, Page 1, Col. 7, erroneously gave Eldon Durrett of Amarillo High School credit with being the first place winner in 1944. Eldon Durrett was the second place winner.

*** "Developing Number Sense" (1945) No. 4526, 32 pages. 10 cents. (See Appendix)

Written by Dr. John W. Calhoun, Professor of Applied Mathematics, The University of Texas. This bulletin is a revision of the bulletin issued by the League under the same title in 1925. It contains directions to the teacher and to the student for developing "number sense," that is, an ability to solve quickly arithmetical problems with a fair degree of accuracy without the use of pencil or paper. It is old-fashioned "mental" arithmetic systematically presented. This bulletin is used as a basis for conference contests in arithmetic. It contains more than a thousand problems. One free copy is available to each member school expecting to enter the arithmetic contest. Extra copies are ten cents each or fifty cents per dozen or \$3.00 per hundred.

*** **THE FIRST EDITION** of "Number Sense" was issued ten years ago, 1935. Prepared by Dr. John W. Calhoun, it met with immediate popularity in the public schools. Originally, it was designed for the seventh grade, equivalent, under the reorganization of public schools in Texas, to the present eighth grade. The revision now in press has increased the scope somewhat, and, while still adaptable to the grades, may be used in high school. Indeed, the contest which it is designed to support is now open to all grades in the high school. It is often pointed out that nine-tenths of the arithmetic used in life situations is mental arithmetic. One does not carry around a deaf-man's pad and pencil to figure out change, or comparative prices of oranges by the dozen with oranges by the basket, nor the number of miles he gets from a gallon of gasoline. "Numbers" is a language, and the development of the "number sense" is an essential part of learning to talk effectively. The new, enlarged and revised edition of "Number Sense" by Dr. Calhoun will be ready for distribution by the time this issue of the Sept. 1945 LEAGUER reaches its readers.

***** March, 1944 ... Number Sense Bulletin Serves 6-week Course**

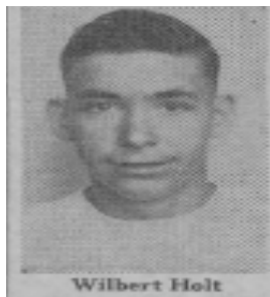
Miss Ruby Adcock, of Sunray, says that she thinks there is no better way of teaching arithmetic than by the methods advised and illustrated in the League "Number Sense" bulletin. "I use it," she says, "as class work for six weeks each year through the seventh and eighth grades, and I plan to use it in my freshman high-school classes also this year."

***** March, 1944 ... Official Notices --- Rule 2, "Number Sense"**

Question is asked whether Rule 2 excludes high schools from this contest. Rule 2 takes care of the few schools that have not yet gone over to the 12-grade system, and applies only to the Grade School Meets.

The high school meet in this contest is not confused in any way by this provision. The second paragraph of Rule 1 permits each high school to enter a team of two in its conference met.

***** December, 1944 ... Wins Distinction in Math and Athletics**



Representing Pyote High School, Wilbert Holt placed third in the Number Sense Contest at the State Meet last May. While maintaining an A average, he has also participated in a number of extra-curricular activities. Honors won in addition to the State award include Junior Class presidency, first place in 880 yard dash in conference meet, and first place in junior tennis at the 1942 county meet. He plans to join the Navy as soon as of age. Parents are Mr. and Mrs. S. J. Holt, Pyote.

***** February, 1945 ... Scholarships**

Let us not forget the scholarships that are awaiting winners in certain League contests in regional and state contests. You will find in Appendix V of the Constitution and Rules detailed offerings from Baylor, Southern Methodist, and Southwestern universities, including awards in the following: Extemporaneous Speech, Number Sense, Debate, Declamation, Dramatics, Ready Writers, and Slide Rule. Some of these apply in Regional contests, and some in the finals at the State Meet.

Moreover, do not overlook the 14 scholarships offered by the Student Council of the College Government Association of the Texas State College for Women at Denton. These scholarships apply, of course only to women, and include the contests mentioned above as well as tennis and journalism. The TCW scholarships are announced by President L. H. Hubbard in the October issue of the Leaguer page 1, column 5. If this number of the Leaguer is missing from your file, we shall be glad to send a copy free on request.

***** March, 1945 ... 1st Place Math Winner Is Also a Journalist**



Eldon Durrett, State number sense contest winner in 1944 was incorrect. Eldon placed second to Carrol Trail. Eldon is an honor student in Amarillo High School with a three-year average of 97. He is recognized for his brilliant mathematical mind, and for his journalistic abilities, having served as editor and staff writer of the school paper, "*The Sandstorm*." During the summer he was employed by the "*Amarillo Globe-News*" as a reporter, and has now resumed his senior year school activities. He is the son of Mr. and Mrs. J. R. Durrett, Amarillo.

***** April, 1945 ... Prizes and Scholarships Up for Award 1945 State Meet**

War conditions have made some of the cups and plaques usually awarded in the University Interscholastic League State meet unobtainable at present. Each winner of such award, however, will be given a certificate entitling the school he represents to the trophy when the same becomes available on the market; and a special League fund is being set up to take care of these delayed purchases.

Following is the list of trophies and medals which are awaiting award to the winners in the forthcoming State Meet, May 2-4:

Debate, Conference AA --- permanent trophy

Debate Conference A --- permanent trophy

Boys' High School Declamation -- The Wolzendorfcraft silver cup

Girls' High School Declamation -- The Eli Hertzberg silver cup

Slide Rule --- Silver plaque, permanent

Number Sense --- Silver plaque, permanent

Ready Writers --- The University silver cup

High School Track Meet --- Silver plaque, permanent

Relay --- Silver plaque, permanent

Tennis --- The Caswell & Smith silver cup for boys' doubles; The University silver cup for boys' singles; The University silver cup for girls' doubles; and The University silver cup for girls' singles

Extemporaneous Speech --- The University silver cup for boys' division and for girls' division
One Act Play --- Plaque to winner and small plaque to runner-up, permanent; Samuel French award of a set of books (value \$15) to best actor for boys and similar set to best actress in the Tournament

Typewriting --- Silver plaque, permanent

Shorthand --- Silver plaque, permanent

Journalism --- Silver cup for winning schools and small plaque for second place, permanent

440-yard Relay --- Silver plaque, permanent

Medals --- Gold, silver, and bronze medals for first, second, and third place, respectively, of each event of the track meet, and for declamation, extemporaneous speech, journalism, ready writers, shorthand, number sense, and slide rule; also gold and silver for medals to first and second places winners in tennis and debate; also for each member of the All-Star Cast in the One-Act Play Tournament.

* All trophies except those designated as permanent are to be in the custody of the winning schools for one year, and a trophy must be one by the same school three years in succession in order to entitle that school to permanent possession of the same.

Scholarships

For the first time in League history, various educational institutions are offering attractive scholarships to Regional and State winners in certain contests.

Baylor University --- a winning boy and a winning girl in extemporaneous speech at the State meet; each of these is worth in money \$180 and entitles the holder to free tuition for three courses in the academic department for one year only. It may be renewed after the end of the year, but the scholarship, when granted, holds good for just one year.

Southern Methodist University, Dallas --- scholarships in Regions III, IV, and VII of the Interscholastic League covering all tuition and fees at S.M.U. for one year (not including books, board, and lodging) to the first place winners Number Sense and Debate with the conditions that the pupils are in the upper quartile in scholarship in their graduating class and they provide character references from three reputable citizens.

Southwestern University, Georgetown --- scholarships to first place winners in each of the eight Regions of the Interscholastic League in the following contests:

Debate (first place winning team in each division); Declamation (first place winner in each of the four divisions); One-Act Play (each of the three boys adjudged best actors and each of the three girls adjudged best actresses); Ready Writers (first place winner); Extemporaneous Speech (first place winner in each division); Slide Rule (first place winner); and Number Sense (first place winner).

These scholarships provide tuition for two semester values at \$100. Only those students who are in the upper quartile in scholarship in their graduating class in their respective high schools are eligible for these scholarships. Scholarships are also offered to the winners in the contests listed above in the State Meet scholarships valued at \$150 for two semesters, representing tuition and part payment of fees. Similar scholarships for study will be available to these young people if their work here bears out the promise indicating by their winning either in Regional or State. Winning in Regional and then winning in State will not be eligible for both, but will receive the one with the highest value.

*** September 1945 ... **Number Sense Winner Is from Amarillo**



The state trophy for first place in Number Sense was awarded to Joe Perry of Amarillo High School in 1945. He was a member of the National Honor Society and Ken Club and graduated in May with a four-year high school average of 92.92. At present he is attending Amarillo Junior College. Parents are Mr. and Mrs. J.H. Perry, Amarillo.

*** September, 1945 ... The first edition of "Number Sense" was issued ten years ago. Prepared by Dr. John W. Calhoun, it met with immediate popularity in the public schools. Originally, it was designed for the seventh grade, equivalent, under the reorganization of public schools in Texas, to the present eighth grade. The revision now in press has increased the scope somewhat, and, while still adaptable to the grades, may be used in high school. Indeed, the contest which it is designed to support is now open to all grades in the high school. It is often pointed out that nine-tenths of the arithmetic used in life situations is mental arithmetic. One does not carry around a deaf-man's pad and pencil to figure out change, or comparative prices of oranges by the dozen with oranges by the basket, nor the number of miles he gets from a gallon of gasoline. "Numbers" is a language, and the development of the "number sense" is an essential part of learning to talk effectively. The new, enlarged and revised edition of "Number Sense" by Dr. Calhoun will be ready for distribution by the time this issue of the Leaguer reaches its readers.

*** Oct 1945 ... Number-sense tests now in circulation are gradually being replaced by others. New ones will all have this statement in the heading after the statement regarding starred problems which require only approximate answers: **"Any answer falling within the two extremes given in the key will be scored perfect."**

*** February, 1946 ... New Practice Tests in Number Sense Ready
So far this season we have been furnishing schools practice tests in Number Sense which have been in circulation for some time. Now we have just received two sets of new Number Sense tests prepared with the revision of the Number Sense bulletin in mind. All tests hereafter issued will be based on the revision and incorporate the new features of the revision. They are sold at the same price, one cent per copy, and no order filled for less than ten copies.

*** April, 1946 ... Southern Methodist University is offering scholarships in Regions III, IV, and VII of the League covering all tuition and fees for one year to first-place winners in Number Sense and Debate. Regional Winners First-place winners in each of the eight regions of the League are offered scholarships by Southwestern University in Debate, Declamation, One-Act Play, Ready Writers, Extemporaneous Speech, Slide Rule and Number Sense.

===== Dr. R. H. Bing and W. E. S. Dickerson era Fall, 1946 – Spring, 1952 =====



According to the September, 1946 Leaguer, state contest directors introduced were Dr. R. H. Bing, number sense, Dr. G. B. Huff, slide rule, and Dr. D. A. Penick, tennis.

Dr. R. H. Bing graduated from Southwest Texas State Teacher's College (known today as Texas State University), and taught mathematics for four and a half years at three different high schools in Texas, the first being at the Palestine High School in Palestine, Texas. As well as teaching mathematics he coached the football and track teams, and taught other classes, one of which was typing. He was awarded an M.Ed. from the University of Texas in 1938, appointed as an instructor at the University of Texas, was awarded a Ph.D. in 1945. He was the Chairman of the Department of Mathematics from 1975 to 1977 at the University of Texas. He held a chair at the University of Texas until he retired in 1985. He worked mainly in the areas of geometric topology and continuum theory. He was a visiting scholar at the Institute for Advanced Study in 1957–58 and again in 1962–63, served as president of the MAA (1963–1964), president of the AMS (1977–78), and was department chair at University of Wisconsin, Madison (1958–1960), and at University of Texas at Austin (1975–1977).

W.E.S. Dickerson assisted R. H. and was the Number Sense Contest test preparer from 1946-49, manager from 1949-51, and director in 1952. He was a staff teacher in the Department of Mathematics of the University High School in Austin. He was born in the Choctaw Nation of the Indian Territory in Oklahoma, near Durant and is a member of the Choctaw Indian Tribe. He graduated from The University of Texas with highest honors and was elected to Phi Beta Kappa. He taught in the public schools of Texas and Oklahoma for the past 26 years.

Items of interest 1946-1952

>>> Note: It is assumed that the number sense tests were labeled as the D-series in 1946-47, E-series 1947-48, F-series 1948-49, G-series 1949-50, H-series 1950-51, and the J-series 1951-52. Mentioning of the labeling of these tests was not found in the archives. Also, two series, possibly the I-series and L-series, were not mentioned in any documents found. They may have not existed. (See appendix, Timeline)

*** 1946 ... UIL offers special service to "ward schools" in December. 526 grade schools registered. Ten contests were available to students of elementary grades including Declamation, Spelling and Plain Writing, Ready Writing, Number Sense, Story Telling, Choral Singing, Tennis, Volleyball, Playground Baseball, and Junior Track and Field. In grade school number

sense, a team consists of a minimum of two members from the grade one level below high school. The test is a mental arithmetic test and only results of calculations reached without pencil and paper are accepted. An excellent aid to "developing number sense" is a bulletin written by J. W. Calhoun, professor of applied mathematics at The University of Texas, which contains practice drills.

*** November, 1946 ...



Thirteen year old David Gavenda of Rio Hondo High School won the State Championship in the Number Sense Contest last May. A freshman at Rio Hondo last year, David has always been an honor student, showing great aptitude in all of his subjects as well as in mathematics. He ranks highest in his class in each of his courses. David is very much interested in athletics, playing baseball and volleyball, and is a member of the local Boy Scout troop. He is a favorite among his classmates, who, according to one of his teachers, predict a great future for the Number Sense Champion. His parents are Mr. and Mrs. Ed Gavenda, Rio Hondo, Texas.

>>> **November, 2022 Special note:** While visiting with a retired coach, Joe Cuellar, I found out that David was actually an 8th grader competing as a freshman. Joe said he remembered that since David competed as an 8th grader and could win four more times while in high school, a rule was passed that limited competition eligibility to just four years. I am not aware of any other 8th grader having such an accomplishment. David retired in 1999 after 40 years with the University of Texas Physics department and passed away in 2021.

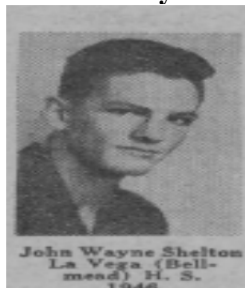
*** 1947 ... Rural schools re-joined league competition after an absence of three years, because of wartime transportation difficulties. Rural schools played an important part in the history of the League since 1919 until they were forced to drop memberships in 1943. The *Constitution and Rules* define rural schools as those with not more than four teachers, which cannot qualify as high schools. They will organize their own local meets. Winners in high-school number sense, ready writers and declamation qualify to the next higher meet and compete as Conference B schools in Area, Regional and the State Meets. Principals of the schools, or persons designated by them, compose the Executive Committee and enforce League Regulations. Listed Contests open to this group are: number sense, playground ball, ready writers, declamation, spelling and plain writing, junior track and field, junior tennis, volleyball and choral singing.

***** March, 1947 ... San Saba Junior Takes Honors in Two League Contests**



Writing is the chief interest of Cornie Miffleton, San Saba High School junior who tied for third place honors in Number Sense at the 1946 State Meet. This year Cornie is editor-in-chief of the *Armadillo Grunts*, the school paper. She plans to major in Journalism when she enters college. Cornie entered two League contests last year and won honors in both of them. She placed first in Extemporaneous Speed at the District Meet and third place at the Regional Meet. In Number Sense, she won third place at District, second place in the Region, and tied for third place at the State Meet with Flora Hunter of Woodsboro. Her hobbies are collecting match covers and antiques. She is the daughter of Mr. and Mrs. C. G. Miffleton of San Saba.

***** March, 1947 ... La Vega Winner Attends Baylor**



Winner of second place in the Number Sense contest at the 1946 State Meet, John Wayne Shelton was valedictorian of his class at La Vega High School, Belmead, and is now attending Baylor. John was vice president of his class, assistant editor of the school paper and annual. He received the departmental award in mathematics and the departmental award in science. Before winning State honors, John had only competed in grade school contests. He was a member of two winning spelling teams and one number sense team. He played football three years and basketball two years. Now he is majoring in business and mathematics at Baylor. He is the son of Mr. and Mrs. P. W. Shelton, Belmead, Texas.

***** April, 1947 ... Excellent Records Made By Woodsboro Students**

In the literary meet held in District 73-B at Odem, on the 21st of this month, two of our pupils set very fine records. One student scored 450 out of a possible 500 in Number Sense and the second student scored 900 out of a possible 1,000 in the Slide Rule Contest. Please advise if State records exist in these events and, if not, steps should be taken for recognition of aforementioned marks. --- E. A. Meyer, Woodsboro.

*** April, 1947 ... **Another Texas University Offers Scholarships to Winners**

Winners of State Meet contests and of Regional Meets in some contests are offered scholarships by Baylor University, Southern Methodist University, and Southwestern University as mention in the April, 1945 write-up. Added to this list is the Texas State College for Women. The College Government Association of the Texas State College for Women has undertaken to supply funds for fourteen scholarships to State Meet winners. Payment of the \$50 tuition charge will be made for the winning girl contestant in the following contests: Journalism, Debate, Extemporaneous Speech, Ready Writers, Dramatics (three chosen on the all-star cast), Tennis Doubles, Tennis Singles, and Declamation.

*** September, 1947 ... **Letter Box and Personal Items**

Walton Principal Favors Separate Rural Divisions

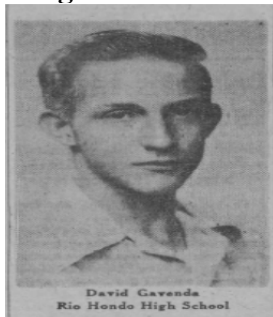
At the outbreak of World War II Hunt County left off Interscholastic League meets but has come back for the last two meets. In this year's meet we had two Rural Schools represented and last year three. Before the war, there was a large number of Rural Schools in the League. May I offer a few suggestions that might help to get more Rural Schools back into the League.

1. Bring back separate divisions for Rural Schools instead of being in a class with city or town schools. This seems to throw us out of our class. We would like separate divisions in such events as Number Sense, Spelling, and Declamation. This the wish of most every teacher in our meet. I believe that this would cause more Rural Schools to enter.
2. We would like to see a division in Declamation for Junior boys and girls --- boys and girls under 10 years of age.
3. Since our classes are small and at times we find it hard to have a team of two, we would like for Number Sense and Spelling to be lowered to one contestant for each event or maybe allow two to enter, but let schools have a chance to win two places as Three-R's used to be.
4. We would like a division in Story Telling for grades 2 and 3, each school to enter one contestant.
5. We would like to see Picture Memory brought back.

---- John B. Ward, Principal, Walton Rural School, Rt. 1, Lone Oak, Texas

[Editor's Note. --- Since most rural schools are grade schools (see definition in Article VII), provision is made for any group of "rural" schools to have a division, or, indeed, a meet of its own. Most of the other suggestions in this letter appear as rule-changes in the forthcoming issue of the *Constitution and Rules*.]

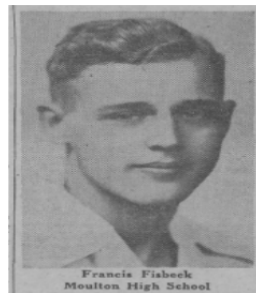
*** September, 1947 ... **Gavenda Awarded 2nd State Title ---
1946 Number Sense Champion Wins Again at State Meet**



A brilliant young mathematician, David Gavenda of Rio Hondo High School, this summer brought home the highest honors in the Number Sense contest for the second time. In 1946 he also won the championship in this contest. With an I.Q. of 141, David is recognized as a leader of his group, and according to his superintendent, is "an unofficial teacher of his class." Baseball, volleyball, and other sports are enjoyed by this math wizard, who is a member of the local Boy Scout troop.

The second place winner at the State Meet was Bobby Carpenter, Woodsboro. Third place was a tie between Jack Alderson, Lubbock, and Francis Fisbeck, Moulton.

***** December, 1947 ... Fisbeck Reaches Eagle Scout Rank**



Francis Fisbeck of Moulton tied for third place in the Number Sense contest at the Interscholastic League State Meet, May 2 and 3. Francis, a sophomore, received first place at the local Number Sense meet when he was in the eighth grade. Last year he tied for second place at the district meet and was also on the Junior High Boys' Softball Team that won first place at the regional meet. He won first place at the district and regional meets in Number Sense this year.

Honors he received include serving as president of the tenth grade class and acting as song leader in the local chapter of F.F.A. This year he was reporter for his chapter. He is a Boy Scout, reaching the rank of Eagle Scout, and is now junior assistant Scoutmaster. He also belongs to the Senior Scouts in which he is assistant post guide.

For a career, Francis is interesting in engineering or perhaps physical education. His parents are Mr. and Mrs. G. G. Fisbeck, Moulton, Tx.

***** February, 1948 ...**

Grade School Contestants Can Make Their Choice Among 11 Literary, Athletic Events

The eleven contests are sponsored by the University Interscholastic League for elementary schools this year. Music Appreciation, a favorite contest among grade school students which has been dropped for several years, has been restored. Grade schools are not required to pay a fee but must register with the League. Last year 636 elementary schools entered League competition. Contest listed for grade school students are: Declamation, Ready Writers, Spelling - grades may enter two teams, one in the division for Grades V and Plain Writing, Choral Singing, Number Sense, Story Telling, Music Appreciation, Tennis, Volleyball, Junior Track and Field, and Playground Baseball.

There has been a slight change made in the rules for the Number Sense Contest this year. Each school shall be permitted to enter two contestants who compete on an individual instead of a team basis.

*** March, 1948 ... For the first time there will be 3 conferences for district, regional, and state meets. Three qualify for regional and two for state in number sense for classes AA, A, and B.

*** April, 1948 Leaguer article:

Study of League Booklets Will Aid Math Contestants

by W. E. S. Dickerson, University Junior High School, Austin

"Number Sense is to study Dr. Calhoun's booklet carefully, particularly pages 4-17, in which he gives excellent suggestions for rapid calculation in the fundamental processes covered by the contest. Following this study, a careful drill on the 1,000 type problems on pages 17-39 will prove of great benefit.

In order to determine the exact range of error permitted in the starred problems in both the booklet and the contest problems, 5 per cent of the exact answer should be subtracted from and added to that answer, fractions being rounded off in each instance. This rule will correct any uncertainty that may have existed in the past. Constant drill on speed is imperative, since only ten minutes are allotted for the mental solution of 100 problems in the contest. In the State Finals each spring, only a comparative few of the finalists succeed in working all of the problems within the given time. This development of speed in mental calculation is one of the chief purposes of the Number Sense Contest and is also one of the highest rewards of study in preparation for the contest. A study of the Number Sense booklets is recommended for all classes in mathematics on both the junior and senior high-school levels. Teachers of mathematics will find it a stimulating aid in the motivation of mathematics study, as well as an excellent leisure-time occupation for the tag ends of periods. Students welcome this old fashioned idea of "mental arithmetic" and in these days when our educational philosophy sometimes flounders about in seeking its own definition, the study of this fundamental method in arithmetical calculation provides a sure unit for progress."

*** September, 1948 ...

Pioneer UIL Coach Keeps Enthusiasm -- Teacher Has 100% Record in Contest



Mrs. Lela Dunn, for more than a score of years a member of the faculty of the Marlin Elementary schools, has found Interscholastic League work throughout her career an effective incentive for stimulating interest among her pupils in their work. As the originator of a series of arithmetic test used in League activity, Mrs. Dunn has contributed materially to the growth and development of the nation's largest interscholastic organization. During her long connection with Interscholastic endeavors, **she has never lost a contest in which her team entered the Number Sense Contest.** She is also interested in speech work, dramatics, and other contests. She has coached many winners in the county and district meets. For thirty-two years she has taught

arithmetic, twenty-five years at Marlin and seven at Rosebud. This pioneer and current league enthusiast is the widow of the late Honorable Andrew C. Dunn, former member of the Texas Legislature from Falls County.

*** January, 1949 ... **Marble Falls Girl Wins State Crown In Number Sense**



State winner of Number Sense for Conference A in 1948 was 16-year-old Paula Kae LaForge of Marble Falls High School, and in earlier district she also placed first in Shorthand. She graduated with the highest honors in the spring of 1948 and was given the Doug Michel Achievement Award, a local award presented annually to the student who is designated by student body and faculty as having best served the school. While in high school, Miss LaForge was a member of the band and baseball team, president of the Curtin Club and editor of the high school annual. This fall, she entered Southwest Texas State Teachers College at San Marcus where she is majoring in mathematics and minoring in music. As a hobby, she lists music having taken piano lessons for ten years. She served as pianist for the First Baptist Church. Parents are Mr. and Mrs. S. N. LaForge, Marble Falls.

*** February, 1949 Leaguer article:

Study of League Booklets Will Aid Math Contestants

by W. E. S. Dickerson, University Junior High School, Austin

The Number Sense contest sponsored by the University Interscholastic League is one of the most important contests open to the public school children of Texas.

The handbook available for study in preparation for this contest is The University of Texas Publication No. 4526 entitled *Developing Number Sense*, by Dr. J. W. Calhoun. Copies are available by application to the University Interscholastic League State Office.

The best method to follow in preparation for the contest in Number Sense is to study Dr. Calhoun's booklet carefully, particularly pages 4-17, in which he gives excellent suggestions for rapid calculation in the fundamental processes covered by the contest. Following this study, a careful drill on the 1,000 type problems on pages 17-39 will prove of great benefit. The contest problems have been chosen so as to represent all the various general types given in the booklet. Careful Study should also be made of the Number Sense section of the *Constitution and Rules*. This will server to familiarize students, teachers, and directors with the technical details of the contest.

Another excellent help is the booklet, *How to Teach Number Sense*, by Mrs. Roberta T. Waddill, University of Texas Publication No. 3842. Both of these publications may also be secured by writing to the State Office of the League in Austin.

In order to determine the exact range of error permitted in the starred problems in both the booklet and the contest problems, 5 per cent of the exact answer should be subtracted

from and added to that answers, fractions being rounded off in each instance. This rule will correct any uncertainty that may have existed in the past.

Constant drill on speed is imperative, since only ten minutes are allotted for the mental solution of 100 problems in the contest. In the State Finals each spring, only a comparative few of the finalists succeed in working all of the problems within the given time. This development of speed in mental calculation is one of the chief purposes of the Number Sense Contest and is also one of the highest rewards of study in preparation for the contest.

A study of the Number Sense booklets is recommended for all classes in mathematics on both the junior and senior high-school levels. Teachers of mathematics will find it a stimulating aid in the motivation of mathematics study, as well as an excellent leisure-time occupation for the tag ends of periods.

Students welcome this old-fashioned idea of "mental arithmetic" and in these days when our educational philosophy sometimes flounders about in seeking its own definition, the study of this fundamental method in arithmetical calculation provides a sure unit for progress.

***** April, 1950 ... Marble Falls Boy Wins State Title**



Alvin Ray Riddell made it two in a row for Marble Falls Public Schools. When he took home the state championship in Conference A number sense contest in 1949, he was duplicating the accomplishment of Paula Kae LaForge in 1948. Both champions were coached by M. F. Mayfield, superintendent of Marble Falls Public Schools. He does the coaching purely as an extracurricular activity. A graduate of Austin College and The University of Texas, Supt. Mayfield has an enviable record: two state championships in three years of coaching number sense. In the first year, he managed only to coach his pupil to victory in the regional contest. Alvin Ray is now a junior in high school, and continues to be an honor student despite work after school. He holds down a regular job during the week of school, and then helps out in a grocery store on weekends. He is Active in dramatics.

***** April, 1951 ... Persistence Pays For Number Sense Champion Hodges**



Gene Hodges is a persistent fellow. He was firmly convinced that he had what it took to win the State Championship in Number Sense. So when he didn't make it in 1948 and was second place winner in the State Meet in 1949, he just dug harder in 1950. Gene's persistence was rewarded last State Meet, when he won the Conference B State Championship in Number Sense. It was his second try at the State Meet, but the third year in which he had competed and won first place in his district. In 1949 he tied for second place when he reached the regional meet, and another second at the State Meet. He is the son of Mr. and Mrs. Clyde Hodges of Miami, Texas, and competed each year for Miami High School. His record is especially note-worthy because he is even now just a junior in high school, having won his first district title while he was in the eighth grade. Gene's home is on a ranch, but riding a school bus 13 1/2 miles daily doesn't prevent him from taking a very active part in the life of his school. He has won two letters each in football, basketball, and baseball, making all-tournament ranking at the 1950 basketball tournament. He was vice president of Future Farmers of America, and served as president of his Freshman Class. Coach of this successful competitor is Mrs. Scott W. Corbin. The hard work which she and Gene put in is best illustrated by the fact that she gave him, during the year preceding his State Championship victory, 40 speed tests containing 5,000 problems and worked out fundamental facts which Gene memorized.

*** April, 1952 ... **Number Sense State Champions, 1951**



Bob Duncan and Robert Morris McCharen do math problems in their heads which most people can't to with paper, pencil, slide rule, abacus, or electric adding machine. They won the Number Sense contest at the University Interscholastic League State Meet last year. Bob Duncan, left, won the B-conference championship for Alpine High School. Robert McCharen won the A-conference championship for Pharr-San Juan-Alamo High School.

Bob, son of Mr. and Mrs. F. C. Duncan, has been competing in Number Sense contests since 1948. His coach this year was Miss Johnnie Weyerta. He also swings a mean plow, having represented the Alpine FFA chapter which won a national award at Kansas City, recently. Morrie's number sense isn't needed in one of his activities. A golf enthusiast, he shot low enough to take fourth in his district in that sport in 1951. His coach this year was Miss Edith Carmen. His parents are Mr. and Mrs. R. N. McCharen of Pharr.

===== James Mann Hurt era Fall, 1952 – Spring, 1965 =====



*** November, 1952 ... **J. M. Hurt Named State Director**

J. M. Hurt, professor of applied mathematics at the University of Texas, has accepted the position of director of the Number Sense Contest, sponsored by the University Interscholastic League.

"I feel honored in having been appointed director of the Number Sense Contest," he said.

"Although I have much to learn about my new job, I know that I am being given an opportunity to do something of real value for the school children of Texas. Never before in history has mathematics been as important as it is today. Anything we can do to stimulate interest in mathematics and to encourage talented young people to enter the profession of mathematics or related fields is surely a worthwhile service to the nation," Prof. Hurt declared.

Prof. Hurt succeeds Dr. W. E. S. Dickerson as Number Sense director. Dr. Dickerson resigned his work with the League because of stress of school work, combined with ill health. His long service has been invaluable both to the League as a whole because of the "going concern" he made of the Number Sense Contest, and to the young mathematicians of the state, who were guided wisely and rapidly by his program. His work has been deeply appreciated by all who have been familiar with it.

Prof. Hurt received his bachelor of science degree in education from the University in 1938 and his master's degree in 1945. He has taught at the University since 1942, except for a period of teaching at UCLA in 1947-48. Although his main interest is in teaching, study and development of mathematics, Prof. Hurt also enjoys the wildlife of Texas. He likes to camp out in the blue quail, rabbit, javelina, and coyote areas of the state. Some day he hopes to take a camping trip to East Africa. The Hurts have two sons. The boys are in the first and third grades at Robert E. Lee School.

The Number Sense tests are ten minute quizzes of 100 problems each. Those taking the tests give the exact or approximate answers, according to the instructions, to short mathematical problems without figuring on paper. Only the answer may be written down by the contestant. Prof. Hurt will prepare and supervise the contests.

Items of interest 1952-1965

>>> Note: the number sense tests were labeled as series K through X, except for the letter L, during the Hurt era. No mention of a series L was found in the archives. The K-X series consisted of 8 tests labeled K-1 to K-8 thru X-1 to X8.

*** February, 1953 Leaguer article:

Mental Arithmetic A Practical Habit

by J. M. Hurt, Number Sense Director

A prominent engineer once visited a paper mill. This engineer had long before developed the habit of quantitative thinking. He continually added to his store of knowledge by thinking quantitatively about new situations.

As he walked through the mill, he noticed a log about to be processed. He estimated that the log was four feet long and one foot in diameter. He asked himself how many newspapers the log could make. He guessed that the log weighed about 40 pounds a cubic foot, and he calculated that it contained approximately three cubic feet, hence weighed about 120 pounds. About half, or 60 pounds, would probably end up as paper. A big city newspaper weighs about half a pound. So the log should yield at least 120 newspapers. Still curious, he wondered how much newsprint costs. If the log should be sawed into boards it might yield two cubic feet of lumber, or about 20 board feet. Estimating lumber at 10 cents a board foot, he guessed the log's value at \$2. Thus 60 pounds of paper would cost \$2, and a ton of newsprint about \$70.

It is not surprising that this engineer learned more than most visitors to the paper mill. I think almost anyone would have been impressed by these simple calculations and would agree that it was an easy way to inform oneself about things worth knowing. Yet most visitors to the paper mill would never dream of making such calculations. The reason is not that the mental arithmetic is beyond their powers, but that they have not trained themselves to think in this way.

The habit of quantitative thinking, which is the judicious combination of a sense of numbers and technical knowledge, is a professional skill of engineers, and should be developed early in the prospective engineer's life. Indeed, everyone needs some proficiency in this kind of thinking. While most of us do not find it absolutely necessary to estimate the volume or the probable value of such logs as come our way, who is there who does not at least occasionally have to determine quickly and without paper and pencil such amounts as the approximate charge for 21 1/2 yards of lace costing 39 1/2 cents for two yards? The value of the ability to make such calculations is recognized even if not possessed by everyone. But what few realize is that mental arithmetic is also an instrument for discovering and storing up in the mind new and useful information every day.

Skill with numbers needs to be combined with other technical knowledge in order to become useful. The engineer would have been handicapped in estimating the price of newspaper if he had not known how to find the volume of a right circular cylinder. A student trying to solve problem number 141 in the League bulletin "Developing Number Sense," by J. W. Calhoun, would probably fail if he did not know, not only that 8 times 15 equals 120, and that 120 is 75% of 160, but also that an acre contains 160 square rods. Furthermore, it is frequently necessary that one be able to estimate accurately the size of objects. Sometimes this is the most important part of the solving of a problem. It is often inconvenient and occasionally impossible to measure the quantity whose value is required in order to obtain the solution.

For instance, it is usually quite difficult to measure the coefficient of friction between the piston and the cylinder wall of a high-speed gas compressor, but many problems related to such compressors have been solved by using a good estimate. In many instances a good estimate is all that is needed. Not everything requires to be measured within one-ten-thousandth of an inch. Astronomers say that the mass of the sun is 330,000 times the mass of the earth, and have obtained excellent results in using this figure in their calculations; yet this estimate cannot

possibly be exactly correct, since the sun loses about 4 million tons of mass a second while the mass of the earth is constant.

Mental arithmetic is not all work and no play. There is much fun in it when one has become adept at it. Recently, my nine-year-old son saw a photograph of the sun in a book on astronomy which showed the largest sun spots ever photographed. The caption under the picture said the area of the spots was 5 billion square miles, and he wanted to know how this area compared with the area of the earth. We spent a very pleasant quarter of an hour determining that the sun spots were about 25 times as large as the earth, and we were both amazed that so small a portion of the surface of the sun could be as many times as large as our own world.

To sum up, quantitative thinking is composed of at least three ingredients: a well-developed sense of numbers, an ability to estimating accurately the size of objects, and a knowledge of the formulas relating the quantities known to the quantities sought. Like other valuable habits, the habit of quantitative thinking results only from practice. You can be sure that anyone who is really effective in this kind of thinking has become so through long and constant training.

In conclusion, I wish to extend to the contestants, coaches, district directors, and others interested in the Number Sense Contest, my hearty greetings, and to say that I am eagerly looking forward to meeting and working with you this spring.

***** March, 1953 ... Number Sense 'Fans' Meet May 8 in Austin**

Contestants, coaches, directors, and others interested in the Number Sense Contest are invited to attend a Number Sense conference to be held during the State Meet on May 8 at 7:30 p.m. in Benedict Hall 111. Professor C. M. Cleveland, chairman of the Department of Applied Mathematics and Astronomy, will be present. The main topic of discussion will be ways and means of improving the Number Sense Contest. Aims, uses, and implications of number sense will also be discussed. Please come prepared to present your ideas. We want to hear your views.

***** October, 1953 ... Number Sense Training Should Be Started Now**

Now is the time for all number sense contestants to begin drilling in preparation for the contests next spring. As many of you have already discovered, it takes lots of practice to develop accuracy and speed in solving problems in mental arithmetic.

Always be on the alert to solve new problems, wherever and whenever you may encounter them. You can find them almost anywhere. Shopping at the grocery store, budgeting a party, buying new clothes for school, planning a weekend trip, assimilating statistics regarding government expenditures that you read in the newspaper, the cost of operating the family car, and many other examples that you can easily think of yourself all present opportunities for sharpening your sense of numbers and for adding to your fund of information. For additional practice, you may obtain copies of the Number Sense Contests that were used last season from the Interscholastic League. Everyone needs to be reminded occasionally of the importance of what he is doing. Some people ask, "Why solve problems in your head when you could solve them more easily with paper and pencil?" This is a fair question and merits a careful answer. One answer is that we would use paper and pencil if the problem were complicated enough to warrant it. In teaching students mental arithmetic we do not at the same time teach them to disdain paper and pencil.

There are many ways to make calculations, and mental arithmetic is one of them. If one were planning a trip to California, he would certainly recognize that there are several ways to get there

and then select the mode of travel that best suited him. There are many situations in which calculations need to be made and for which mental arithmetic is best suited. Anyone who will try can think of millions of examples. In mental arithmetic we solve with our minds only simple arithmetical problems, just as we solve mentally many other types of simple problems. No one requires anything other than a few seconds thought to decide to avoid getting wet by putting on hat, coat, and overshoes before going out in the rain. Similarly, one uses his head only to determine the cost of a hen weighing $4\frac{1}{2}$ pounds at 52 cents a pound and a loaf of bread for 21 cents. One who has become skilled in mental arithmetic is likely to be more efficient at paper and pencil arithmetic than one who has not.

In order to keep the Number Sense Contest up to date we are including many problems relating to current interests and events in the contest for next spring. Problems are common these days which reckon in the billions and also in the millionths. Occasionally one encounters a problem that involves both the extremely large and extremely small, such as the weight in pounds of a billion billions of hydrogen atoms or the value in dollars of a million French francs. Perhaps you would like to see a few examples of this type of problem. The following are typical examples:

1. Find the interest on the national debt if it is now 270 billion dollars and the interest rate is 3%.
2. A traveler to Mexico estimates that his trip will cost \$450. How many pesos should he obtain if 8 pesos equal one dollar?
3. If a certain kind of molecule weighs .000021 oz., find the weight of 12,000,000 such molecules.
4. If light travels 180,000 miles a second and the sun is 93 million miles from the earth, approximately how long does it take a ray of light from the sun to reach the earth?
5. Mr. Jones borrowed \$40 and 3 months later repaid \$40.55. At what rate did he pay simple interest?
6. How much does the government collect annually in excise taxes if the population is 60,000,000 and each person pays \$12?
7. The U. S. has given Germany and Japan about \$8,000,000,000 since the end of the war. How much, has each of us contributed on the average if our population is, 160,000,000?
8. Find .047% of 500,000.
9. Evaluate $2.9 \times .013 + 2.1 \times .013$.
10. Which is the better buy: 2 lb.15 oz. of detergent for 72c or 1 lb. 3 oz. for 29c?
11. Mr. Smith makes \$520 a month. 12% is withheld for income tax, 5% for retirement fund, and $2\frac{1}{2}\%$ for insurance. Find his take-home pay.

*** April, 1954 Leaguer Article:

Algebra Methods Outlined For Mental Arithmetic

by J. M. Hurt, State Number Sense Director

Suppose you want to divide 1 by 1.03 and express the quotient as a decimal. You could get the answer in the usual way by dividing 100 by 103 using long division. This method is impeccable and one that everybody understands. The answer you would obtain (very likely with the help of paper and pencil) is .97087, which is accurate to 5 decimal places. Now observe that you could have gotten this answer accurate to 2 decimal places simply by subtracting .03 from 1, something you could easily have done in one second in your head. Each answer is an estimate of the correct answer, long division of course giving the better estimate. Two decimal places of accuracy are

sufficient in many instances, thus among the questions that we shall ask and answer are the following: How do we know that $1-.03$ is approximately equal to $1/1.03$?

Most students who compete in the Number Sense Contest have studied some algebra. They know that letters are used to stand for numbers and that sums, differences, products, and quotients are written respectively as follows: $a+b$, $a-b$, ab or $a \cdot b$, and a/b or $a \div b$. They know that if a , b , and c are any three numbers, then $ab = ba$ and $a+b = b+a$ (the commutative laws), $a \cdot bc = ab \cdot c$ and $a+(b+c) = (a+b)+c$ (the associative law), and $a(b+c) = ab+ac$ (the very important distributive law which connects the operations of addition and multiplication).

Some contestants may not have noticed that algebra can sometimes be very effectively used in mental arithmetic. As an example, let us return to the problem of estimating the value of $1/1.03$. Now by algebra long division it is easy to see that $1/(1+x) = 1-x + (x^2)/(1+x)$. If x is a number close to zero, $(x^2)/(1+x)$ may be so small as to be negligible. In this case $1/(1+x)$ is approximately equal to $1-x$. Hence since $.03$ is close to zero, $1/1.03$ is about $1-.03$ or $.97$.

Similarly, $10/9.6 = 1/.96 = 1/(1-.04) = 1-(-.04) = 1.04$ approximately.

Suppose our problem is that of multiplying two numbers each of which is close to 1. For instance, 1.025×1.013 . This suggests that we look at $(1+x)(1+y)$, which by the distributive law is equal to $1+x+y+xy$. Again if x and y are close to zero, xy may be negligible. In this case $1+x+y$ is an estimate of $(1+x)(1+y)$. Thus 1.025×1.013 is approximately equal to $1+.025+.013$ or 1.038 . Notice that this is within 325 millionths of the correct answer. Similarly, $.96 \times 1.025 = (1-.04)(1+.025) = 1.025 - .04 = .985$, $.96 \times .97 = (1-.04)(1-.03) = 1-.04-.03 = 1-.07 = .93$, approximately. Furthermore, since $(1+x)/(1+y) = (1+x)(1/(1+y))$ and an estimate of $1/(1+y)$ is $1-y$, we might estimate $(1+x)/(1+y)$ as $1+x-y$. For example, $1.025/1.013 = 1.025-.013 = 1.012$, $1.031/.989 = 1.031/(1-.11) = 1.031-(-.11) = 1.031+.11 = 1.141$, and $.947/.951 = 10(.947/.951) = 10((1-.053)/(1-.049)) = 10(1-.053+.049) = 10(.996) = 9.96$, approximately. To multiply 2.03 by 3.06 we might first write 2.03 as $2(1.015)$ and 3.06 as $3(1.02)$. The product is then $6(1.015)(1.02) = 6(1.015+.02) = 6(1.035) = 6.21$, correct to 2 decimal places.

The most important skill in mental arithmetic is the ability to quickly and accurately estimate the answer. For this reason it would probably be wise to increase the percentage of problems in our Number Sense Tests that require answers from the present 10% to 25% or more.

However, there are occasions when it is necessary to obtain the exact answer mentally, and here also algebraic methods may be sometimes used. To multiply 2.03 by 3.06 , we first recall that $(a+b)(c+d) = ac+ad+bc+bd$; thus $(2.03)(3.06) = (2+.03)(3+.06) = 2 \cdot 3 + 2(.06) + 3(.03) + (.03)(.06) = 6 + .12 + .09 + .0018 = 6.2118$ exactly. $(a+b)(a-b) = a^2 + b^2$ is a special case of this rule and may be used to multiply two numbers which can be written as $a+b$ and $a-b$; for instance $28 \times 32 = (30-2)(30+2) = 30^2 - 2^2 = 900 - 4 = 896$. Another special case is the rule $(a+b)^2 = a^2 + 2ab + b^2$ which may be used to square a number written in the form of a sum; as an example, $28^2 = (20+8)^2 = 20^2 + 2 \cdot 20 \cdot 8 + 8^2 = 400 + 320 + 64 = 784$.

There are many tricks to the business of developing in oneself skill with numbers as anyone knows who has studied Professor J. W. Calhoun's excellent brochure "*Developing Number Sense*" a University of Texas publication.

>>> Note: Dr Roger Osborn became J. M. Hurt's number sense assistant in 1955-56.

*** September, 1955 Leaguer article:

Corrections Made In No. Sense Keys - Education Board Integration Policy:

By Dr. Roger Osborn, Assistant State Director of Number Sense

Over the last few years the League office and the State Director of Number Sense have received many letters pointing out errors in the keys to the number sense tests. The State Director decided that it was time for some effort to be made to correct the keys, not one problem at a time, but as a whole. When this project was undertaken, it was concluded that it was uneconomical to keep all back tests available for practice purposes. So, to the task of correcting the keys was added the task of deciding which series to keep available. Furthermore, an outgrowth of the project has been to re-examine the types of problems most suitable for number sense tests, and it is hoped that this examination may be reflected in continually improved tests.

1. Objectives: correcting the keys to be sure:

- (a) the answers were correct,
- (b) the form of each answer was correct (for example, it was necessary to eliminate a few answers given in the form of improper fractions which are unacceptable), and
- (c) the answers, to starred problems gave a margin of error of five percent of the correct answer.

2. Tests Analyzed

- (a) Four series of tests have been kept available to be ordered. Altogether, these four series contain 34 tests (containing 3,200 problems).

1. J series – 9 tests – 100 problems each

Series J and N are medium difficulty containing a wide range of types of problems.

Only a few problems on any one examination are direct tests of a contestant's memory, and relatively few require any extremely difficult computation. There is some variation in the types of problems and the manner of their statement from test to test, so that the contestant is not led to expect that any one type of problem will recur with any regularity.

2. K series - 9 tests – 100 problems each

Series K is easiest difficulty containing many problems in which a common fraction is to be converted into a percentage and vice versa. This depends mainly on the contestant's memory, and is probably good drill material. This series also contains a great number of simple multiplication and division problems, many of which would merely be exercises in memory for contestants who have memorized the multiplication tables through 20 or 25. Each test in the K series is almost an exact duplicate of each other test. This leads to good scores because the contestant knows what to expect, and such tests may serve well as drill material in the early stages of a contestant's preparation for competition.

3. M series - 7 tests – 100 problems each

Series M is the most difficult. It contains a minimum number of problems related to memory alone, and a maximum number of worded problems. Any contestant who is able to perform well in Series M should experience little difficulty in a competition using a test from a simpler series.

4. N series - 10 tests – 80 problems each

Series N is medium difficulty similar to J series and is the first series to have 80 problems instead of 100 problems and be 10 tests instead of 8.

3. Misprints

Two serious misprints were found in the test questions. In question 62 of M-1, a number 18,0000 occurs. The key has been altered to include the answer which might arise from an interpretation of either 18,000 or of 180,000. In question 26 of N-5, the fraction $\frac{2}{7}$ was misprinted as $\frac{2}{/}$. It is hoped that this error can be corrected before a student uses the test for practice purposes.

The State Director and the League office hope that this project will improve their services to the public, and that the entire project—and in particular the comments relative to the difficulty of the tests—will prove to be of benefit to coaches and contestants alike.

*** September, 1955 ... James Hurt and Milo Weaver are appointed to the 43rd State Meet Number Sense committee.

*** October, 1955 ... NUMBER SENSE TEST ORDER

(List quantity and series below. Grading Key is included. Minimum—10 tests of each number.)

Series: J-1 J-2 J-3 J-4 J-5 J-6 J-7 J-8 J-9

Series: K-1 K-2 K-3 K-4 K-5 K-6 K-7 K-8 K-9

Series: M-1 M-2 M-3 M-4 M-5 M-6 M-7

Series: N-1 N-2 N-3 N-4 N-5 N-6 N-7 N-8 N-9 N-10

*** January, 1956 ... **Perseverance, Versatility Make State Contest Winners**



The virtue of perseverance is demonstrated by looking at the records of 1955 State Meet winners. Take a look, for instance, at the John Caldwell of La Feria, who teamed up with Richard Shannon to win first in

Conference B debate in the State finals. Four years in a row John won his way to State Meet in number sense. In 1954 he placed second at Austin. In 1955 he came back for a final try at number sense, but this time he was entered also in debate. Again he took home the runner-up medal in Conference B number sense. But John and Richard, coached by Morris Baer, took home the winning plaque in debate. John, son of Mr. and Mrs. R. H. Caldwell, was planning to enter Rice Institute this fall. Richard, whose parents are Mr. and Mrs. H. A. Shannon of La Feria, is a freshman at the University of Texas.

Both boys were versatile outside the classroom. Besides being valedictorian, John was a four-year football letterman, and all-district tackle two years. He also competed in track, softball, and

tennis. He was active in student council, National Honor Society, school publications, dramatics, and 4-H work. He likes hunting, fishing, reading, and church work.

Another four-year footballer and all-district guard was Richard Shannon. He, too, was a track man, and participated in one-act play, student council and honor society. He was student council president. His other interests include photography, golf, hunting, fishing, and church.

Conference B number sense winners make a story by themselves. Another "comeback kid" is Mike Merritt of Dayton, first place winner in number sense for 1955. Mike placed third in number sense in 1954, behind John Caldwell, and he also took third that year in slide rule. In 1955 he came back to pass his rival and take first. Mike, whose guardians are Mr. and Mrs. R. J. Sisk, is a member of the Dayton High School band. His hobbies are "math and magic." He is a senior this year and plans to enter Rice Institute upon graduation. His high school coach was Mrs. Catherine Griffiths.

Third place winner in Conference B number sense for 1955 was Don Clough of Van Horn. Don showed up at League headquarters in 1954, asking for training material in number sense. He went away loaded down with number sense pamphlets. Fellow students, learning that he was coming to Austin, had asked him to buy material for them, also.

*** February, 1956 Leaguer article:

Widespread Values Claimed For Number Sense Contest

by Dr. Roger Osborn, Assistant State Director of Number Sense

Primitive man needed practically no knowledge of numbers and no ability to calculate with them.

But times have changed, always toward man's need to calculate with numbers.

This makes it important for us to look into what factors will improve our "calculating" ability.

One factor seems to be the values which come from participation in the number sense contest.

All life is competitive. We compete for better jobs, for boy-friends and girl-friends, in sports.

Competition is all around us. Competition helps bring out our best efforts and contributes to our best achievements. Thus, as a contest, number sense is in keeping with the world we live in.

Benefits of participation in the number sense contest come to the teacher who is coach or sponsor of the group interested in number sense. These benefits center around increased interest by students involved. These same benefits spill over into all mathematical and scientific work of the student, and hence the benefits are felt by many teachers.

Students participating in number sense contests ... even though they many never become winners ... find values in participation alone. Each participant cannot help having a better grasp of numbers and their relationships. This knowledge will yield both immediate and far-reaching benefits for the student.

Participation in this contest ... or any other which places emphasis on both speed and accuracy of thought ... will yield a beneficial by-product not often recognized. One of the hardest problems faced by any individual is working under pressure.

Student participation in the number sense contest can even have a beneficial effect on non-participating students, for the interest stirred in one individual may be transmitted to another ... awakened interest is contagious!

Parents may begrudge the extra time their children spend preparing for contests, but proud and happy is a parent whose son or daughter wins.

The community will obtain a benefit from school participation in the contest. This stems from the same benefits which come to all others ... increased interest and knowledge in mathematics and its applications.

Knowledge of numbers obtained from participation in number sense activities may be only a small portion of a person's knowledge. But, when multiplied by the number of people participating and when surveyed in the light of additional material learned through increased interest in mathematics, it represents a large amount of knowledge.

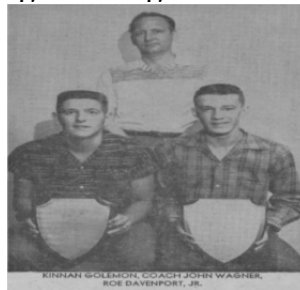
I am convinced we will not survive in this world if we do not accelerate our program of scientific preparedness. Any means by which mathematical or scientific interest may be awakened, and knowledge gained, will be a factor in our survival. The number sense program is such a factor and means. If we survive, it will also be a factor in our entering the age of automation.

To the school will accrue one benefit which easily be overlooked. Previous participation in number sense contests is always a good springboard for a teacher and team to plunge with renewed vigor into further participation. The activity of today will, for all tomorrow, be the history upon which we build.

It is apparent, then, that taking part in number sense activities yields benefits which are primarily those of interest and knowledge, but secondary benefits are felt in ever-widening circles.

*** April, 1956 ... 61,000 number sense tests and 6,500 copies of Developing Number Sense bulletin #4526 were distributed by the League during the period of September 1, 1955 to March 1, 1956.

*** September 1956 ... **Tivy Forming Winning Habits in Number Sense, Slide Rule**



Tivy High School of Kerrville had never won a state title in League math competition until 1954, but now has to its credit three consecutive championships in slide rule plus a title in number sense to boot.

The man largely responsible for Tivy's upsurge in math power was John Wagner, who last spring ended a nine-year tenure as science and math teacher at Tivy to become affiliated with the Division of Extension of the The University of Texas.

Eagerness, Cooperation ... But Wagner is unwilling to accept such a lion's share of the credit. "It is a record we are proud of," he said, "but we depended 100 per cent on the eagerness and enthusiasm of the students and the cooperation of the administration of Tivy High School."

A glance at the record of Wagner's students in State Meet competition clearly illustrates the rapid and remarkable advances made. Six years of working with slide rule competitions produced state meet results:

1951 (11th place), 1952 (6th), 1953 (4th), 1954 (1st and 2nd), 1955 (1st and 3rd), 1956 (1st).

In number sense contests the record doesn't stretch back quite so far, but still features that rapid advancement through the ranks: 1954 ("We showed up at State and that is about all"), 1955 (3rd), 1956 (1st).

Wagner's winners in the conference AA slide rule and number sense events this year were a couple of 17-year-old youths who plan to enter the engineering profession. Kinnan Golemon, son of Mr. and Mrs. W. L. Goleman of Kerrville, won the slide rule event and Roe Davenport, Jr., son of Mr. and Mrs. R.R. Davenport, took the number sense honors. Goleman was a 1956 graduate at Tivy and planned to enter Oklahoma University this fall, while Davenport is a senior at Tivy this year.

Both have had enviable records in past competitions. Davenport, in addition to his state number sense title, placed third in district meet in 1954 and 1955, first in 1956, and first in regional in 1956. Golemon was third place winner in the slide rule contests at district meet in 1953 and 1955, second in district 1954 and 1956, third in regional in 1953 and 1954, and first in regional in 1956. He also placed second in number sense at the district and regional meets in 1955.

*** October, 1956 ... **Two League Competitions Get Conference Mention**

Two of the League's contests, slide rule and number sense, were included on the program of the third annual Conference for the Advancement of Science Teaching, held in Austin October 4-6. At the morning session on Oct. 5 a workshop was held on how to improve laboratory instruction in slide rule and number sense. The next day, John Wagner, of the Texas Science Teaching Improvement Program, conducted a panel presentation on the Interscholastic League, discussing the slide rule and number sense competitions.

*** October, 1956 ... **COST**

Number sense tests now available; two cents each, minimum order of ten of each test: J series, J1 - J9; M, series M1 - M7; N series, N1-N10; and O series, 01 - 06.

*** November, 1956 ... **Two El Paso Teachers Set Fine Math Records**



Two El Paso High School math teachers have used good teaching and careful coaching throughout the years as the secret to UIL State Meet success in number sense and slide rule contests.

Since 1949 Miss Rebekah Coffin, retired slide rule coach and chairman of the El Paso mathematics department, and Mrs. Elizabeth Hansen, math teacher and number sense coach, have consistently produced state winners in the two math contests.

Two of Miss Coffin's students won first places in the state slide rule contest, Martin Chonoles, in 1949, and Fred Grossman, in 1953. Mrs. Hansen has produced five consecutive state winners in

the number sense contest with Nancy Wilbanks, second place, 1949, and first place, 1950; Jim Webb, first place in 1951; Maurice Bryson, first place, 1952; Betty McAfee, first place, 1953; and Phillip Seeger, first place, 1954.

Mrs. Hansen attributes much of the success of her students to the method of training she uses. She urges students who are especially outstanding in freshman algebra to try out for number sense in the fall of their sophomore year. The students are given a ten-minute number sense test, and those scoring the 15 highest grades are admitted to the Number Sense Club. The club meets weekly for instruction and testing, Mrs. Hansen is able to choose the five or six best students. They practice an hour each day at school under Mrs. Hansen's drilling. No school credit is given the students taking the number sense drill, but it is conducted as a class. Training continues until time for the regional meet, when two representatives are selected. As her record demonstrates, Mrs. Hansen has found this method highly successful for sifting out the students most talented in math.

Mrs. Hansen, noted among students for her keen sense of humor, has chalked up 23 years of teaching. She holds a bachelor's degree in Latin from the University of Oklahoma and a master's degree in Spanish from the University of Colorado. She switched to teaching math after finding that students responded better to math than languages and because of the shortage of high school math teachers. Mrs. Hansen took courses at West Texas State Teachers College in Canyon to satisfy teaching certificate requirements for mathematics.

Miss Coffin, who retired from her position on the El Paso faculty last year after 31 years of teaching and is now on the faculty of the Barstow, Texas, public schools, initiated slide rule classes at El Paso High School.

She met every morning before school with students interested in learning to work the slide rule and gave special training to those who showed promise. She gave El Paso its two state slide rule champions.

One of the organizers of the Texas State Math Teachers Association and former officer in it, Miss Coffin holds a bachelor-of-arts degree from New Mexico State Teachers College and master's degree from Sul Ross State College. She joined the El Paso faculty in 1925 after serving as principal of the Columbus, New Mexico, high school.

On her retirement last year, Miss Coffin was named Woman of the Week by an El Paso newspaper and awarded a certificate of merit by the El Paso High School student council in recognition of her service to the school. As one El Paso High School student put it, "Both are what you may call 'born teachers.' There are few members of the faculty of whom we think as highly as we do these two. They have the most important qualities for a teacher. "

*** November, 1956 ... Leaguer article:

Math Champs Developed By Sound Plan

By John Wagner, Texas Science Teaching Improvement Program

As a preliminary to any discussion on developing interest and participation in the Slide Rule and Number Sense contests, it might be well to dwell a moment on the value of both these contests. The slide rule to many people, including both laymen and student, is a symbol of the engineering profession and of technology itself. Students are drawn to the use of the slide rule in a magnetic sort of way. As a matter of fact, in the on-going situation in the secondary school, the slide rule can be very valuable. It would seem a waste of time in an hour's period in physics or chemistry for a disproportionate amount of time to be spent on long hand calculation and burdensome

computation when the real learning goal is scientific concept. Accurate, rapid, use of the slide rule overcomes this barrier.

Quantitative Thinking

The rationale for the Number Sense contest is even more vivid. In reality the title "quantitative thinking" would be more accurate since this is the long range goal of participation. Number Sense aims at quantitative thinking, which is the stock in trade of any scientist or engineer worth his salt.

Harold Moser in a recent article comments: "Those who follow the literature of the teaching of arithmetic are finding more and more frequent mention of mental arithmetic. ... The importance of mental arithmetic is presently being enhanced by the popular swing toward meaningful arithmetic. This trend is based upon the belief that arithmetic is more properly a system of thinking than a body of content to be memorized. Since effectiveness in quantitative thinking depends upon a richness of number ideas, much effort is going into the planning of classroom activities that will help children to discover useful and effective ways of thinking about number."

Obtaining Prospects

There are several sources for deriving students for participation in both these meaningful activities. They will be listed briefly:

1. Mathematics clubs. The literature is rich in activities, programs,, and projects for clubs. An active club should find little difficulty in getting interest in either contest.
2. The mathematically talented pupil. Contest work should appeal heartily to the above average student in mathematics or science with only little encouragement from the sponsor.
3. Course in advanced math. Mental arithmetic and slide rule work make a wholesome addition to any curricular innovations in the field of mathematics on the level above trigonometry or algebra.
4. Regular course work. As part of the regular course work in trig, solid geometry, physics, chemistry, or algebra there could easily be introduced the use of the slide rule. Both science and mathematics teachers should have responsibility for the introduction and effective use of the slide rule.
5. Checking school records. The interested sponsor should regularly check the cumulative records of the school to attempt to uncover prospective talent. Number sense or slide rule may be just the thing to bring them out of hiding.
6. Teacher recommendations. Too often the talented pupil has time on his hands and may be a discipline case in one teacher's class. This teacher would do well to refer this case first to the sponsor of mathematics competition. Contest work may absorb the talent of this student and serve as a springboard to significant work in mathematics or science.

Use Quality Rule

The following suggestions to sponsors are presented in a rather random manner. They simply represent a series of thoughts that come to mind after several years of activity associated with both contests.

Nothing will substitute for a quality slide rule both from the viewpoint of accuracy or speed. At first the student might have to use an inexpensive student-type rule, but as soon as the switch to a quality instrument can be made, it should be done. Quite often the parent desires information on Christmas presents and the like, and the suggestion of the purchase by them of a good rule may just fill the bill. By the same token the teacher should have a good, large demonstration slide rule for the classroom. The several manufacturers sell them at reasonable rates to the schools. Teaching effectiveness can be enhanced many times over with such a visual device. The room

where the slide rule activities are practiced should be equipped with tables and comfortable chairs so as to stimulate contest conditions and also give the student comfortable working quarters.

Text References

There are several good text books for use with slide rule but reliable information in the Number Sense field is rather limited. Two books that are valuable include:

Meyers, Lester. *HIGH-SPEED MATHEMATICS*. New York: D. Van Nostrand Co., 1947.

Slade, B. A. *SHORT CUT MATHEMATICS*. Chicago: Nel-Hall, 1953.

Both of these books contain all the short-cut methods that the writer has been able to dig up independently over the past several years.

In slide rule we might find valuable:

Hills, E. Justin. *A COURSE IN SLIDE RULE AND LOGARITHMS*. Dallas: Ginn and Co., 1950.

Leach, H. W. and Beakley, George C. *THE SLIDE RULE*. New York: The Macmillan Co., 1950.

Machovina, Paul E., *A MANUAL FOR THE SLIDE RULE*. New York: McGraw-Hill Book Co., 1950.

Note Books

In slide rule probably one of the finest things that the sponsor can do is to have the students organize a note book of old contests. This should include a loose leaf note book which includes all tests ever administered by the League from number 30 to the present. The student should secure a key and put answers to all problems on the reverse side of the contest sheet. When student practices he may remove the contest from the note book and use slips of paper over in the answer column. These slips may consist of 8 1/2 x 11 mimeo paper cut into three slips. When the sample contest is completed, the problem sheet can be turned over and the answers on the slips graded. In this fashion the same tests may be used many times. The student should also be disciplined at this time not to mark on the contest sheet. All work should either be done on the slide rule or mentally.

The Number Sense participant would do well to have a note book of old contests and also the booklet *DEVELOPING NUMBER SENSE*, which includes 1,000 excellent problems. He should also have on hand reliable keys so that his regularly self-administered tests can be graded accurately and promptly.

Contest Conditions

The sponsor in both contests should have on hand several mechanical kitchen timers. These times can be used for timing the practice contest, 30 minutes for slide rule and 10 minutes for number sense. With such a timer the sponsor can go about his business doing something else during this time and not be spending all of his time glancing at his watch. At this time it should be mentioned that in all practice sessions, contest conditions should be simulated. This is true in timing, having students compete against each other, and in grading their efforts, even in the early practices. These efforts should remove any possibility of jitters later on.

In both slide rule and number sense the enthusiastic sponsor would do well to organize and mimeograph introductory lessons illustrating the various processes demanded of the student in both contests. Good leads should be furnished by reference to old contests. Introduction of such lessons should be preceded by sound explanation as to theory behind the processes. Winners in these contests come from students who know the theory and meaning behind what they are doing and are not just operating on blindly memorized material. Each year's contests contain just enough of the new and novel to catch the "blind" student off-guard for a second or third best.

Other Techniques

In the development of top-notch, state winners, the writer innovated several techniques which might be passed along. For several years at Kerrville we have "doctored" old tests. That is to say, we took the original contests and altered all the problems to make them overly difficult. Some of the problems we fixed were horribly grotesque. Yet, students finished the contests which contained them and when district meet came along it would seem rather simple by comparison. The theory behind this being that the work-out should be far more difficult than the actual game. Another extension of this idea was to make up several contests with approximately 80 tough problems of nightmare variety stemming from the several problems on actual contests which had proved of more than average difficulty. These tests were also administered under contest conditions with the school's several participants. The only difficulty with this approach to developing contest winners is that some bit of difficulty is met in developing accurate keys. This could be a good opportunity for introducing the use of the electrical calculator for schools that might have them in their business offices.

Plan Competitions

Good will also comes about by organizing contests with other schools both before and after the various organized meets. A pleasant afternoon or Saturday morning can be spent by have several neighboring schools get together for informal contests and discussions of "tricks of the trade." Both teachers and students would profit from such wholesome get-togethers. The students should also be responsible for keeping a log of their scores on the various tests. Their own improvement then becomes obvious over the weeks with terrific motivating power as well as serving as a source of competition between the various participants. We had a lot of success in Kerrville in keeping the scores of the "old-timers" and letting this be a goal for the beginners. When the newcomer finds he is up to par with a former regional or state champion he is hard to hold down.

Speed, Speed, Speed

Under odds and ends might be mentioned the efficacy of introducing the matter of speed early in the development of contestants. Their motto might well become "Speed, Speed, Speed." Again, and it cannot be over stressed, is the point of, at all times, duplicating contest conditions. And lastly is the matter of having a good time with the work and communicating that attitude to your students.

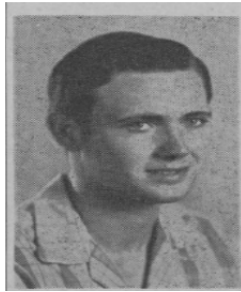
Make trips with the participants, enjoy yourself, and have a good time. If you lose a contest once in a while, find out what happened and be better prepared next time. If there is a winner, there has to be a loser. I doubt, however, that there is, in reality, a "loser" in an activity such as slide rule and number sense with their terrific carry-over effects to both school work and later life.

Ask Questions

As a last note to the sponsor, I might mention the term "inquisitiveness." Have no hesitation at the various meets about asking questions of other sponsors whose student are showing some degree of skill. I have been amazed in the past six years at the response I have had to my questions. "How do you do this?" This has been true in both number sense and slide rule contests.

The successful sponsors I know have been more than eager to pass "the word" along about what makes their programs successful. And although I have left a number of gaps in this article, I feel the same way about sharing my experiences as a number sense and slide rule coach. If I can be of any further assistance, please write: John Wagner, Consultant, Texas Science Teaching Improvement Program, 308 Extension Building, The University of Texas, Austin 12, Texas.

***** November, 1956 ... Double Winner**



Wade Dyer, 17-year-old Bowie High School senior, was a dual State Meet winner last year with a first place in both the Conference A slide rule and number sense contests. Wade, son of Mrs. Jewell Dyer of Bowie, is also a three-year letterman in basketball and a member of the Bowie track squad. Last year he was top student in the junior class and after graduation he plans to study some field of engineering, either at The University of Texas or Abilene Christian College. R. E. Mattingly coached Wade in the slide rule contests and Mrs. Venita Bradford was his number sense coach.

***** January, 1957 ... Math Teachers Now Eligible for New Cash Awards Plan**

Good news for Texas high school math teachers! The Actuaries Club of the Southwest has made available \$2700 for scholarships and awards for Texas teachers who are judged to be most successful in promoting student interest and participation in the Interscholastic League number sense competitions. Final details of the awards program are still being worked out, but present planning calls for a \$300 award to be given the outstanding teacher in each of the eight League regions of Texas. It is felt this fine method of recognizing teachers who are pre-eminent in arousing interest in mathematics should do much to increase student participation in number sense contest.

The Actuaries Club of the Southwest, made up members of the actuarial staffs of many Texas life insurance companies and a few out-of-state firms, has inaugurated the program to stimulate interest in the actuarial profession. Too few qualified high school graduates are entering this field, while engineering, science and other professional fields attract most of the small number of high school students showing promise in mathematics.

Instead of presenting awards to the outstanding graduates the Club plans to recognize the teachers who have been, and will remain, instrumental in finding students gifted in mathematics and in developing their ability.

Since the teachers are so important in discovering talent among students, it seems fitting that they receive this recognition for a job well done. The classroom teacher with vision will assist the student to develop when he shows signs of being capable and desirous of achieving something over and beyond the regular routine of classwork.

The criteria for becoming eligible for one of the Actuaries Club awards will be published in the February issue of the Leaguer. It is hoped that Texas math teachers will be interested in qualifying for one of these scholarship awards.

***** February, 1957 ... Committee Sets Rules For Math Award Plan**

All Texas high school math teachers who qualify contestants to the regional meet will become eligible to receive one of the eight \$300 Number Sense Scholarship Awards sponsored by the Actuaries Club of the Southwest, according to a report from the awards committee.

The three-man committee met in Austin January 31 to formulate plans for selecting one winner from each of the eight League regions. The group includes League Director R. J. Kidd, Gene P. Archer of Dallas, associate actuary of Southland Life Insurance Company and chair man of the Actuaries Club's education committee, and W. R. Battle of Dallas, associate actuary of Southwestern Life Insurance Company and a member and former chairman of the Club's educational committee.

Cash Awards

The Number Sense Scholarship Awards, first announced in the January Leaguer, will be made from funds donated by the Actuaries Club of the Southwest and obtained from some 50 Texas life insurance firms. An award will be made to the math teacher in each region who is judged to be most successful in promoting student interest and participation in mathematics and the Interscholastic League number sense competitions. The eight winners will be decided at the individual regional levels by a committee composed of the director general of the regional meet, the director of the regional number sense contests, and the director of the regional slide rule contests. Although a candidate for one of the cash awards must qualify a contest to the regional number sense contest, there is no stipulation that the teacher's entry must be a regional winner, although this point might be considered by the judges if all other factors were equal.

Requirements

In addition, a candidate must:

1. Prepare a personal data sheet in duplicate, sending one copy to Archer or Battle in Dallas and other to the director general of the regional meet. (These data sheets, although not ready at this time, may be procured from the League Office or from the regional director.)
2. Be actively engaged in teaching math in high school and in coaching contestants for the number sense contest.
3. Have a record of successful achievement in teaching mathematics.
4. Be actively encouraging students to participate in the number sense contest.

Other areas to be considered by the judging committee are the total number of students entered in the preliminary number sense contests, as attested to by the candidates' high school principals, and the total number of students attending the number sense workshops at the Student Activities Conferences.

Announced in May

After the final selection, the regional selection committee will send the names of the three finalists along with each finalist's background material, and the name of the winner to the educational committee of the Actuaries Club of the Southwest. The winners will be announced on or about May 1, and will be again recognized at the fall Student Activities Conference in their respective regions.

The Actuaries Club of the Southwest, made up of members of the actuarial staffs of many Texas life insurance companies, has inaugurated the program to stimulate a greater interest in teaching and studying the mathematics field. The League endorses the plan with the feeling it is a fine method of recognizing teachers responsible for stimulating interest in mathematics in general, and student participation in the number sense contests in particular.

***** February, 1957 ... Popular Programs**

The State office published 85,000 spelling lists for use in the League spelling contest during the 1955-56 school year. The supply was exhausted by January 1, 1956. This year (1956-1957), the State office published 100,000 copies of the bulletin and, as of February 1, 1957, had approximately 30,000 copies left for distribution to the schools.

The League number sense bulletin has also been in great demand. In the last twelve months, 10,000 copies of Dr. J. W. Calhoun's bulletin entitled "Developing Number Sense" have been sold.

Frequently people say that students are not interested in spelling or arithmetic. If the demand for these two publications in Texas are indicative of the interest in these two basic subjects, it appears that teachers are doing an excellent job in promoting interest in spelling and arithmetic.

***** February, 1957 ... Elementary Number Sense**

In the past, both elementary and high schools have been using the same number sense tests in League meets. These tests have been made more difficult through the years, in order to challenge the talented high school math student. This change has resulted in tests being too difficult for the elementary student. Many have complained that the tests are too rigid and that they destroy the interest of the elementary pupil in the number sense contest. In order to correct this situation, a new series of number sense tests has been prepared especially for the elementary grades. These tests will be available for distribution to the elementary schools this spring. These are designated "E-series" and may be purchased by writing to the state office.

***** March, 1957 ... Number Sense Tests Available for Practice**

Some time ago, the State office announced a special series of number sense tests for elementary contestants. This test is the E-series. Only tests E-1, E-2, and E-3 will be available for sale as practice material this spring.

***** April, 1957 ... Beckman Starts New Scholarship**

The Henry Beckman Number Sense Scholarship award will be awarded for the first time in September by The University of Texas. Applicants for the award, made possible by a \$500 grant to the University, must be high school seniors who are planning to enter the University and who have participated in Interscholastic League number sense contests at the regional or state meet levels. Interested applicants can obtain further information by writing to the Chairman of the Committee on Loans and Scholarship Information, The University of Texas.

Beckman has been awarding similar scholarships to UIL slide rule winners for several years. Texas high school seniors with engineering ambitions may compete this spring for the \$200 University of Texas Henry Beckman Scholarship and Slide Rule Proficiency Award.

The competition is open to seniors who rank scholastically in the upper 25 per cent of their class and who participate in the University Interscholastic League State Meet slide rule contest in Austin on May 3.

On May 4 the applicant must compete in a 200-word essay contest on why he or she wants to study engineering at The University of Texas. The contest is scheduled for 1 p.m. in

Experimental Science Building 115 on the University campus. Qualified applicants may report to the contest without having made any official application.

The successful award candidate will be announced between August 1 and September 15. Before that time the recipient must have qualified for admission to the University by a satisfactory admissions test and must complete all English and mathematics entrance requirements for the University College of Engineering.

Final selection of the award winner will be made on the basis of his scholastic preparation, proficiency in the use of the slide rule, his contest paper, and possibly an interview with the award committee members.

The \$200 will be paid in two installments, with one-half of the sum being paid at the first of each of the two initial semesters in which the recipient matriculates in the University College of Engineering.

The award was made for the first time in 1956 with Roy Glen Turnbo of Kempner the winner. Additional content information may be obtained from Dr. Leonardt F. Kreisle, Mechanical Engineering Department, University of Texas, Austin 12.

*** September, 1957 ... **Math Teachers Collect Awards**

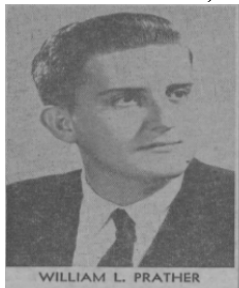
Eight Texas high school math teachers are \$300 richer as a result of their activities in promoting mathematics among their students and coaching contestants for the League's number sense contests.

The eight teachers were named winners of the newly-created Number Sense Scholarship Awards originated last spring by the Actuaries Club of the Southwest. They are: Region I, Miss Ellabelle Radford, Quanah; Region II, J. F. Crabtree, Stephenville; Region III, Miss Fay Cocanouer, Decatur; Region IV, Miss Georgette Ellis, White Oak; Region V, W. J. Harlan, Liberty; Region VI, Miss Juanita Welch, Temple; Region VII, Miss Edith Carman, Pharr; and Region VIII, Mrs. Elizabeth Hansen, El Paso.

The winners were selected on the basis of success in promoting student interest and participation in mathematics in general, and in the Interscholastic League number sense contest in particular. To be eligible, it was mandatory that a teacher coach a student to the Regional Meet level in number sense, but there was no stipulation that the contestant win Regional or advance to the State Meet. In fact, of the eight winners, only three had contestants placing in State Meet. Miss Ellis' entry won second in conference B, Miss Welch's contestant won second place in AA, and Mr. Harlan's entry took third place in conference A.

Winners were selected at the regional level by a committee composed of the director general of the regional meet, the director of the regional number sense contest and the regional slide rule director.

*** September, 1957 ... **Bill Prather, Donna Student, Wins Number Sense Award**



WILLIAM L. PRATHER

William L. Prather, a 1957 graduate of Donna High School, has been named the recipient of the first annual Henry Beckman Number Sense Scholarship award and will enroll this fall at The University of Texas.

The \$500 scholarship, made for the first time this year, was given to the Donna youth on the basis of character, integrity, participation in the Interscholastic League's Number Sense contests, and other factors.

Bill, son of Mrs. Iris Prather of Donna, was the highest ranking boy in his senior class scholastically, he has been extremely active in church work and served as church organist at the Donna First Methodist Church, and he has competed in the League's Number Sense Contest for the past three years.

This Number Sense award is the second math scholarship established within the past two years by Henry Beckman. In 1956 Beckman created the Henry Beckman Scholarship and Slide Rule Proficiency Award for competitors in the League's Slide Rule contest. The first Slide Rule Scholarship, for \$200, was won last year by Glen Turnbo of Kempner.

*** October, 1957 ... **Participation Waning?**

Interscholastic League Contest	Participation		Percent Increase
	1953	1957	
Slide Rule	169	366	116.6
Debate (teams)	259	527	103.5
Girls' Extemp Speech	236	418	77.1
Boys' Extemp Speech	241	377	56.4
Number Sense	379	563	48.5
Shorthand	371	541	45.8
Ready Writing	439	636	44.9
One-act Play	353	502	42.2
Typewriting	520	699	34.4
Girls' Declamation	522	619	18.6
Boys' Declamation	468	548	17.1
TOTALS	3,957	5,796	43.9

Some people are convinced that participation in the League's literary and academic contests is waning. However, figures on spring meet participation indicate this belief is not justified. Prior to World War II, the spring meet contests were conducted on a county-wide, or County Meet, basis. During this period the interest was local and participation was at an all-time high. With the outbreak of World War II and the ensuing restrictions on travel, many schools dropped their forensic programs. The war provided the excuse for many to discontinue the non-profit-making academic activities, and many of these schools have never seen fit to resume competition in the non-athletic contests.

Immediately after World War II, participation in the literary and academic contests was at the lowest ebb in League history.

The League then began to reorganize the spring meet program and inaugurated the present conference plan of competition. Student Activities Conferences were sponsored in virtually every section of the State to provide additional impetus for re-entering the literary and academic fields of competition, and interest in these contests began to grow. Since that time, participation in all literary and academic activities has gradually and steadily increased.

According to reports from director generals of district meets, much of this increase has occurred during the past three years. The chart above indicates the actual number of contestants at the district level in 1953 and 1957, and reflects the continued healthy growth that is going on. It should speak for itself to refute the idea that League participation in literary and academic contests is on a steady decline. .

*** December, 1957 ...

Math Awards Get Renewal Actuarial Club Reports Prizes Again Available

League Director R. J. Kidd has received confirmation from the Actuaries Club of the Southwest that the group will again offer eight \$300 Number Sense Awards to qualifying high school math teachers.

These eight cash awards (one for each Region in the State) were made for the first time last year to teachers judged most successful in promoting student interest and participation in mathematics and the Interscholastic League's number sense contests.

A meeting will be scheduled soon after the first of the year to set up the criteria for making the awards for the 1957-58 school year. Scheduled to attend this meeting are Kidd and two representatives of the Actuaries Club's educational committee— Gene P. Archer, Dallas, associate actuary of Southland Life Insurance Co. and W. R. Battle, Dallas, associate actuary of Southwestern Life Insurance Co.

It is believed, however, the rules will remain basically the same as those set up last year. Under this plan the winner in each region was determined by a regional committee composed of the director general of the regional meet and the slide rule and number sense contest directors of the regional meet. There was also the stipulation that a candidate must qualify a number sense contestant to the regional meet, although it was not mandatory for the contestant to win at regional in order for his coach to be eligible. In addition, a candidate was required to:

1. Secure a personal data sheet from the League Office, prepare it in duplicate, and send one copy to Archer or Battle in Dallas and the other to the director general of the regional meet.
2. Be actively engaged in teaching math in high school and in coaching contestants for the number sense contest.
3. Have a record of successful achievement in teaching mathematics.
4. Be actively encouraging student to participate in the number sense contest.

The Actuaries Club of the Southwest, made up of members of the actuarial staffs of many Texas life insurance companies, inaugurated the program to stimulate a greater interest in teaching and studying mathematics. The League has cooperated in the Award plan with the feeling that it provides an excellent opportunity to recognize outstanding high school math teachers and to stimulate interest in the number sense contests.

*** December, 1957 ... **FRESHMAN CHAMPION**



Winfred Blanton, Granbury, came to State Meet last year as a freshman and walked off with the conference A championship in number sense. He was coached by Mrs. Emma Roberson. Winfred is an honor student, a member of the baseball team, enjoys hunting and fishing, and plans to be a nuclear physicist or electronics engineer.

*** February, 1958 ... **Cash Awards Again Available For Number Sense Coaches**

For the second consecutive year the Actuaries' Club of the Southwest will provide eight \$300 cash awards for outstanding number sense sponsors throughout the State, with an award going to one mathematics teacher from each of the eight League regions. Purposes of the awards are to promote interest in the study of pure mathematics and to reward classroom teachers who are doing outstanding jobs of coaching number sense contestants and encouraging their best students to compete in the district, regional and State contests.

Increase Noted

Although the awards were given only last year for the first time, the State Office has already discerned a decided increase in number sense participation. The demand for number sense material has increased and more students have been attending the number sense and slide rule sections of the fall Student Activities

Conferences

Following the procedure established last year, the selection of winners will be done in each region by a selection committee, composed of the regional contest director general, the director of the regional number sense contest and the regional slide rule director.

For additional information, schools should contact their regional contest directors. (See list in this issue of the Leaguer.) Factors Considered Since the basic purpose of the award is to encourage and stimulate the coach or sponsor to interest more students in mathematics, through the number sense contest, the regional selection committee will consider such factors as: years of teaching experience, the number of years a candidate has had contestants reach the regional or State meets, the number of students who "tried out" for the number sense contests, and the number of students attending the fall Student Activities Conferences. Last year's eight winners will be ineligible for consideration again this year by the regional selection committees.

Reactions Last Year

Corresponding with and investigating the backgrounds of the recipients of the eight \$300 number sense awards originated last year by the Actuaries' Club of the Southwest, Gene P. Archer, Dallas, chairman of the Club's Education Committee, came up with some interesting highlights and sidelights.

The winners incidentally, were: Miss Ellabelle Radford, Quanah, Region I; J. F. Crabtree, Stephenville, Region II; Miss Fay Cocanougher, Decatur, Region III; Miss Georgette Ellis,

White Oak, Region IV; W. J. Harlan, Liberty, Region V; Miss Juanita Welch, Temple, Region VI; Miss Edith Carman, Pharr - San Juan - Alamo High School, Region VII; Mrs. Elizabeth Hanson, El Paso, Region VIII.

Inspiration for All

The general feeling of the teachers was that the awards offered a great source of encouragement to Texas math teachers. One said "We teachers often become discouraged when we try so hard to get capable high school students interested in the fields of math and science and they want take the easier courses.

The awards . . . will be an inspiration for us to put forth more effort." Another stated "You are doing much to encourage interest in the field of mathematics." One winner reported "I will attempt to show my appreciation by doing a better job of teaching mathematics and science and in the number sense contest."

Students Stick

This observation was made by another: "Your reason for giving this award does serve its purpose. Students who are encouraged to work in number sense almost always become very interested in math careers."

The combined high school and junior high teaching experience of the winners spans 144 years—an average of 18 years for each. The "novice" of the group is Miss Radford, who has been teaching math for the past 10 years at Quanah, and the "veteran" is Miss Cocanougher, with 31 years. Miss Radford has been coaching slide rule and number sense contestants since 1955 and has qualified students to State Meet twice in number sense and once in slide rule.

Excellent Records

Miss Carman began coaching number sense in 1946 and has qualified contestants to regional each year since. For seven years she qualified one or more contestants to State Meet and one, Daniel Bowker, went to State each year he was in high school. In 1949 he placed third, in 1950 he was second and in 1951 another of her contestants, Robert McCharen, won first. She has coached slide rule for the past four years, and sent contestants to regional twice.

Miss Cocanougher began coaching slide rule and number sense in 1949 and has had a student qualify to state in one of the events each year since. Her number sense contestants have reached State five times, and won one second, and her slide rule contestants have made it eight years, with one first place.

Miss Ellis has qualified number sense contestants to regional meet for eleven years and they have reached State eight times. In slide rule, her students have qualified to regional and State for nine consecutive years, winning the title in 1952 and 1954.

Mrs. Hansen has coached five successive State champions in number sense from El Paso High School.

And all are continuing work in the math field—two are teaching mathematics, one is planning to begin teaching math next fall, one recently graduated from Harvard with honors in physics, and the other is majoring in physics and math at Rice Institute.

*** February, 1958 ... **Wagner Suggests Math References**

Need slide rule and number sense help?

John Wagner, consultant for the Texas Science Teaching Improvement Program and a guest math consultant at many Student Activities Conferences last year, has offered a list of references in addition to the League publications on slide rule and number sense. They are:

Number Sense

Bass, Ernest F., *Aids and Shortcuts in Arithmetic*. Portland: Ernst F. Bass (4043 N. E. 28th Ave., Portland 12, Oregon). 1956.

Collins, A. Frederick, *Magic With Numbers*. New York: . Surrey House, (distributed by The Citadel Press, 222 Fourth Avenue, New York 3, N. Y.). 1956.

Gilles, William F., *The Magic and Oddity of Numbers*. New York: Vantage Press (120 West 31st Street, New York 1, N. Y.). 1953.

Meyers, Lester, *High – Speed Mathematics*. New York: D. Van Nostrand Co. (250 Fourth Ave., New York 3, N. Y.). 1947.

Slide Rule

Engineering Instruments, *The Quick and Easy Slide Rule Instruction Book*, Peru, Indiana: Engineering Instruments, Inc.

Harris, C. O., *Slide Rule Simplified*. Chicago: American Technical Society (848 East Fifty-Eighth Street, Chicago 37, Illinois). 1943.

Hills, E. Justin, *A Course in the Slide Rule*. Dallas: Ginn and Company. 1950.

Leach, H. W. and Beakly, George C, *The Slide Rule*. New York: The Macmillan Co. 1953.

Machovina, Paul E., *A Manual for the Slide Rule*. New York: McGraw-Hill Book Co. 1950.

*** February, 1958 ... **Tivy Delegates Refuse to Miss**

Tivy High School (Kerrville) has compiled an admirable record in League slide rule and number sense competitions, and this may partly show why: Tivy's November trip to the Student Activities Conference nearest Kerrville (San Marcos—about 85 miles) was called off due to inclement weather, thus depriving the conference of some 130 extra students. This, no doubt, was disappointing to all of the students, but those interested in the math competitions did something about it—they decided to attend the conference next closest to home. As a result, two carloads of them showed up at the January 11 Kingsville Conference —some 200 miles away. This speaks highly of the benefits of the Student Activities Conference, and just as highly of the initiative of the Tivy students, and, needless to say, was gratifying to all concerned

*** March, 1958 ... **Two Scholarships Again Available**

Two mathematics scholarships are again available to graduating high school seniors who participate in the University Interscholastic League slide rule or number sense contests at Regional Meet. Both scholarships—a \$200 slide rule award and a \$500 number sense scholarship—were established in recent years by Henry Beckman of Austin and coaches of these two League contests who have contestants planning to enroll in The University of Texas should urge them to investigate the awards. Complete details for application, along with other qualifications needed, can be obtained from: Scholarship Committee, The University of Texas, Austin 12.

*** March, 1958 ... **LETTERS TO THE EDITOR**

Dear Mr. Kidd:

The award given me by the Actuaries Club last year truly culminated a year of most rewarding work.

It's an incentive to more students to become proficient in number sense when they realize first-hand that it pays in more ways than they had thought.

Our program here started in 1955. Our first beginner in slide rule graduated last year and is doing well in science and mathematics at Texas A&M. This year, we will graduate the first two to take part in the number sense program. Since they have had the highest scholastic averages in their class each year they will probably be our valedictorian and salutatorian. Both plan careers in the field of science, mathematics or engineering.

Since the beginning of the program here we have qualified contestants to the Regional Meet in both events, and the last two years we qualified contestants to the State Meet in number sense. Last year we had a contestant in the State Meet slide rule contest, too.

There is a great deal of enthusiasm for the program among our students and each year more students participate than the year before. It is strictly on a voluntary basis and the students give up their study period to take part in the activities.

Like all the coaches in slide rule and number sense — I'm hoping to see you in Austin in May.
Ellabelle Radford, Quanah High School

*** April, 1958 ... **B CHAMP**



Conference B number sense champ last year was Charles McLure, a senior at Van Horn High School. Although he has had no formal "coaching" in the event, Charles has been participating in both number sense and slide rule since his freshman year. He has also been busy competing in journalism and track, and won the National Science Award to attend the University of Kansas last summer. He plans a career in nuclear engineering and will study either at The University of Texas or the University of California.

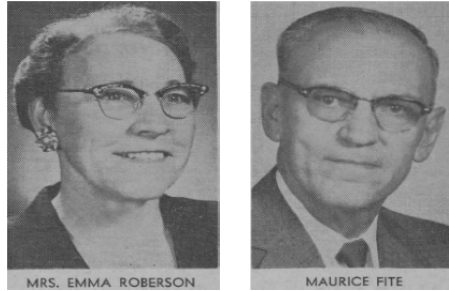
*** September, 1958 ... **NUMBER SENSE WINNER**



Robbie Ann Walters of Yoakum High School is the first girl to win the \$500 Henry Beckman Number Sense Scholarship. Robbie Ann, who plans to enter The University of Texas this fall and work toward a degree in mathematics, made an outstanding record in high school. She was

valedictorian of her class, National Honor Society president, state semi-finalist in debate, third place winner in extemp speech, a regional number sense winner, a member of her school newspaper staff and a member of the all-state band. She also served as band president and was a member of the one-act play cast.

*** September, 1958 ... **Lubbock and Granbury Teachers Get Awards**



Mrs. Emma Stephen Roberson of Granbury High School won the \$300 number sense award given by the Actuaries Club of the Southwest in Region II. Mrs. Roberson has been teaching since 1925. Her 32 years of teaching have ranged from grade school through junior and into senior high school. Also, she has served as principal of both junior and senior high schools.

Math and Basketball

For the last twelve years she has taught only mathematics in high school. Not only has she been active in coaching slide rule and number sense in addition to her regular classroom work, but she has also served as class sponsor of the yearbook and for sixteen years has been the girls' basketball coach. Since 1952, Mrs. Roberson has had from one to five contestants qualify to the regional meet in number sense and slide rule. Except for one year during this time, one or two contestants have qualified annually to the State Meet. At State Meet, one student placed first in number sense, one tied for first place, and two placed second.

Additional Training

"The Actuaries Club is doing a wonderful thing to sponsor this number sense award," says Mrs. Roberson. "In my home town, money seems to ring the bell louder than most, because I have had such enthusiastic congratulations upon having won the award. Math is certainly being taught more than ever before. Yes, I plan to further my educational training in mathematics so that I may better fulfill my obligation to my students. "Recognition in this field means more to me than any other phase of my teaching," Mrs. Roberson continued. "Mathematics is such an interesting and vital subject that I am so happy it is now recognized as essential to our curriculum rather than as a L'fill-in'."

Maurice Fite, an algebra teacher in the Monterey High School at Lubbock since 1951, won the Region I \$300 recognition by the Actuaries Club of the Southwest for his outstanding work in coaching number sense contestants.

Likes Classroom

Fite has taught mathematics in Texas schools for 35 years. He has served as high school coach, principal and superintendent, but in 1951 he finally decided that the regular classroom work was best for him.

Immediately he became interested in coaching and developing a number sense team, which in 1952 won second and third place at the district meet. In 1955, his team won first and second at the district and regional meets, and placed sixth and eighth at the State Meet.

In 1956 Don Cannon of Monterey won second place at state and in 1957 won first place. In 1958, Jerry Milburn won third place at the State Meet, after placing first at the regional meet over this year's state winner, Neal Parker of Tom S. Lubbock High School.

*** November, 1958 ... **Actuaries Club Offers Awards**

The Actuaries Club of the Southwest will again offer eight regional awards of \$300 to teachers and sponsors who have done outstanding work in the number sense contest. To date, sixteen teachers have benefited from this annual award, receiving a total of \$4800 in the last two years. The Regional Executive Committees have selected award winners on the basis of the following criteria:

Award Criteria

1. Number of students the sponsor has interested in the contest.
2. Number of students attending the number sense section of the Student Activities Conference held in the area.
3. Number of students qualifying from the district to the region and from the regional to the State Meet.
4. Number of years the sponsor has been promoting mathematics contests in the local high school.

Participation Increase

Since this award was inaugurated, attendance at the number sense conferences has noticeably increased.

High schools in the larger towns and cities are becoming interested in the number sense and slide rule contests for the first time. Judging from the orders received in the League office for the number sense practice material, this should be one of the best years in League participation in this contest.

Number sense sponsors who have never applied for the Actuaries Club award should do so this year. If your school has been entering this contest at the district meet, write for application blanks for this award from the League office.

Math Contests

The University Interscholastic League is the only high school state association in the nation which sponsors two mathematics' contests on an interscholastic basis, with a final state championship being awarded to the winners. Many national mathematics contests are sponsored by organizations other than the official state high school league. Last year, 650 Texas high schools participated in the number sense contest. Slide Rule is one of the newer contests, but still 375 schools entered this contest last year.



ACTUARIAL WINNERS—J. B. Hardway, left, math teacher at Pittsburg High School, and Charles A. McNeill, Sugar Land, were two of the eight winners of the number sense awards presented by the Actuaries Club of the Southwest. Hardway, the Region IV winner, has served

the public schools for 30 years as principal, coach and classroom teacher, and has achieved an outstanding record in training number sense contestants. One of his contestants, Willis Russell, was the winner of the Beckman Slide Rule Proficiency scholarship at The University of Texas in 1956. McNeill, the Region V winner, has been teaching math and science for four years and has coached number sense and slide rule contestants during that time. In number sense his contestants have reached regional all four years and one, Kenneth Albers, won first place at State Meet in 1956. In slide rule he has had contestants reach the regional level for three years.

*** November, 1958 ... Leaguer article:

Number Sense Tips Given by Director

by James M. Hurt, State Number Sense Director

The main obstacles to effective mental calculation are lack of knowledge of proper methods of adding, subtracting, multiplying and dividing mentally and insufficient information about the technical aspects of the problem to be solved.

Methods of calculation suitable and proper for pencil work are seldom suitable for mental work. One who tries to calculate mentally as he would on paper encounters great difficulty; even if he succeeds, his work is slow and awkward. He may decide that mental calculation is not feasible and may resolve to use paper and pencil for all such work.

Valuable Skill

On the other hand, one who attempts mental calculation with proper methods finds the process quite feasible and acquires, if he works diligently, a valuable skill which will serve him well as long as he lives.

In addition to proper method, the calculator must have sufficient technical information to set up the problem. Add to method and technical data plenty of practice and the sum is an effective mental calculator.

Many are the methods of mental calculation. There is indeed no end to the number of them.

Certain methods, however, are basic and must be learned by every number sense contestant.

Many of these may be found in "Developing Number Sense" by Professor J. W. Calhoun, a copy of which should be possessed by every number sense coach and student.

Additional Methods

Such devices as multiplying by 4 in order to effect division by 25 are fully discussed in this pamphlet.

Mastery of the methods presented by Professor Calhoun is necessary, but not sufficient for successful competition in the number sense contest. An examination of recent number sense tests reveals many problems that are not amenable to these basic devices. Additional methods are needed. A discussion of certain of these follows:

I. Use of fractions in multiplying and dividing:

Example: $425 \times 825 = 4\% \times 8\% \times 100 \times 100 = (32 + 1 + 2 + A) \times 10,000 = 35.0625 \times 10,000 = 350,625$.

Note the need to have in mind the conversion of A to .0625 and to observe that $425 = 4\% \times 100$.

Example: Estimate 38×72.24 to within 5 per cent.

Solution: Since 38 is close to 37% and 37% is $\% \times 100$, then 38×72.24 is slightly larger than $\% \times 100 \times 72.24$, which is equal to $\% \times 7224 = 3 \times 903 = 2709$.

Example: $450 \sim 62\% = 450 -r- (\% \times 100) = 4.5 \times 8/5 = .9 \times 8 = 7.2$

II. Adjustment of terms and factors in finding sums, differences, and products:

Example: Find the sum of 89 and 58.

Since $a + b = (a + c) + (b - c) = (a - c) - f(b + c)$, then $89 + 58 = (89 - 2) + (58 + 2) = 87 + 60 = 147$ or $89 + 58 = (89 + 11) + (58 - 11) = 100 + 47 = 147$.

Example: $\$5.73 - \$2.88 = ?$

Now $a - b = (a - c) - (b - c) = (a - f - c) - (b + c)$.

So $\$5.73 - \$2.88 = (\$5.73 + \$0.12) - (\$2.88 + \$0.12) = \$5.85 - \$3.00 = \$2.85$.

Example: $89 \times 89 = ?$

Since $a^2 = (a + c)(a - c) + c^2$, then $89 \times 89 = 89^2 = (89 + 11)(89 - 11) + (11 \times 11) = (100 \times 78) + 121 = 7800 + 121 = 7921$

Example: $19 \times 19 = (20 \times 18) + 1 = 360 + 1 = 361$

Example: $28 \times 28 = (30 \times 26) + (2 \times 2) = 780 + 4 = 784$

Example: $48 \times 52 = ?$

Since $(a - c)(a + c) = a^2 - c^2$, then $48 \times 52 = (50 - 2)(50 + 2) = 50^2 - 2^2 = 2500 - 4 = 2496$

Example: $82 \times 34 = (80 + 2)(30 + 4) = 2400 + 320 + 60 + 8 = 2788$

III. Use of cumulative information:

Example: $24 \times 24 = (28 \times 20) + 16 = 576$

Example: $24 \times 24 \frac{1}{2} = (24 \times 24) + (24 \times \frac{1}{2}) = 576 + 12 = 588$

Example: $24 \frac{1}{2} \times 24 \frac{1}{2} = (24 \times 24) + 24 + \frac{1}{2} = 576 + 24 + \frac{1}{2} = 600 \frac{1}{2}$

Example: $24 \frac{1}{2} \times 24 \frac{3}{8} = 576 + 18 + 12 + \frac{3}{8} = 606 \frac{3}{8}$

Example: $245 \times 24 = 24 \times 24 \frac{1}{2} \times 10 = 5880$

Example: $245 \times 245 = 241 \frac{1}{2} \times 24 \frac{1}{2} \times 100 = 600 \frac{1}{4} \times 100 = 60,025$

Example: $245 \times 2475 = 24 \frac{1}{2} \times 10 \times 24 \frac{3}{4} \times 100 = 606 \frac{3}{8} \times 1000 = 606.375 \times 1000 = 606,375$

IV. Use of T and square roots:

Since π and such square roots as $\sqrt{2}$ and $\sqrt{3}$ are irrational numbers, there is no decimal fraction to which they are equal. However, all irrational numbers can be approximated by decimal fractions, and 3.1416, 1.4142, and 1.7321 are close estimates of π , $\sqrt{2}$ and $\sqrt{3}$ respectively. Less accurate though still useful estimates are $3 \frac{1}{7}$, 1.4 and 1.7.

Example: Estimate the area of a circle of diameter 28 inches.

Solution: $A = \frac{\pi d^2}{4}$ where d is the diameter and A is the area. Thus $A = \frac{22}{7} \times \frac{1}{4} \times 28 \times 28 = 22 \times 28 = 616$ square inches.

Example: Estimate the circumference of a circle of area 42 square inches.

Solution: $A = \pi r^2$ and $C = 2\pi r$, where r is the radius, A is the area and C is the circumference.

Hence $C = 2\sqrt{\pi A} = 2\sqrt{3 \frac{1}{7} \times 42} = 2\sqrt{132} = 2\sqrt{4 \times 33} = 4\sqrt{33}$.

A good estimate of $\sqrt{33}$ is 5.7.

So $C = 4 \times 5.7 = 22.8$ inches, approximately.

Example: Find the hypotenuse of a right triangle of legs each 5 inches.

Solution: $h^2 = a^2 + b^2$ (the famous theorem of Pythagoras), where h is the hypotenuse and a and b the legs.

So, $h^2 = 5^2 + 5^2 = 2 \times 25$, and $h = 5 \times \sqrt{2} = 5 \times 1.4142 = \frac{1}{2} \times 14.142 = 7.071$ inches.

Example: Given an f -stop on an adjustable camera, what f -stop permits twice as much light to pass through the lens? Half as much light?

Solution: Recalling that the f -number is defined as the ratio of the focal length of the lens to the aperture diameter (for instance, if the focal length of the lens is 50 mm. or about 2 in., then at $f:16$, the aperture diameter is $\frac{1}{8}$ in.) and making use of the formula for the area of a circle, it is not difficult to determine mentally that twice the exposure will result if the given f -number is divided by $\sqrt{2}$ and that half as much exposure is obtained by multiplying the given f -number by $\sqrt{2}$.

Further thought indicates that division by $\sqrt{2}$ is equivalent to multiplication by $\frac{1}{2}\sqrt{2}$.

Thus the exposure is doubled if the given f -number is multiplied by .7071 or, with less accuracy, .7, and halved if it is multiplied by 1.4142 or, again with less accuracy, 1.4.

*** November, 1958 ... **Official Notice**

RULES: In order for an answer to be considered correct in the elementary number sense contest series, all answers must indicate "kind" if called for in the problem, such as "square yards," "\$," "%," etc.

*** November, 1958 ... **LETTERS TO THE EDITOR**

I am writing . . . in regard to the first editorial in the October, 1958, issue of the *Interscholastic Leaguer* which is entitled "Drop 'B' Contests?", the contests to drop being debate, number sense and slide rule.

I should like to register our school's opposition to dropping these contests. It is possible that there will be only 20 debate teams next spring; but the values the members of these teams receive from this one activity make it worthwhile to keep them. Furthermore, with increased emphasis on college preparatory courses, the debate ties in very well with them. These same thoughts are apropos for slide rule and number sense contestants. The current emphasis on science and mathematics will result in greater interest in these contests so they should be retained. Lastly, debate, slide rule and number sense appeal to students who in many instances are not able to find outlet for their abilities in the other more popular events.

Abolishing these would merely shut avenues of interest to this group of children who exist in many schools without benefiting those who do participate in the more popular events. I still think UIL provides one of the finest means to motivate an entire school program; and I'm writing in hopes of saving the valuable debate, slide rule and number sense contests.

Peyton Cain, Supt. Alpine, Texas

*** November, 1958 ... **PRACTICE MAKES PERFECT**



That old adage seems to be pretty well proved by students from Tivy High School in Kerrville; not only that, but it can be fun, judging from this picture taken just prior to the **1958** State Meet. Seated in the picture (left to right) are Ray Wilson (who won second at State in slide rule), Dale Blount (first in slide rule at State Meet) and Leland Carmichael. The kibitzers in the background are Sandra Perlowski and Dillard Faries (second place winner in the State Meet number sense contest). Scott Ferguson coached the contestants, but last year wasn't Kerrville's only good showing in the State Meet math contests. In the past five years, Kerrville's contestants have won 4 firsts, 3 seconds and 2 thirds

*** December, 1958 ... **Alpine, Laredo Teachers Win**



The \$300 Actuarial Club award for 1958 in Region VIII went to Miss Johnnie Weyerts, Alpine High School, for her outstanding work with high school math students.

Miss Weyerts, who holds two degrees from Sul Ross College and has done additional graduate work at Texas Tech and The University of Texas, has established a record, of sorts, that is possibly unequalled in Texas. Between 1948 and 1954, 130 of "her boys" graduated from college with majors in math. Of these, 19 became engineers, 1 an architect, 3 geologists and 2 physicians. Another 16 became teachers and 6 of these are teaching math.

Her slide rule and number sense coaching has brought: 1947—two students won district number sense honors. 1948—first and second at district in number sense; first and second and third at district in slide rule.

1949—Ronald Klein was state number sense winner, but slide rule team was unable to compete at regional due to time conflict. 1950—both teams swept district honors, slide rule team won at regional and qualified for third and sixth places at state. 1951—both teams won district and regional contests; in number sense Bob Duncan won first and John Newell sixth at state; slide rule team was unable to compete at state because one of contestants took Polio. 1952—both teams won district and regional contests. State Winner 1953—both teams won district and regional, and Hobson Wildenthal won first at state in slide rule. 1954—both teams won district and slide rule won regional meet while number sense contestants dropped to third and fourth. 1955-1958—winners at district and regional levels, plus a second place at state in 1958 in number sense by Kern Wildenthal. He had entered competition for four consecutive years.

In addition to her interest in math, Miss Weyerts has taught Spanish, social science, and girls' physical education. At one time she taught public school music in El Paso County and directed the high school chorus.

Mrs. Bessie R. Watkins, of Martin High School, Laredo, has won the \$300 region VI award for 1958 from the Actuaries Club of the Southwest. Mrs. Watkins, a graduate of Southwest Texas State College in San Marcos, has been teaching in Texas public schools for 32 years.

Prior to assuming her duties at Laredo, where she has been for the past 9 years, she taught 2 years in Wood County, 2 in Dimmitt County and 19 years at Crystal City. For 13 of her 19 years at Crystal City Mrs. Watkins coached number sense contestants, until the abolishment of county meets.

More and more students are entering the math contests each year, Mrs. Watkins reports, and she personally tries to promote additional interest by attending workshops and conferences, having picnics for the students, and by getting publicity for the contestants in local newspapers and school publications.

Mrs. Watkins has had Martin High students qualify to the regional meet every year since 1950, and to the State Meet one year during that time.

*** December, 1958 ... **Practice Material Demand Setting New Sales Records**

The demand for Interscholastic League contest practice material for the literary and academic events has far exceeded amounts ordered in previous years. Below are listed the major publications of the League and the quantity of each item purchased, up to and including October 31, 1958:

Spelling Lists 24,901

Slide Rule Tests 10,036

Number Sense Tests 7,511

Shorthand Tests 4,538

Typing Tests 4,538

Developing Number Sense 1,582

Girls' Basketball Guide 1,257

Constitution and Contest Rules 904

Debate Kit 844

Ready Writers Handbook 738

Number Sense Test Booklets 624

Prose & Poetry Bibliography 322

Slide Rule Manual 287

Picture Memory Booklets 272

Prescribed Music Lists 224

Play List 143

The demand for slide rule test material exceeds the orders for number sense test material. This is due to the fact that a large number of orders for this material come from outside the state. A number of schools in other states have formed slide rule "districts" and are using the slide rule material printed and prepared by the League. The bulletin, "Developing Number Sense," is another very popular League publication in mathematics. The total sale averages about 5,000 copies per year.

*** 1959... Class AAA and AAAA are added to the State meet.

*** February, 1959 ... **Actuarial Awards Slated for 1959**

The Actuaries Club of the Southwest will provide, for the third consecutive year, eight \$300 cash awards for winning Interscholastic League number sense sponsors and coaches. The respective regional executive committees will select the sponsor in each region who is doing the most outstanding job in that particular region.

The purpose of these awards by the Actuaries Club is to promote interest in the study of pure mathematics and to reward those teachers and sponsors who are doing an excellent job in stimulating among their students interest in mathematics. Since these awards have been offered, attendance at the number sense sections of the clinics throughout the state has increased. The demand for number sense practice material has been exceeding that of any previous years. A greater number of students have been competing at the district level where the elimination process first begins.

Due to the fact that there are now five conferences instead of three, and that four of these conferences now have only four regions, while conference B retains eight regions, procedure for

selecting winners will vary somewhat from that used last year. In consultation with the state director of number sense, Jim Hurt, and with the approval of the Actuaries Club, the League office has set up the following plan for making these awards for this year:

1. Region I: Lubbock—three conferences AA, A and B
2. Region II: Stephenville, Conference B
Region II: Dallas, Conferences AAAA and AAA
3. Region I I : Denton, Conferences AA and A
Region III: Denton, Conference B
4. Region IV: Kilgore, Conference B
Region III: Brenham, Conferences AA and A
5. Region III: Houston, Conferences AAAA and AAA
Region V: Houston, Conference B
6. Region IV: San Marcos, Conferences AAAA and AAA
Region VI: San Marcos, Conference B
7. Region IV: Victoria, Conferences AA and A
Region VII: Kingsville, Conference B
8. Region I: Odessa, Conferences AAAA and AAA
Region VIII: Odessa, Conference B

Winners will be selected, according to this outline, from applications from the conferences in the eight areas. Teachers interested in applying for the number sense award should check their regional assignments before filing their applications. Factors considered in selecting the winning sponsors are (a) years of teaching experience, (b) number of years the candidate has had contestants at the regional and state meet, (c) number of students who "tried out" for the number sense contests, (d) number of students who attended the student leadership conferences in the fall. Items (c) and (d) are "adjudged" according to the conference in which the sponsor is competing.

Last year's eight winners will be ineligible for consideration again this year. All other sponsors, including winners the first year, will be eligible to apply for these annual awards.

*** February, 1959 ... **La Feria and Gunter Teachers Get Awards**



The \$300 award from the Actuaries Club of the Southwest for 1958 in Region III was given to Mrs. J. E. Autry, Gunter High School. Not only has Mrs. Autry coached number sense contestants but also slide rule, typewriting, and shorthand contestants. She has qualified contestants to the State Meet in both typing and shorthand. At present, some of her students are in The University of Texas and making outstanding records in their classroom work.

Mrs. Autry is the mother of three children, Paula Jane, age 14, Lou Ann, age 11, and John E., age 7. Mrs. Autry graduated from Gunter High School and later attended North Texas State College, earning her B.A. degree in 1935 and her M. Bus. Ed. in 1958.

When she started her "second hitch" in teaching, after getting her family under way, Mrs. Autry says she was afraid she might be using "mule and walking plow" tactics on her students when "tractor" methods had been developed. With this thought in mind, she began commuting between her home and Denton, a distance of 78 miles, on Saturday for nine months and two summers to complete work for her Master's degree. In addition to her outstanding school work, she has served as vice-president of the Alpha Epsilon chapter of Delta Pi Epsilon; she is a member of Kappa Delta Pi and Pi Omega Pi. She teaches Sunday school and is a co-counselor of the YWA and GA. She was on the Gunter Housing Committee (Federal) and a member of the local Hale-Aiken study group. She is also a member of the Gunter Garden Club.

Mrs. Mattie Freeman Robinson of La Feria High School won the \$300 award from the Actuaries Club of the Southwest from Region VII. Upon receiving the award, Mrs. Robinson stated that these awards, given throughout the state, tend to "make the number sense contests seem more important in the eyes of people not in the mathematics field. The number sense contests have not been viewed in the same light of importance, for instance, as the various speech events or athletic events. Some of this, of course, is due to the nature of the different contests and the fact that mathematics contests are not for spectators. It is good for people to realize that they are none the less important."

Mrs. Robinson is a graduate of Stephens College, Columbia, Missouri, where she majored in mathematics.

She did graduate work at the University of Missouri and later took her M.Sc. from Texas College of Arts and Industries at Kingsville. She has been teaching eighteen years, for the last thirteen at La Feria in mathematics. In addition to coaching number sense contestants for thirteen years, she has also served as slide rule sponsor for three years. She has been class Sponsor, student council sponsor, and sponsor of the science-math club in La Feria High School.

While in college, she was a member of the Kappa Delta Pi, a national educational fraternity, and of Alpha Sigma Alpha, a national social sorority. She is a member of Kappa Delta Gamma and of the National Council of Teachers of Mathematics.

***** March, 1959 ... 3 Scholarships Available in '59**

School administrators and coaches of the slide rule, number sense and ready writing contests are urged to call their students' attention to three scholarships available to contestants in the University Interscholastic League spring meet.

For participants in the slide rule contest there is the \$200 Henry Beckman Scholarship and Slide Rule Proficiency Award. It is open to students who are in the upper 25 percent of their graduating class scholastically and have demonstrated unusual proficiency in the use of the slide rule by participating in the State Meet slide rule contest. Full details may be obtained from Dr. Robert D. Turpin, department of Civil Engineering, The University of Texas, Austin 12.

For number sense contestants there is the Henry Beckman Number Sense Award—a \$500 scholarship award to The University of Texas. Full details concerning application and eligibility may be obtained from the Dean of Student Life, The University of Texas, Austin 12.

Contestants who qualify to State Meet in ready writing may apply for the \$500 J. O. Webb Ready Writing Scholarship, made available for the first time last year by Mr. and Mrs. J. O. Webb of Houston. Webb, former assistant superintendent of schools in Houston, has virtually devoted a lifetime to the League program and is still vitally interested in the success of that

program. Full details about the Webb Scholarship may be obtained by writing to the Dean of Student Life, The University of Texas, Austin 12.

***** October, 1959 ... Eight Math Teachers Get Actuarial Awards**

For the third consecutive year the Actuaries Club of the Southwest last summer made eight \$300 cash awards to outstanding Interscholastic League number sense coaches and sponsors.

The awards are designed to stimulate interest in the study of pure mathematics and are based on the applicants' past records in the classroom and in the sponsorship of number sense participation.

Two of the 1959 winners, Miss Georgette Ellis of White Oak and Mrs. Elizabeth Hansen of El Paso High School, are previous winners. Both won in 1957, the first year of the awards, and both have outstanding records as mathematics teachers and number sense sponsors. The other winners for 1959 are: E. Rex Arnold, Cleburne; Nay B. Benich, Canadian; J. C. Smith, East Mountain (Gilmer) ; A. E. Aguirre, San Diego; Mrs. Margaret L. Carver, McAllen; and Caton Lake, Brazosport (Freeport).

Winners were selected at the regional level by a committee composed of the director general of the regional meet, the director of the regional number sense contest and the regional slide rule director.

To be eligible, it was mandatory that a teacher coach a student to the regional meet level in number sense, but there was no stipulation that the contestants win regional or advance to State Meet.

Three of the winners, however, did have contestants place at the State Meet level. Arnold's entry won first place in the AAA conference division, Benich's won first in conference A and Miss Ellis' entry won second in conference A.. Three others, Mrs. Hansen, Mrs. Carver and Lake, had contestants reach the State Meet level.

***** October, 1959 ... ACTUARIALWINNER**



E. Rex Arnold, Cleburne, has received one of eight \$300 number sense awards from the Actuaries Club of the Southwest for 1959. Arnold, who has taught math for 32 years, has coached number sense contestants since 1934, first at the elementary level and then, since 1948, at the high school level. Except for one year he has had a contestant in the State Meet number sense competition each year since 1950. His 1959 representative Brooks Taylor, won first in the A AA division. Arnold annually works 15 or 20 students in slide rule and number sense and, during the 1958-59 schoolyear, he had 28 trying out for the contests, in addition to coaching 16 beginning students from junior high school.

***** November, 1959 ... TILF Secures Scholarships**

J. O. Webb, chairman of the Texas Interscholastic League Foundation board of trustees, has announced that 50 new \$500 college scholarships will be made available to League contestants during the next Ave years.

These scholarships, the first to be secured from outside sources by the newly-formed Foundation, have been made possible by a \$25,000 grant from the Houston Endowment Corporation of Houston. They will be awarded on the basis of ten \$500 scholarships per year for the next five years, and will be known as the Jesse H. Jones Texas Interscholastic Scholarships League Foundation

Provisions

The announcement of the grant came in a mid-October letter from John T. Jones, Jr., of the Houston Endowment board of trustees. It stipulated:

1. Regional and/or State Meet winners in any of the League's literary and academic contests, except typing, shorthand and one-act play, may apply for one of these scholarships. The contests specifically included are: debate, declamation, poetry reading, original oration, extemporaneous speaking, journalism, number sense, slide rule and ready writing.
2. Applicants for the scholarships must be students in schools in conferences AAA, AA, A or B; contestants from conference AAAA schools are specifically excluded.
3. Funds for these scholarships will be paid to the Texas Interscholastic League Foundation board of trustees and allotted to the winning applicants on this basis: \$250 after enrollment for the first semester and \$250 after enrollment for the second semester.

Colleges Specified

4. Scholarship winners must attend The University of Texas in Austin or Texas Western University in El Paso.
5. Scholarship winners will be selected by the Texas Interscholastic League Foundation board of trustees.
6. The first scholarships will be established at the conclusion of the current school year, and will be available for the 1960-61 schoolyear.

Additional details about the scholarships, including how to apply and the criteria for selecting scholarship winners, will be published in the *Leaguer* and made available to the schools at a later date.

***** November, 1959 ... Actuarial Awards Scheduled For 4th Consecutive Year**

For the fourth consecutive year the Actuaries Club of the Southwest will again offer eight regional awards of \$300 to high school teachers and sponsors who have done outstanding work in the League's number sense contest.

Already more than \$7,000 has been awarded through this program in the Club's efforts to stimulate and improve mathematics teaching in Texas high schools as well as student interest in career opportunities in the mathematics field.

Winners will be selected at the regional level by a committee composed of the regional meet director general, the regional meet slide rule contest director and the regional meet number sense contest director.

Applications may be obtained from the League Office or the regional meet director general. Because there are only four regions for conferences AAAA, AAA, AA and A, while conference

B has eight regions, a new basis for making the awards was designed and put into use last spring. Tentative plans call for using that same schedule this year. The schedule:

1. Region I: Lubbock — conferences AA, A and B.
2. Region II: Stephenville—conference B.
Region II: Dallas — Conferences AAAA and AAA.
Region II: Denton — conferences AA and A.
3. Region III: Denton — conference B.
4. Region IV: Kilgore — conference B.
Region III: Brenham—conferences AA and A.
5. Region III: Houston—conferences AAAA and AAA.
Region V: Houston — conference B.
6. Region IV: San Marcos—conferences AAAA and AAA.
Region VI: San Marcos—conference B.
7. Region IV: Victoria—conferences AA and A.
Region VII: Kingsville—conference B.
8. Region I: Odessa — conferences AAAA and AAA.
Region VIII: Odessa—conference B.

Check Assignments

Teachers interested in applying for one of these awards should check their regional assignments before filing an application, for they are eligible only in the region in which their students compete. Previous winners of the awards will not be eligible to win again, but all other number sense sponsors, whether or not they have applied before, will be considered.

The criteria for making these awards remain unchanged since last year. Points the judging committees will consider are:

1. Number of students the sponsor has interested in the League number sense contest.
2. Number of students attending the number sense section of the Student Activities Conference held in the sponsor's area.
3. Number of students qualifying from the district to the regional and from the regional meet to the State Meet.
4. Number of years the sponsor has been promoting mathematics Contests in the local high school.

*** December, 1959 ... **WINNER**



Mrs. Margaret L. Carver, McAllen, was one of eight 1959 winners of a \$300 number sense award from the Actuaries Club of the Southwest. Mrs. Carver has coached number sense at McAllen for twelve years and, in nine of the past eleven years, she has qualified a dozen contestants to the State Meet number sense contest. She is a graduate of Southwestern University and has done graduate work at Southern California and Texas Woman's University.

*** December, 1959 ... The popularity of the University Interscholastic League's two math contests, number sense and slide rule, is evidenced by the sale of practice contest material. Last year the League office sold more than 100,000 individual number sense tests, 10,000 number sense bulletins, 33,000 slide rule tests and 800 slide rule manuals.

*** December, 1959 ... **MATH WINNER**



Nay B. Benich, Canadian, was one of eight high school math teachers to win a 1959 \$300 number sense award from the Actuaries Club of the Southwest. Benich, a native of Mississippi, is a graduate of Oklahoma State University and taught 32 years in the Oklahoma school system. He retired in 1952, moved to Canadian, and resumed his teaching career there. Last spring his contestant, Johnny Slenn, won first place in conference A number sense at State Meet.

*** January, 1960 ... **MATH CONTESTS**

Only first and second place winners in the spring meet slide rule and number sense contests qualify to the next higher meet. This change from last year applies to both district and regional level contests.

*** February, 1960 Leaguer article:

Number Sense Tests Have 'New' Problems by James Hurt

Each of the number sense tests to be used in the spring contests this year will contain a few simple problems on **probability**. This is in line with our policy of keeping the contest abreast of the times, providing the contestants with challenging problems, and stimulating interest in important branches of mathematics. The mathematical theory of probability is a very extensive and profound science and has important applications to insurance, statistics, the mathematical study of heredity, and other fields.

Typical examples:

1. Suppose that two envelopes have been addressed to different people and two letters written, one for each envelope. If the letters are put into the envelopes at random, what is the probability that the letters are put into the wrong envelopes?

If we alter the problem by addressing three envelopes and writing three letters and ask for the probability that the letters will be put into the envelopes in which they belong.

2. If 3 coins are tossed once, what is the probability that they all fall heads?

3. A bag contains 5 red balls and 6 black balls. A ball is taken at random from the bag. Find the probability that the ball is black. If two balls are selected at random from the bag, what is the probability that one is red and one is black. If 4 balls are taken at random from the bag, 2 are red and 2 black?

Another type of problem to be encountered for the first time this spring concerns an **average** other than the common **arithmetic mean**. It is called the **harmonic mean**; its use is illustrated in the following problem.

Typical example:

1. A plane flies from Austin to Dallas (200 miles) at a constant speed of 200 miles an hour and returns from Dallas to Austin at 300 miles an hour. Find the average speed of the plane; that is, find the constant speed at which it could make the round trip in the same time.

Note that the arithmetic mean of 200 and 300 is 250. The value 240 obtained for x is the harmonic mean of 200 and 300, and is easily seen to be independent of the distance.

Except for a few problems on probability and harmonic mean, the tests for this spring will be quite similar to those used last year. Conversions of Italian lire into dollars, and conversely, at a ratio of 10,000 to 16 and Indonesian rupiahs into dollars at 500 to 43 may occur in place of the now familiar conversion of pesos into dollars at 12% to 1. This is done for the sake of variety. Remember that many of the problems on each test are related; the solution of one may help in the solution of another. This is done to illustrate the cumulative nature of mathematics, to enable the contestant to solve mentally more difficult problems than would otherwise be possible, and to prevent mental abandonment of a problem once it is solved. Keep in mind that understanding and accuracy are far more important than speed. What is the use of quickly getting a wrong answer? As they say in the Air Force, "Hit the target, hit the target, hit the target." ***

*** February, 1960 ... **New Scholarship Awards Stressed**

The Texas Interscholastic League Foundation has ten scholarships of \$500 each to be awarded to some League regional or state winner. Any such winner from conference AAA, AA, A or B in debate, declamation, poetry reading, original oration, extemporaneous speaking, journalism, number sense, slide rule, or ready writing may apply for this scholarship.

Administrator and sponsors in these conferences should advise their students that these scholarships are available from the Texas Interscholastic League Foundation.

These incentive scholarships are provided by the Houston Endowment Foundation to make it possible for ten worthy students to get started on their college careers.

They are to be awarded in recognition of outstanding work to ten students in League activities.

Other League scholarships available are the Beckman number sense scholarship of \$500, the Beckman slide rule scholarship of \$200, the J. O. Webb ready writing scholarship of \$500.

Drama scholarships are also being given to two technicians, three best actors, three best actresses. These are for full tuition for one year.

Also, any girl who wins first place in journalism, debate, extemp, declamation, poetry reading, ready writing, dramatics, or tennis may apply for a \$50 tuition scholarship at the Texas Woman's University at Denton.

*** February, 1960 ... The University Interscholastic League inaugurated a number sense contest in 1924 for an estimated 750 participants. Last year 566 high schools entered 1,698 contestants in the number sense contest while probably an equal number of students participated in the elementary division

*** February, 1960 ... **Bar Winners ?**

The Legislative Council of the League is submitting on an April ballot a proposal to delete Section 11 from Article 8 of the League Constitution. Section 11 disqualifies former state winners in declamation, original oration, extemporaneous speaking, poetry reading, number sense, and slide rule from entering the same contest again in any successive year. This rule has been in the *Constitution and Contest Rules* for some 30 years and proponents of the change feel that it no longer serves its purpose. They contend that, since students in other contests who win first place at the State Meet are not disqualified from future participation in the same contest, winners in the speech and mathematics contests should not be barred. The rule was adopted to encourage winners to broaden their interests and compete in other events. League records show that many former debaters have later won in declamation or extemporaneous speaking and many declaimers and extemp speakers have later become winners in debate. Likewise, many winners in number sense have later become winners in the slide rule contest. So apparently the rule has helped to keep the students "diversified."

*** February, 1960 ... **LETTERS TO THE EDITOR**

My enrollment at The University of Texas, and the circumstances that surrounded it, have been a most gratifying experience, and I would like to share it with other participants in League contests.

When I first entered Gunter High School I knew that someday I would go to college. Early in high school I began to write for college catalogues and to consider several different schools that I thought I might like to attend. From the very first I had to give special attention to the financial angle, because I knew my parents would be unable to pay my way through.

During my junior year in high school I became interested in Interscholastic League activities. My high school mathematics teacher, Mrs. J. E. Autrey, wanted me to enter the number sense contest. I had also picked up a fair working knowledge of the slide rule, and wanted to enter that contest, too. I advanced to the State Meet in number sense and went to Austin along with several other hopeful students. My score at State Meet wasn't good enough to win, but I wasn't displeased with it.

It was while I was in Austin for the contest that I became interested in The University of Texas. Everything about it impressed me as the kind of school I would like to attend. I was interested in mathematics and engineering, and the school has a very good department in both of these fields.

I knew I could never attend the University unless I could get a job and help pay my own way. I asked several students and some teachers about employment opportunities, but everyone discouraged me when, almost without exception, they said job opportunities were very scarce. I decided then to make other plans, although I still dearly wanted to attend The University of Texas.

Graduation day came and I made plans to enroll at North Texas State in Denton. Because North Texas had no engineering school, which I wanted, I had decided to study mathematics.

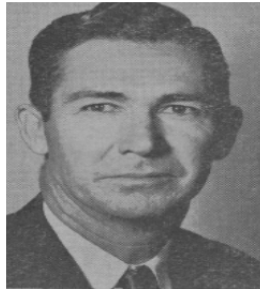
On the day I was to register I received a call from Mrs. Autrey. She was one of the few people that really knew how much I wanted to go to UT, and she had contacted R. J. Kidd, the director of the League, about it. She had told him of my financial situation and my accomplishments in League competition, and just that morning he had called to inform her he was certain everything could be worked out.

Everything did work out and the next day I was on my way to Austin. Mr. Kidd had contacted Dr. Walter Prescott Webb, professor of history at the University, and the two had managed a job for me and a \$150 scholarship for each of my first two semesters. All I had to do when I reached Austin was register and go to work.

I worked 18 hours a week and carried a 14 semester hour class load. It was not as easy as it sounds. I had to plan all of my time carefully, and forget social life except on weekends. At times it was difficult to keep from getting discouraged. Now I have completed all of my first year and half of my second. As I become more adjusted, it becomes easier. I think it has been well worth the effort so far, and that it certainly will continue to be. I am thankful for all of those who helped me so much, and they are now my friends. But when they helped me, they did not know me except through my high school teacher. I had always thought of the University as a cold organization, but now I know differently.

There is always help available for someone who needs it and can display the ability and desire to "make it" at the University. Roy Lee Baughman, Gunter, Texas

*** February, 1960 ... MATH WINNER



J. C. Smith, superintendent of East Mountain Schools, Gilmer, has received a \$300 number sense award from the Actuaries Club of the Southwest for 1959. Smith has worked in the Texas public schools system for 30 years as teacher, principal and superintendent. He has been at East Mountain since 1934. A graduate of East Texas State College, Smith has qualified number sense contestants to the regional meet for nine consecutive years and to the State Meet for four years.

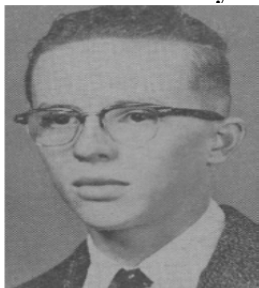
*** February, 1960 ... TOP TEACHER



A. E. Aguirre, San Diego, is one of the 1959 winners of a \$300 number sense award from the Actuaries Club of the Southwest. A native of Mexico, Aguirre attended elementary and high school in Kingsville, and graduated from Texas A&I College there. He has taught math for 24 years, has coached high school number sense for twelve years and he has had 19 district winners. He has had contestants in the regional meet for the past 12 consecutive years. In addition to the

Actuaries award, Aguirre also won a National Science Foundation scholarship last year for summer study at TCU.

*** March, 1960 ... **Scholarship Winners Have Many Activities**



Number Sense Winner of the Beckman number sense scholarship for 1959 was Stanley Fuhrmann, Hereford, who placed second in the conference AAA number sense contest at State Meet after winning firsts at both district and regional.

Stanley's primary interests in high school were mathematics, choir and chemistry, and as a sophomore he placed first in the district meet number sense contest and repeated that effort the following year as a junior.

*** April 1960 Leaguer article:

James Hurt Feels Teaching A Privilege, Not Drawback by Bob Johnson

A name and face that is becoming as familiar as report cards to Texas high school mathematics teachers and students is that of James Mann Hurt, instructor of applied mathematics at The University of Texas and state director of the League's number sense contest. As contest director for the past eight and a half years, Hurt has been the originator of many of the tests used in the number sense competition and has fostered a sustained interest in the young Texans who enter the contest.

When he assumed the number sense duties back in 1952, Hurt was a novice where the contest mechanics were concerned, but he immediately grasped the importance of the overall League effort. He said: "Although I have much to learn about my new job, I know that I am being given an opportunity to do something of real value for the school children of Texas. . . . Anything we can do to stimulate interest in mathematics and to encourage talented young people to enter the profession of mathematics or related fields is surely a worthwhile service to the nation."

Very popular among math students at the University, Hurt is one of those educators who is completely caught up" in his work and immensely enjoys doing it.

"You know," he says, "you read in the newspapers and magazines about the disadvantages of being a teacher—low salaries and all—but there are advantages, too. Right now I have in my classes some of the very finest young people in America. It's a privilege to work with people like those."

A tall, moon-faced fellow, with closely-cropped black hair flecked with gray on the sides, Hurt is a thorough and exacting teacher. He has no sympathy for students who are "looking for a soft place to land," but is quite anxious about those who really want to learn.

Lecturing on subjects like vector analysis, differential geometry and advanced calculus, he keeps his students on their toes. Now and then, he briefly fixes his eyes on various pupils during his

lecture, just as if he were momentarily taking each of them aside and explaining the subject matter to them personally.

As his work at the University is rather closely confined to advanced courses and students in mathematics, Hurt is particularly enthusiastic about his work with the League and the number sense contests. He feels it gives him a pretty fair preview of the kind of student he can expect eventually in his own classroom, and it keeps him close to the heart of the educational system in Texas—the public schools. As he puts it, "Working with the League has done me a lot of good, because it gives me the contact I need with high school teachers and students."

Recalling his own experiences as a student at Oak Cliff High in Dallas, Hurt said, "Although I did fairly well in it, mathematics held no special interest for me. Latin was my 'long suit.' "

In spite of this incongruity, he says that even as a student in high school, he felt certain that he wanted to teach. He took his first degree at The University of Texas in education in 1938 and got his MA there in 1945.

Illness kept him from getting his doctorate, but he once studied under Herbert Busemann, the famous mathematician at the University of Southern California. "I learned more mathematics in that one year," Hurt stated, "than all the other years I spent in study prior to it."

Starting to work as a part-time instructor at the University in 1942, Hurt has been with the department of mathematics there ever since, except for the year of 1947-48, when he was teaching at UCLA. Hurt is a dedicated family man and he and his wife Mildred have two sons. Despite the popular conception of a university professor, he also maintains numerous other interests outside the classroom. Primarily he is a camera and wild life enthusiast, and has made many camping trips to various parts of the state to hunt deer and javelina, mostly with a camera. He is particularly pleased with the three dimensional results of his new "stereo" camera, and sometimes regrets not having more time to give to his photography.

As state director of number sense contests, Hurt is required to devise testing means whereby students, with practice, can develop a familiarity with arithmetic to the extent that they can use it accurately and quickly without aid of pencil and paper.

The need for such tests and the improvement of arithmetic teaching methods in Texas was first brought to the attention of the League in 1922, by the late R. L. Paschal. Then principal at Fort Worth High Paschal School, later changed to Paschal High School in his honor, wrote a letter that appeared in both the Dallas *Morning News* and the *Leaguer*. In it, he pointed out the gross shortcomings of the arithmetic texts then being used in Texas' public schools, and urged that more attention be given to practical application of arithmetic by students. He went on to suggest that teachers should not fail to teach their students the method and application of the four basic operations and the system of weights and measures. With the issue of this statement by Paschal, the late John W. Calhoun, an applied mathematics professor at the University of Texas, immediately came out, not only to second what Paschal had said, but to urge the development of what he called "number sense" in students.

It was his contention that a student should be taught to use the fundamentals of arithmetic, addition, subtraction, multiplication, division and counting so instinctively and confidently that he could give prompt and approximate answers to typical arithmetic problems without the benefit of notation. In this way, he said, students would build up confidence in their ability to use arithmetic, so that the fears students so often have about numbers could, to a certain extent, be alleviated.

Finally, in October, 1924, he began writing a column, "Number Sense," for the *Leaguer*. In it, he gave problems that teachers could use in their classes to prepare their students for the arithmetic

part of the League contests. The column was well received, and its popularity was a primary factor in the creation of the number sense contests which were not a part of the State Meet at that time.

In the school year of 1943-44, the UIL constitution was amended, and number sense was made a separate category in League competition. The first State Meet was won by Carrol Trail of Forney High School. Since the time of Calhoun and Paschal, the popularity and quality of the number sense contests have continued to increase. When confronted with sample number sense problems, which now include problems on probability, most adults are forced to admit that mental solution of the puzzlers is beyond them. Though this speaks well of the young people who enter the competition it doesn't say much for the general level of education. In this vein, Hurt says, "I feel certain that my mathematics teachers were no less devoted to their work than math teachers today. However, in my opinion, the high school teachers in this state are not as good, generally, as they ought to be, but efforts to improve the situation are being made. I feel the League program is helping in this direction."

*** September, 1960 ... **Actuaries Club Again Gives Eight Number Sense Awards**

The Actuaries Club of the Southwest, for the fourth consecutive year, last summer made eight \$300 cash awards to outstanding high school mathematics teachers and sponsors of contestants in the League's number sense contest.

Designed primarily to reward math teachers for doing good jobs and to stimulate interest in the study of pure mathematics, the awards are made on the basis of applicants' past records in the classroom and their successful promotion and sponsorship of participation in number sense.

Winners of the 1960 awards were: W. R. Taylor, Anton; Mrs. Olive Ruth Lacy, Port Neches-Groves High School, Port Neches; Fred Crabtree, Stephenville; P. A. Karney, Electra; Miss Mary E. Troy, King High School, Kingsville; Roel A. Saenz, Roma; James W. Garner, Hereford; and Miss Silas McFarland, Lampasas.

Winners were selected at the regional level by a committee of the regional director general and the directors of the number sense and slide rule contests. Candidates were required to have number sense contestants compete at the regional level to be eligible for one of the awards, but there was no stipulation that a candidate's contestant win at the regional level or advance to the State Meet.

Five of the winners, however, had contestants participating in the State Meet contest, and two of these placed in the final standings. Taylor's entry won second place in the conference A division at State Meet, while Mrs. Lacy's won third in AAAA. In addition, Miss Troy had one entry in the AAA division, Saenz had two entries in the B division and Garner had two entries in the AAA division.

Additional information about the winning sponsors, along with their pictures, will be published in later issues of the *Leaguer*

*** September, 1960 ... **League Foundation Awards First Eleven Scholarships**

The Texas Interscholastic League Foundation, established only a little more than a year ago to provide college assistance to outstanding participants in the academic contest program of the League, made its first eleven scholarship awards last summer.

Ten students received Jesse H. Jones-Interscholastic League Foundation scholarships, made possible by a grant from the Houston Endowment Corporation of Houston.

The other winner received the Charles I. Francis Debate Scholarship, established last spring by Charles I. Francis of Houston, vice president and general counsel of Texas Eastern Transmission Corporation. All scholarships are for \$500.

Winners of the Jones awards, their schools, hometowns and the League contests in which they qualified for their scholarships are: Joseph Peyton Wyatt, Jr., Bloomington High School, Bloomington, extemporaneous speaking; Mark Wayne Perrin, Yoe High School, Cameron, debate; Laura Lee Barber, Colorado High School, Colorado City, journalism; Charles Frank McKinney, Cooper High School, Cooper, debate; Frank Forsythe Smith, Jr., Crystal City High School, Crystal City, declamation. Also, Marshall Lee Anderson, Gunter High School, Gunter, slide rule; Helena Rebecca Frenkil, Hempstead High School, Hempstead, ready writing; Joe William Shaw, Jr., Mertzon High School, Mertzon, number sense; Jack Calhoun Long, Paducah High School, Paducah, journalism; Kathleen Elizabeth Emmer, Wink High School, Wink, extemporaneous speaking. Winner of the Francis debate scholarship was Roy Edward Morey, A. N. McCallum High School, Austin.

Other Awards

Other scholarships awarded recently to League participants include:

J. O. Webb Ready Writing scholarship (\$500) to Karen Lightizer, Carrizo Springs High School, Carrizo Springs; Henry Beckman Number Sense Scholarship (\$500) to Bruce Arthur Kowert, Fredericksburg High School, Fredericksburg; Henry Beckman Scholarship and Slide Rule Proficiency Awards (\$200 each) to Samuel Lynn Ward, Ball High School, Galveston, and Henry Baade, Boling High School, Boling.

In the past, only one Beckman slide rule award was given each year, but due to the increased value of the scholarship endowment, two awards were made available this year for the first time.

***** October, 1960 ... ACTUARIAL WINNERS**



Here are three winners of \$300 Actuarial Number Sense Awards for the 1959-60 school year. Left to right they are P. A. Karney, supervisor, Electra Elementary Schools, Miss Silas McFarland, Lampasas High School, and W. R. Taylor, superintendent of schools, Anton. Karney is a veteran of 36 years in public school education, 31 of which have been in the Electra system. He has sponsored number sense for nine years and has had contestants qualify to regional each year except one and to State Meet each year except two. Miss McFarland has 37 years of experience in the public schools of Texas and has taught math at Lampasas for the past 16. She has coached number sense for 15 years and has had contestants at regional for the past 12 years. Three of her contestants have qualified for State Meet and, in 1959, one was state champion. Supt. Taylor has been coaching number sense for 23 years, since the first year he taught, and

even after entering the administrative field 12 years ago has continued his interest in the contest. His county meet and district champions have been numerous, and he had a state winner in 1958.

***** December, 1960 ... Awards Aid Interest Actuarial Club Told**

"I first became acquainted with the Actuaries Club of the Southwest and the League number sense contest almost simultaneously when, in 1957, I was reading a copy of the *Interscholastic Leaguer* to see if any changes had been made in the typewriting and shorthand contest rules. At the time, number sense was just some League contest in which no one in our district, or even in our region, seemed interested." Thus Mrs. J. E. Autry, business and math teacher at Gunter High School, explained the spark that led, in 1958, to her receipt of a \$300 award from the Actuaries Club and to an outstanding record of participation in the League math contests by the students of Gunter High School.

Interest Created

Addressing the annual meeting of the Actuaries Club of the Southwest in Fort Worth last month, Mrs. Autry discussed in detail how the combination of "Teachers—Number Sense—Actuaries" can create an interest in the field of mathematics and science for today's students who will be tomorrow's leaders.

Too many math teachers have been lured away from the public schools, Mrs. Autry pointed out, by the more lucrative pay of industry and business, leaving "many teachers, such as I, 'pinch-hitting,' so to speak, as mathematics teachers."

When she began her "second hitch" of teaching, she was employed as a business teacher, but consented to teach math, too, "for mathematics had always been one of my first loves in school due to a thorough, interested teacher I had in the fifth, sixth and seventh grades who taught me arithmetic, as well as mental arithmetic, so thoroughly that I've never had any trouble with it since."

In 1957, when she first read about the actuarial awards designed to stimulate interest in the study of mathematics, she had an above-average algebra II class, so she told her superintendent that if the school would order some practice material she would "see what she could do" about training some students for the contest.

"Training in speed and accuracy," Mrs. Autry said, "should be the goal of both student and teacher."

Students take pride in the fact that they can solve problems mentally instead of having to write them down. Quite often, most of the 'number sense' with which children are born is siphoned out of them by the pencil route . . . the student should be trained to analyze his problem, decide on the necessary operations and then determine the answer or a good approximation to it before putting down an answer on paper."

State Meet Entry

That first year, because her practice materials arrived so late, Mrs. Autry attempted to train only above-average students in arithmetic 8 and algebra II. To her surprise, one of her junior boys won second place at the regional meet and participated in the State Meet. He didn't place very high at State Meet, she said, but he returned home more determined than ever to do better the following year.

The following year Mrs. Autry and her students attended the mathematics workshops at the North Texas Student Activities Conference (at Southern Methodist University), and went home more determined than ever to do well in number sense and, in addition, to take up slide rule as

well. They ordered more tests in number sense, some in slide rule, bought one slide rule, borrowed two and had one given to the school by a slide rule firm, then went to work. The big problem, Mrs. Autry said, was finding time to practice.

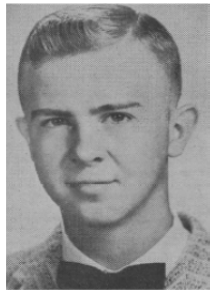
In addition to morning sessions before school started, she set up evening slide rule classes in her home, and by the time regional meets rolled around she had ready three entries in slide rule, three in number sense and two in typewriting. Only one of those contestants reached the State Meet, but that was the year Mrs. Autry won the Region III Actuarial Award, and things have been booming in the mathematics contests at Gunter ever since. Scholarship Winner Marshall Lee Anderson, who placed 15th at regional as a sophomore, last year won the conference B state championship in slide rule, won a \$500 Jesse H. Jones-Interscholastic League Foundation scholarship and is now a freshman at The University of Texas. Mrs. Autry's own daughter, who placed last at regional as a freshman, has won second at regional the past two years. Last year in number sense a freshman who had trained for only a month won second at the regional meet and Peggy Payne, who won first at regional, won a third place at the State Meet.

The secret of Mrs. Autry's success, if it could be properly called a secret, probably lies in the fact that she takes such a personal interest in her students and their work. "It is a joy to recognize the spark of interest and ability in a young student and to set it into full flame," she told the assembled actuaries.

"My students have always been reminded that they can be just as smart in a small school as they could in a larger school—if they will but set their minds to work."

Mrs. Autry helps them set their minds to work.

*** January, 1961 ... YOUNG WINNER



Michael Bassham, as a 14-year-old high school freshman at Sulphur Bluff, last year won the conference B state championship in number sense at the 1960 State Meet.

*** January, 1961 ... The University Interscholastic League, which observed its golden anniversary during the 1959-60 school year, inaugurated a number sense contest in 1924 for an estimated 750 participants. Last year almost 600 high schools entered more than 1,500 contestants in the number sense contest while probably an equal number of students participated in the elementary division. The popularity of the University Interscholastic League's two math contests—number sense and slide rule is evidenced by the sale of practice contest material. Last year the League sold more than 165,000 individual number sense tests, 6,000 number sense bulletins, 42,000 slide rule tests and 800 slide rule manuals.

***** February, 1961 ... New Math Proposals Made at Recent SAC**

by E. Rex Arnolld, Mathematics Department Cleburne High School

We participated in the University Interscholastic League Student Activities Conference conducted recently on the campus of Tarleton State College in Stephenville and found many interesting ideas and suggestions given for promoting and motivating greater student participation in UIL activities. Students and teachers were enthusiastic in their reception of the information and explanations given by representatives of the League.

For the benefit of other high school directors of number sense and slide rule in Texas, some of the suggestions discussed at the Conference were:

Slide Rule Contest

The importance of the decimal point in slide rule contest answers — The correct placement of the decimal point should be given more emphasis, such as being given the same consideration as the first significant digit in the answer; or, perhaps the problem should only be counted incorrect, with no negative value given for the error.

Also, many in the group felt that students should use only one slide rule in the contest, with no special markers or magnifiers.

New Contests

There was also discussion of new mathematics contests for the Interscholastic League (not to replace any of the present contests).

The first contest would be a 30-minute slide rule contest which would include trigonometric operations as well as arithmetic operations, and would be graded in the same general manner as the present slide rule contest.

The second, a co-partner of the first, would be a 30-minute contest in mathematics, including operations in arithmetic, number theory, algebra and, perhaps, some geometry. This contest would also permit the use of pencil and paper calculations and be graded on a correct answer basis with a "right minus wrong" ratio similar to the present number sense contest.

Third Proposal

The third proposed contest, an alternate to the two contests described above, would be a 30-minute contest that would include operations in arithmetic, algebra, geometry, number theory, trigonometry and, perhaps, some analytical geometry—none of which would be considered advanced material. The test would be prepared for pencil and paper calculations and include slide rule operations, with tables and handbooks of any kind prohibited. This test appears similar to the present Mathematical Association of America test, but would be on the level of the average high school instruction, whereas the Mathematical Association test is too accelerated to be used as a statewide contest.

These contests, either the first two used as a pair, or the third, could create more interest and present a greater challenge to all high school students, especially those in accelerated mathematics programs and in high schools offering five or more credits in mathematics.

Undoubtedly, all concerned would appreciate suggestions and comments on these matters.

Administrators and teachers are invited to write either Jack Lenhart, state director of slide rule for the Interscholastic League, James M. Hurt, state director of number sense, or R. J. Kidd, director of the University Interscholastic League. The address is Box 8028, University Station, Austin 12.

*** March, 1961 ... **Scholarships Available for Contestants**

As spring meet contest time approaches all administrators should see that their schools' contestants are informed of the scholarship opportunities available to participants in League literary and academic competitions.

Also, they should remind their number sense sponsors of the eight \$300 cash awards available from the Actuaries Club of the Southwest.

There are 10 **Jesse H. Jones Interscholastic League Foundation Scholarships** available each year (value: \$500 each) to participants in the journalism, debate, declamation, poetry reading, original oration, extemporaneous speaking, number sense, slide rule and ready writing contests. Exception: Contestants from conference AAAA schools are not eligible.

Applicants must be high school seniors planning to attend either The University of Texas or Texas Western University, and must have represented a conference AAA, AA, A or B school at regional meet in one of the above contests during their senior year.

Additional information may be obtained from the Texas Interscholastic League Foundation, Box 8028, University Station, Austin 12.

The **Beckman Number Sense Scholarship Award** is awarded each year to an outstanding contestant in the number sense contest; it is valued at \$500.

Applicants must be seniors planning to attend The University of Texas and must have been a regional meet number sense contestant during their senior year. Details may be obtained from the Committee on Loans and Scholarship Information, The University of Texas, Austin 12.

For number sense sponsors, eight \$300 **Actuarial Number Sense Awards** are given each year to high school math teachers who have done outstanding work in coaching contestants for the number sense contest.

These are awarded on a regional basis and applicants must apply in the region in which their contestants compete.

To be eligible, applicants must be actively engaged in teaching math in high school, in coaching contestants for the number sense contest, in encouraging and promoting student interest in mathematics and they must have coached a student to the regional meet level in number sense competition during the year of application. Previous winners are ineligible.

Additional information may be obtained from Director R. J. Kidd, University Interscholastic League, Box 8028, University Station, Austin 12; or from the director general of the regional meet in which applicants' contestants compete.

*** April, 1961 ... Leaguer article:

Director Jim Hurt Explains Professional Mathematics'

By James M. Hurt, State Director of Number Sense

Today nearly everyone recognizes that mathematics is very important and that mathematicians do essential work. Yet few know what professional level mathematics is concerned with and what mathematicians do. Many imagine that a mathematician spends his days performing long, involved numerical calculations and tend to view him as a rather odd person for having chosen such an occupation.

While it is true that mathematicians do perform calculations, it is not true that such work is characteristic of what they do nor does it occupy a great portion of their time. The purpose of this article is that of trying to convey to the reader a correct idea by means of an example of the nature of mathematics and of the work of a mathematician.

Binary Operations

Of all the operations in mathematics none are more commonly known than the binary operations of addition and multiplication. Everyone knows that if a and b are numbers, then ab (the product of a and b) and $a + b$ (the sum of a and b) are also numbers; in other words, the real number system, along with many other systems, is closed under two binary operations. Also it is common knowledge that these operations with numbers are associative:

$$a(bc) = (ab)c \text{ and } a + (b + c) = (a + b) + c.$$

So an example in which an associative binary operation plays a basic role would seem to have as much chance as any of being readily understandable to a non-mathematician.

Many such examples are available.

The one we choose to present is a system known as a semigroup.

A semigroup is defined as a system S of elements a, b, c, \dots which is closed under an associative binary operation. This means that if a and b are any two elements of S , then there exists one and only one element x of S such that $ab = x$ and that if a, b, c are any three elements of S , then $a(bc) = (ab)c$. Note that a, b, c may or may not be distinct.

Also note that it is not assumed that $ab = ba$. A semigroup in which $ab = ba$ for every pair of elements a, b of the system is said to be commutative.

Semigroup Examples

Examples of semigroups are abundant: the integers under addition; the rational numbers under multiplication; the set consisting of the complex numbers $1, -1, i, -i$ (i = square root of -1) under multiplication are simple illustrations of commutative-semigroups. A more abstract example is the system consisting of the four elements $a_{12}, a_{21}, a_{11}, a_{22}$ with multiplication defined as follows:

$$a_{ij} a_{kl} = a_{il}, \text{ where } i, j, k, l \text{ represent either } 1 \text{ or } 2. \text{ Thus } a_{11} a_{11} = a_{11}, a_{12} a_{22} = a_{12}, \text{ etc.}$$

Note that multiplication is associative, since $(a_{ij} a_{mn}) a_{kl} = a_{in} a_{kl} = a_{il} = a_{ij} a_{nl} = a_{ij}(a_{mn} a_{kl})$, but not commutative, since $a_{12}a_{22}$ does not equal $a_{22}a_{12}$.

Semigroups are studied by mathematicians because they isolate from many important systems one basic thing they all have in common: closure under an associative binary operation.

Now that semigroup has been defined, illustrated, and presumably fairly well understood, the important questions arise: what are we going to do with this new concept? Shall we try to discover facts about semigroups that are implied but not made explicit by the definition? Shall we consider systems that are semigroups with special properties? If so, just what shall we try to find out, what special properties shall we assume, how shall we proceed?

Let the reader pause at this point, get clean paper and pen, write down the definition of semigroup for reference, try to find answers to questions such as these, and thus face a difficult situation himself that is quite familiar to every professional mathematician. If the reader fails to accomplish anything, the likely reason is that he has not made constructions or definitions, for without these very little can be done.

As an example of a construction, consider the subset aS of S which consists of all products as of the particular element a with each element s of S . Note that the product $(as)s_1 = a(ss_1)$ of any element as of aS and any element s_1 of S is an element of aS . This suggests the following definition: the non-empty subset R of S is called a right ideal of S if rs is in R whenever r is in R and s is in S . Similarly, a left ideal of S if rs is in R whenever r is in R such that sl is an element of L for each s in S and l in L . A subset A of S that is both a left ideal and a right ideal is called a two-sided ideal or simply an ideal. A non-vacuous semigroup S always has left and right ideals, since the subsets Sa and aS for each particular a in S are left and right ideals, respectively.

As another example of a definition, let us say that an element r of S is called a right zeroed element of S if for each element a of S there exists at least one element x of S such that $ax = r$. Similarly, l is a left zeroed if $ya = l$ is solvable for y in S for each a in S . An element u of S is a (two-sided) zeroed element of S if u is both a right and left zeroed element of S . Observe by studying examples that some semigroups have left or right zeroed elements, others have neither. If semigroup S has a right zeroed element and R is the set of all right zeroed elements of S , then R is a right ideal of S . For if a is in S and r in R , then there is an x in S such that $ax = r$. Hence for each s in S , $(ax)s = a(xs) = rs$, which shows that rs is in R , since the equation $ay = rs$ has $y = xs$ as a solution, so that rs is by definition a right zeroed.

Further, R is contained in every right ideal of S . For if A is any right ideal of S , then for each a in A and r in R the equation $ax = r$ can be solved for x in S . Since ax is in A whenever a is in A , then r is in A and hence R is contained in A . Conversely, if S has a right ideal R that is contained in every right ideal, then every element of R is a right zeroed element of S . For aS is a right ideal of S for each a in S and hence contains R . Thus for each r in R there is an x in S such that $ax = r$; so r is a right zeroed element of S . Consequently, S has a right zeroed element if and only if S has a right ideal of S . Similarly, it may be shown that S has a left zeroed element if and only if S has a left ideal L that is contained in every left ideal of S .

If R and L are both non-vacuous, then every element of the set RL , which consists of products rl of elements r of R and l of L , is a zeroed element of S , since rl belongs to both R and L . If rl and $r'l'$ are any two elements of RL , then $(rl)(r'l')$ is also an element of RL , since rl is in R and $r'l'$ is in L . Thus RL is closed under the binary operation of S and so is a sub-semigroup of S . Further investigation has revealed that $R = RL = L$, which indicates that every right zeroed is a zeroed and every left zeroed is a zeroed, and that RL is a sub-group of S whose unit element commutes with every element of S . Let the reader who enjoys facing a strong challenge and who wants to experience himself real mathematical activity devise a proof.

As a final example of a definition that might lead to important discovery, let us say that if S has an element r such that for each a in S there is at least one x in S satisfying $xr = a$, then r is called a right unitoid element of S ; if l exists in S such that $ly = a$ is satisfied by at least one y in S for each a in S , then l is called a left unitoid element of S ; if element u of S is both a right unitoid and a left unitoid, then u is a (two-sided) unitoid element of S . Observe that if r and r' are right unitoid elements of S and a is any element of S , then elements x and y of S exist such that $xr = a$ and $yr' = x$. Hence $(yr')r = y(r'r) = xr = a$, which shows that $r'r$ is also a right unitoid element of S . Thus if the set R of right unitoid elements of S is not empty, then R is a sub-semigroup of S . Similar statements hold for the set L of left unitoids and the set U of unitoids.

Many more facts may be established. Further investigation is left to the interested reader.

*** September, 1961 ... **Special Test Packs Ready**

The League office has prepared a special packet of 100 number sense tests (with answer keys) for sale at \$1.00 per package. These are out-of-print tests, and each packet contains a minimum of 10 different tests from discontinued series M, N, B, C, J and K. Only 300 of these packets are available and orders will be filled on a first come, first served basis.

*** September, 1961 ... **Actuarial Winners Announced; Club To Give Awards in 1962**

Last summer, for the fifth consecutive year, the Actuaries Club of the Southwest made eight \$300 cash awards to outstanding high school mathematics teachers and sponsors of contestants in the League number sense contest.

The awards, made on the basis of the applicants' classroom achievements and their successful promotion of number sense participation, are designed to reward math teachers for doing good jobs of teaching and to stimulate interest in the career possibilities of pure mathematics.

Winners of the 1961 awards were: Don R. Taylor, Lubbock Roosevelt High School; Mrs. Custer M. Knox, Breckenridge High School; Mrs. Lynn C. Huff, Hemphill High School; T. H. Dick, superintendent of Callisburg Schools, Gainesville; Mrs. Alta Duke Pfeiffer, Galveston Ball High School; George M. Swaim, Temple Academy High School; C. H. Evans, Agua Dulce High School; and Miss Ruby K. Jones, Odessa High School.

The Actuaries Club of the Southwest has just announced that the awards will be made available again during the 1961-62 school year, for the sixth consecutive year. Additional details and information about these awards and how applications should be made will be published in a forthcoming issue of the *Leaguer*.

Winners of this year's awards were selected at the regional level by a committee composed of the regional director general and the directors of the number sense and slide rule contests.

Candidates were required to have number sense contestants compete at the regional level to be eligible, but there was no stipulation that a candidate's contestant must be a winner at regional or advance to the State Meet. Of the eight winners, however, six had contestants in the State Meet number sense contest. Additional information about the winning sponsors, along with their pictures, will be published in later issues of the *Leaguer*.

*** September, 1961 ... **LETTERS TO THE EDITOR**

Receiving the \$300.00 award sponsored by the Actuaries Club of the Southwest is one of the most pleasant surprises that I have ever received. I sincerely wish to express my deepest thanks to the Actuaries Club of the Southwest and to every individual who made this award possible. I will strive to utilize it in a manner that will help to promote education in the State of Texas.

It has always been a pleasure to work with students who are interested in the study of number sense. I am 36 years of age and I have been teaching school twelve years. I have coached number sense teams for the last four consecutive years and the students have always won in district and placed well in regional and State Meets, although they have not won a first place in a State Meet. It is best to encourage students in such a way that they will see that it is good for them to learn how to solve simple problems quickly and accurately and that they are the winners in the long run even if they do not place in a contest. By following this line of reasoning, it appears that the student develops a desire to learn first, and winning is a secondary result of good learning.

At times it seems to me that I am a very poor teacher. But it has always been my contention that if the proper desire to learn can be cultivated in any student, then that student will learn regardless of the quality of teaching being done.

With the above thought in mind, the study of number sense is voluntary in the Callisburg School. Teachers may encourage, and do in many instances, however the decision to participate is left up to the student. After the student has decided to participate, materials, gathered mainly through the Interscholastic League in Austin, are furnished him. The student studies on his own time.

Tests are given, graded and discussed by the students and teacher. If anyone can see a quicker, easier way, that is also accurate, to solve any of the problems, he explains it to the students who are participating. This still allows the majority of the teaching to be done by the teacher but it is amazing how many excellent ideas will come from the students themselves.

It is the belief of this teacher that in this day and age of pushbutton automation, nuclear energy, electronic computers, and other highly technical devices that are used daily in a very complex society, it's just as important as it has ever been, and maybe more so, to be able to solve simple arithmetic problems quickly and accurately. Although our society is very complex, there are more people working in service stations, grocery stores, five-and-ten cent stores, and other simple, yet highly necessary businesses today than ever before. These people have to make mental calculations quickly and accurately, daily. Their jobs and I their businesses depend upon their efficiency. Therefore, number sense training is very beneficial to any young man or woman who has the time to work on it. It is a privilege and a responsibility, and it should be a pleasure for any teacher to help a young man or a young woman develop their number sense ability.

T. H. Dick Supt. of School Callisburg, Texas

*** October, 1961 ... **Number Sense Contests Pose Probability Problems**

The number sense tests for 1962 will again contain problems on simple probability. Some of these will require a little knowledge of factorials, permutations, and combinations; all require an understanding of the classical, or *a priori*, definition of probability. Problems of this type were first given in the 1961 tests and were well received by both contestants and coaches.

This favorable reception was expected, since probability is known to be an important branch of mathematics, is very interesting to think about, and in many instances is well suited to mental calculation.

Let us recall a few facts. First, the definition of classical probability. If an event can occur in n equally likely and mutually exclusive ways, and if h of these ways has an attribute X , then the probability that the event will have attribute X is the number $\frac{h}{n}$. Since $0 \leq \frac{h}{n} \leq 1$. The probability that the event will not have attribute X is $\frac{n-h}{n} = 1 - \frac{h}{n}$.

In enumerating the number of ways in which an event can occur, care must be taken that the outcomes are "equally likely" and "mutually exclusive." For instance, in tossing a coin three times, the possible outcomes are three heads, three tails, two heads and a tail, and two tails and a head; but they are not equally likely: two heads and a tail can occur in three ways (HHT, HTH, THH), while three heads can occur in only one way (HHH). The probability of throwing two heads and a tail is by definition $\frac{3}{8}$. An ordinary deck of playing cards contains 52 cards, 13 of which are clubs and 4 kings. In finding the probability that a card taken at random from such a deck is either a club or a king, one counts 16, not 17, possible outcomes with the desired attribute, since one king is also a club. The probability that the card is either a club or a king is $\frac{16}{52} = \frac{4}{13}$.

The enumeration of possible outcomes of a chance event is sometimes simpler if use is made of appropriate formulas for calculating combinations. If we ask for the probability that two cards taken at random from an ordinary deck be "either clubs or kings, then we must find the number of pairs of cards that have the desired attribute; in other words, we must find the number of combinations of 16 cards taken 2 at a time. We must also find the number of combinations of 52 cards taken 2 at a time, for this represents the total number of possible outcomes. The formula required here is that for ${}_nC_r$, which is defined as the number of combinations of n objects taken r at a time: ${}_nC_r = \frac{n!}{r!(n-r)!}$, where $n!$ abbreviation for the product $n(n-1)(n-2) \dots (2)(1)$ and where it is agreed that $0! = 1$.

Thus ${}_{16}C_2 = \frac{16!}{2!(14)!} = \frac{16 \cdot 15}{1 \cdot 2} = 120$ and ${}_{52}C_2 = \frac{52!}{2!(50)!} = \frac{51 \cdot 52}{1 \cdot 2} = 51 \cdot 26 = 1326$.

Hence the required probability is $\frac{120}{1326} = \frac{8 \cdot 15}{51 \cdot 26} = \frac{4 \cdot 5}{17 \cdot 13} = \frac{20}{221}$.

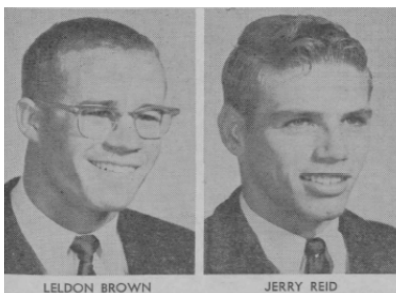
The main purposes of the League's mathematics program are sponsoring competition in mathematics among Texas students, teaching skills in mental calculation, stimulating interest in mathematics, and encouraging young people to think about and to work at mathematics. Student

Activities Conferences, sponsored by the League and various colleges over the state, have developed into one of the main means by which the League carries out its program.

These conferences are always attended by representatives of the League office in Austin, faculty members of the college at which the conference is held, and teachers and students from schools in the surrounding area. At each of the eight conferences scheduled for this fall and winter there will be a program for those interested in Number Sense. Number Sense programs usually include talks on some aspect of the technique of effective mental calculation and on topics in mathematics that are interesting and suitable for young students, question and answer sessions, sharing of ideas among students and teachers, and a practice Number Sense test that contains problems similar to those given in the regular competition tests. A great deal of careful planning and thoughtful execution goes into the preparation and carrying out of these programs. Much effort is made to see to it that everyone attending feels that he has spent his time wisely and profitably.

The increasing attendance year after year indicates that this effort is bearing fruit. Please consult the Conference Schedule given in the lower right hand corner of the first page of the September issue of the *Leaguer* for the time and place of the conference to be held nearest you and make a date now on your calendar to attend. Your presence means a great deal to the success of the Conference; the Conference has a great deal to offer you.

***** October, 1961 ... Levellcmd Math Winners Get Missile Range Study Posts**



Jerry Reid and Leldon Brown, 1959 graduates of Levelland High School, and district winners in slide rule and number sense competition, were accepted for special studies at the White Sands Missile Range Coop Student Training Program of New Mexico State University.

Jerry, son of Mr. and Mrs. Austin M. Reid of Kerrville, was district winner three times in slide rule. He attended the Texas Tech Summer Institute in Physics in 1958.

Leldon, son of Mr. and Mrs. Leldon Brown, Sr. of Levelland won district twice in slide rule and number sense. He participated in football, baseball and track, going to State Meet with the mile relay team in 1958.

***** October, 1961 ... C. H. Evans Given Award By Actuaries**



C. H. Evans, superintendent of Agua Dulce Public Schools, won an Actuaries Club of the Southwest Award in recognition of his work with slide rule and number sense contestants. Mr. Evans has taught number sense for 12 years, qualifying eight students for regional and two for state contests. In five years of teaching slide rule he has sent students to regional every year. He says the fundamental skills necessary for number sense competition definitely prepare students for higher studies in mathematics. He considers number sense an integral part of a student's high school education.

Agua Dulce students spend a great deal of time studying for contests and seem to enjoy it. Evans says that competition is irreplaceable in the educational system and lauds the League for providing for profitable contests.

***** October, 1961 ... Math Contest Coach Developed Champions**



Miss Georgette Ellis coached many White Oak High School number sense and slide rule contestants to district, regional and state victories, but she insists that her prime purpose is not to prepare students to win contests, but to give them a sound understanding of the principles of mathematics.

In 1960, Cherry Hanicak won the state Class A championship in slide rule. In 1961 Donnie Ealy, a junior, took the state number sense crown. In addition Miss Ellis had previously coached three state slide rule contest winners.

Miss Ellis not only sponsored the White Oaks High School slide rule and number sense contestants for the 1961 competition, but she had previously taught her opponents' sponsors. Rex White, who won a fourth in state under Miss Ellis' instruction, sponsored the slide rule and number sense contestants at London.

Jimmie Muckleroy, another former Ellis student, sponsored the Judson Blue Devils' team.

Mrs. Earla Cox instructed the Hallsville number sense students. She is the mother of Jimmie Cox who twice took second place in State Meet under Miss Ellis' sponsorship. White Oak slide rule contestants have won district honors so often that it is news when they don't sweep the field.

1960 was the school's "bad" year—they won only first and second places. White Oak number sense teams have placed in regional competition every year except 1953 since the early 1940s.

When asked about her key to success Miss Ellis said, "I hardly know what to say because I feel that my success and record are due more to the interest and efforts of my students than to any inspiration I might have been.

"We do have many, many hours of practice with emphasis on understanding and accuracy. I believe the carry-over value of this type training is invaluable to mathematics students in their future education."

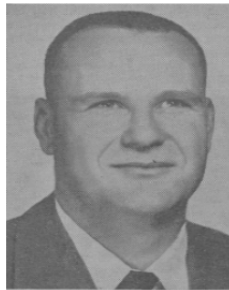
Because of illness Miss Ellis has resigned from teaching temporarily. She will take a deserved rest before deciding on her future work.

*** November, 1961 ... **Winning Ways In Mathematics Bring Award**

Mrs. Alta Duke Pfeiffer was given a \$300 Actuaries Club of the Southwest award for her outstanding record as a number sense coach. In five years at Ball High School in Galveston Mrs. Pfeiffer has never failed to qualify students for the League regional meet. For the past three years her students have gone all the way to state competition. In 1959 Allan Fradkin, now a University of Texas student, took third place in state.

Mrs. Pfeiffer has been a mathematics teacher for 14 years.

*** December, 1961 ... AWARD WINNER



T. H. Dick, superintendent of Callisburg Schools and number sense coach, was given an Actuaries Club of the Southwest \$300 award in recognition of his accomplishments in interesting students in the study of Mathematics.

Since the first awards were given in 1956 the club has given more than \$12,000 to Texas high school teachers as an incentive for improvement of mathematics instruction and to increase student interest in careers in mathematics.

***** December, 1961 ... Number Sense Sponsor Says Grant Fulfilled Her Dream**



"It seems a fulfillment of-a dream I have had since I was in high school." That was Mrs. Lynn C. Huff's response when she was informed that she had been awarded an Actuaries Club of the Southwest grant for her outstanding work in number sense.

Mrs. Huff combines intense energy with her great ability in mathematics to inspire her students. Her first experience with mental mathematics came during her practice teaching while she was a student. She taught for three years after studying for two years at Louisiana State Normal. Then she retired temporarily to take care of her family—four children and four stepchildren.

In 1942 she again entered teaching to help during the wartime critical shortage of instructors. In 1950 she was named head of the mathematics department at Hemphill High School. She has remained at that post.

In 1958 the school entered Interscholastic League competition. Mrs. Huff sponsored the number sense competition. Although she had to find time outside her regular schedule to coach the students they won first, second and third places at the district meet. That record has been duplicated each year since.

Mrs. Huff says mathematics has fascinated her since her years in school at Hemphill ... she finds math fun.

***** February, 1962 ... Student Spirit Given Credit For Success**



Don R. Taylor, Roosevelt Public Schools mathematics teacher and winner of an Actuaries Club of the Southwest award, credits the success of his number sense students to their highly competitive spirits. The Roosevelt number sense students, Taylor adds, just don't like to be surpassed and do their best to be the best.

Taylor says all work in number sense at his school is voluntary, with no class time reserved for work. Students interested in mathematics are given UIL number sense materials and tested regularly during school activity periods, with a two-hour test being administered each month. The League contestants are chosen for their high marks in these practice tests.

*** February, 1962 ... **Breckenridge Teacher Given 1961 Actuaries Club Award**



Mrs. Custer M. Knox, mathematics teacher at Brackenridge High School, was given a 1961 Actuaries Club of the Southwest Award for her outstanding work as a number sense coach. Mrs. Knox has sponsored number sense competition for six years. She started a number sense club to promote interest in the activity.

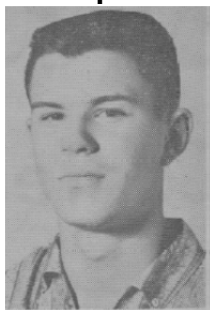
In the past two years her students have won first, second, third and alternate in district competition. Each year here students have gone on the regional contests.

"I cannot give enough credit to the students," Mrs. Knox said. "Without their untiring efforts and interest I could not have won this award."

Most of her work with number sense students is done between 7:30 a.m. and the opening of school. She believes that much practice is essential to speed and accuracy.

*** September, 1962 ... The Texas Interscholastic League Foundation announces winners of the ten Jesse H. Jones scholarships of \$500 each. Two number sense competitors, Robert Joseph Dorotik, El Campo and Wayne Ealy, White Oak were awarded scholarships.

*** September, 1962 ... **Number Sense Champion**



Lawrence Jordan, Cleburne High School, won first place in the Class AAA Number Sense Competition held at the State Meet last May on the University of Texas campus. He was instructed by Mr. E. Rex Arnold.

*** September, 1962 ... **Actuaries Name Award Recipients**

For the sixth consecutive year, the Actuaries Club of the Southwest has made its award to number sense sponsors. Seven awards of \$300 each, given for outstanding achievement in interesting high school students in the number sense contest and in coaching them for contest participation, were distributed as follows:

Mrs. Flora M. Corbin, Miami; Miss Fay Noble, Sherman; Mr. Morris Ruggles, Longview Spring Hill; Mrs. C. C. Ware, Saint Jo; Mr. Charles Engel, Lott; Mr. Bobby Bruce Smith, Mont Belvieu Barber's Hill; Mr. J. B. Kempson, Levelland.

*** October, 1962 ... **Honored For Math Contest Coaching**

Charles W. Engel, Lott High School mathematics teacher, was given a \$300 Actuaries Club of the Southwest Award in recognition of his work in stimulating students to study math.

Sponsor of the number sense contestants, Engel coached his students during noon hours and after school. On Saturdays he took pupils to the League-sponsored Student Activities Conferences for additional training.

He received the unanimous approval of the awarding committee of the Texas Interscholastic League Foundation.

Kay Boswank and Glenard Frei were his two number sense competitors last year. Glenard won district and regional and went on to the State Meet.

Engel also coaches the Lott High School slide rule contestants. He was singled out for the honor because his work has helped to stimulate student interest in number sense, slide rule and mathematics study in general.

*** October, 1962 ... **Miami High Teacher Given Actuaries Club \$300 Grant**

Mrs. Flora M. Corbin won a \$300 Actuaries Club of the Southwest Award for doing what she thoroughly enjoys coaching Miami High School number sense competitors. Mrs. Corbin's students have placed in district nearly every year since she started coaching number sense in 1948. She has sent competitors to regional ten times and brought students to the State Meet four times. She coached a state winner in 1950 and had a contestant in a tie-breaking final last May. She is a graduate of Hardin-Simmons University with a B.A. degree.

She has taught for 17 years, having been principal of Miami Elementary School for eight years. Her teaching career started when she was employed to teach fourth grade in Eagle Pass during World War II. She taught fourth, sixth, seventh and eighth grade students until 1956 when she went to Miami High School to teach Spanish and mathematics.

Mrs. Corbin says she enjoys working with number sense students because she feels that they gain a better understanding of basic mathematics and are motivated to do better work in the field.

She is already grooming contestants for the coming competition and has her eye on State Meet.

*** December, 1962 ... **1952 State Contestants Go On To Success**

Richard Tucker was the League's state champion in Number Sense in 1952. He lettered in football in 1950, 1951 and 1952 and later attended The University of Texas where he took his Masters. He is working toward his Ph.D. and is now teaching at Arlington State College at Arlington.

Maurice Bryson (El Paso, Number Sense) was graduated from Harvard in 1957, magna cum laude, and is now working for Douglas Aircraft in Los Angeles.

Craig Boyd (Woodson, Number sense) has become a doctor. Dr. Boyd serves as a resident physician at Travis Air Force Base in California.

*** February, 1963 ... Leaguer article

Number Sense Contest Introduces New Problems

By James M. Hurt, Director of Number Sense

The number sense tests for 1963 are now on the way to the printer. There are nine of them, of 80 problems each: five for district, two for region, and two for state, including tie-breakers.

The problems are much the same as those for 1962, though there are a few novelties, some of which will be discussed in this article. Great care has been taken to insure that the problems truly are suitable for mental calculation and thus can be solved accurately and quickly by properly trained, talented students.

This of course greatly limits the types of problems that can be given, since most mathematical problems cannot be solved in anyone's head; yet the variety of problems that can be considered is almost without limit.

To compete with success in the number sense contest, the student must have a considerable sense of numbers or aptitude for mathematics and must undergo a rigorous period of training under the direction of a qualified teacher. The period of training is essential, for many in number sense tests there are many that almost anyone with special methods and much practice are required for accurate quick *mental* calculation: ability to solve with paper and pencil is no assurance of ability to solve mentally.

The student undergoing training in mental calculation must be taught to put accuracy ahead of speed.

What is the use of quickly getting a wrong answer? The purpose of solving a problem is that of finding the correct answer. Better to attempt only the first ten problems and get all answers correct (Score:50) than to put an answer after each of the eighty and miss half (Score: 0), thus obtaining with much greater effort the same score obtainable by refraining from putting down any answers at all!

On the other hand, speed must be developed. The student participates with the hope of becoming a winner.

To win he must write down correct results quicker than his competitors. But he must be sure that his results are correct before he writes them down.

Among the problems that occur agree are capable of mental solution, but there are some which an untrained person might think impossible to solve without use of paper and pencil. Who is there who cannot easily find the sum of 88 and 32 or the product of 25 and 20 without writing? But how many can mentally determine the increase in the volume of a cube caused by increasing the edge from 17 in. to 18. in. or mentally estimate with not more than five per cent error the area of a circle of circumference $22\frac{1}{2}$ in.? Anyone can find the number of apples than can be bought for \$2.55 at 5c apiece without exercising anything but his mind; few are able to determine without considerable paper and pencil work the number of gallons of gasoline that must be taxed at $8\frac{1}{4}$ c a gallon in order to yield \$561,000 in revenue. Yet those more difficult problems, together with many others similar to them, are readily amenable to mental methods; and successful competition in number sense contests requires that these methods be mastered.

For the past two years problems concerned with simple probability and combinations have been occurring. In addition, the tests for 1963 will contain a few problems that concern classes, subclasses, class sums, class intersections, and related concepts.

The following two examples are typical of this new variety:

1. Of 220 school boys, 163 play football, 175 play basketball, and 24 do not play either. How many play both football and basketball? How many play football only? Basketball only?

2. Each of 21 boxes of oranges contains at least 41 and at most 50 oranges. How many boxes *must* contain the same number of oranges?
3. A card is taken at random from an ordinary deck of 52 playing cards. Find the probability that it is neither an ace nor a club nor a jack.

*** September, 1963 ... **Math Champs Range Widely In Interests**

Winners of the League's three mathematical scholarships, namely the Beckman Number Sense Scholarship and the two Beckman Slide Rule Proficiency Awards, demonstrate a wide range of interests.

Allison Gale Hasselmeier of Ball High School in Galveston, having placed second in slide rule at district, first in region in 1961 and 1962, won third place at state in the slide rule contest. Gale received one of the Beckman slide rule scholarships for the 1962-63 school term. Gale was also president of the senior class, president of the Slide Rule Club, and president of the Classical League. He was a member of the National Honor Society and the Junior Academy of Science. He will seek a degree in mathematics at The University of Texas.

Richard Donald Ruggles of Spring Hill High School at Longview received the second Beckman slide rule scholarship. Richard participated in the slide rule contest for three years, winning first at state meet in 1962. Richard placed second in the number sense and the typing contests at the 1962 regional meet.

Richard was president of the Slide Rule Club, captain of the basketball team and valedictorian of his class. He is an amateur musician- and set the pole vault record of his school. Richard plans to be an electrical engineer.

Girvice Ward Archer of Kerrville was selected as the winner of the Beckman Number Sense Scholarship.

Girvice was an honor graduate, with the highest rank of any senior in his class. He competed in the number sense contest for three years, winning first at district each year and third at region, in 1961. Girvice was president of the National Honor Society, secretary of the UIL Club, vice-president of the Kerrville Band and parliamentarian of the Student Council. He served as a staff member for the school yearbook, the school newspaper, and is listed in the school's "Who's Who." Girvice participated in the tennis contest for five years.

All three winners of the Beckman scholarships made outstanding high school records.

*** September, 1963 ... **TILF Awards \$47,600 In 24 Scholarships**

Number Sense competitors receiving scholarships include:

Welch scholarship -- Mark Alan Arrington of Miami, Science and Number Sense;

Moody scholarships -- Milton Ervin Evitt of Monterey in Lubbock, Slide Rule and Number Sense and Alan Tim Laverty of A&M, Number Sense and Science;

Texas Laundry and Dry Cleaning Association scholarships -- Maria Estela Guerra of Falfurrias, Number Sense; and

Cook Scholarship went to James Michael Bassham of Sulphur Bluff, Number Sense.

***** September, 1963 ... 8 Actuaries Awards Given Math Sponsors**

The Actuaries Club of the Southwest has, for the seventh year, awarded eight achievement scholarships to number sense sponsors with fine records in coaching the event.

The winners, who each received \$300, are Garland Jones of Quanah, Gene Landers of Sulphur Bluff, Glen V. Lane of West Orange, Doyle Fenn of Deer Park, Aaron L. McCrackin, Jr. of Andrews, Mrs. Emma B. Stoddard of Devine, Mrs. Eloise Williams of Sam Houston in San Antonio, and Miss Gartrell Watson of Dallas. Additional information about these sponsors will be given in later issues.

Since The Actuaries Club of the Southwest will be presenting these for the eighth time in the spring of 1964, each number sense sponsor should keep this in mind and begin training her contestants early in the school year.

***** December, 1963 ... Math Teaching Great Sport To Actuaries Award Winner**

by Mrs. C. C. (Faye Phelps) Ware

Teaching mathematics has been great sport for me. For the past thirty years I have taught English and mathematics in Montague County. I have taught in the Saint Jo High School for ten years and in the schools at Illinois Bend and Caps Corner.

At present, I am teaching English and mathematics in Saint Jo High school. I am the yearly sponsor of the National Mathematics Contest and the Number Sense Contest.

Since the inception of Number Sense contest I have had winners, either in county, district, or regional meets. In the days when we sent the high grade papers to the State Office, I was the coach of the winning team and the papers were sent to Austin. The students were sent Certificates of Award.

This Number Sense Contest is one of the finest stimulants that the mathematics department has ever had. My highest ambition is to help some student win the state contest I was born and reared in Bellevue, Clay County, Texas, and graduated from Bellevue High School in 1917. I have taught continuously, except for two years. I have my BA from North Texas State University in Denton, and I am doing work on the master's degree.

The winning of the Actuaries Award was one of the greatest moments in my career. Students from all over Texas, and various other states, called and wrote congratulations. This was compensation enough, to say nothing of the wonderful gift of \$300. Thanks many times to the Actuaries Club of the Southwest and to the University Interscholastic League

***** April, 1964 ...**



Gene Landers, number sense sponsor at Sulphur Bluff, won an Actuaries Club of the Southwest award for his work with math students. He has qualified students at regional meet for five of the

past six years, and has carried competitors to State Meet three of those years. His contestants won first in state in 1960 and 1963.

***** September, 1964 ... Scholarship Winners Begin College Study**

This year, 47 students who competed in the League literary and academic contests at the state meet will attend college or university under Texas Interscholastic League Foundation scholarships. This is the greatest number of winners and the largest sum the Texas Interscholastic League Foundation Board has ever provided.

The 33 recipients chosen this year will receive \$68,500; the 14 recipients whose scholarships have not yet terminated will receive \$31,050, & grand total of \$99,550. This includes the last half of a one-year scholarship given a boy last year; he was injured and unable to utilize the funds until this fall.

These awards include ten scholarships given by the Welch Foundation in the amount of \$1000 a year for four years; five scholarships of the Moody Foundation in the amount of \$1000 a year for four years; ten Jesse Jones scholarships in the amount of \$500 each for one year; two Texas Laundry and Dry Cleaning Association scholarships in the amount of \$800 each (funds to be distributed over two years), one in the amount of \$500 given by J. O. Webb and a similar sum given by J. B. Cook, both of Houston and both Board members.

Two scholarships of \$100 each were given in honor of Roy Bedichek and Dean Shelby, respectively. The Henry Beckman slide rule scholarship was for \$200, and the Henry Beckman number sense award was for \$500. Mr. Beckman's scholarship, given annually for many years now, was the "mustard seed" which inspired the founding of the Texas Interscholastic League Foundation and the securing of additional grants for other League contestants in the literary and academic competition at the State Meet.

Recipients to College

Of the 47 students, 10 chose to attend Rice University, 25 The University of Texas, 1 A & M, 2 North Texas State University, 2 Texas Tech, 2 Baylor University, 1 The University of Houston, 1 Southwest Texas State College and 1 McMurry College. Note that these winners are attending nine different institutions in Texas. Jones scholarship awardees are restricted to The University of Texas or Texas Western University at El Paso.

"Those who compete in the literary and academic events expend as much effort as those who march down the football field or break the tape at track meets. Their talent is, I believe, equally deserving of recognition.

It was a pleasure to award these scholarships. I only regret that the Foundation has no more funds to award more of the talented boys and girls being graduated from our Texas high schools annually." This was Mr. R. J. Kidd's summary of the work of the Foundation.

Number Sense competitors receiving scholarships included:

Welch scholarship -- Dennis E. Sorrensen, slide rule and number sense, Bridge City; Harol Dean Victory, Jr., number sense, Gladewater;

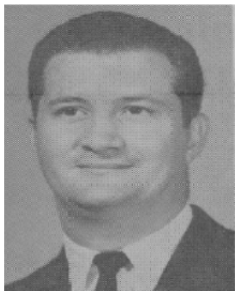
Moody scholarships -- Johnny Virgil Boley, number sense, Monterey (Lubbock); Enrique Gonzalez, number sense, McAllen; Coy Lewis May, number sense, Rider (Wichita Falls); Larry Earl Meyer, number sense, and

Joe B. Cook Scholarship went to Michael R. Irwin, number sense, Pettus.

***** October, 1964 ... Number Sense Needed**

Twenty years ago, the first number sense contest was prepared by Dr. John W. Calhoun. Originally, the contest was designed for seventh grade competition. (As the schools were then organized, this was the equivalent to the present eighth grade.) Revised in 1945, the contest was adapted to be used by both grades seven and eight and by high schools. The contest is now open to all grades from seven through high school. It has often been pointed out that nine-tenths of the math used in every day living is "mental arithmetic." One does not, like a deaf man, carry along a pad and pencil to count change, or decide whether oranges are cheaper by the dozen or by the basket, or compute the number of miles to the gallon of gasoline. The number sense contest is based upon this daily living requirement. "Numbers" is a language and "number sense" must be developed to use that language effectively. Currently, the demand for the Number Sense Bulletin usually exceeds 10,000 copies a year. These are shipped to practically every school in Texas and, in fact, to all parts of the world.

***** October, 1964 ... First Year Nets Teacher Cash Award**



In his first full teaching year at Bridge City High School, Joe F. Chenella Jr. watched his students take the top three places in number sense and slide rule at district, hold the two firsts in regional, and place second and fourth at State Interscholastic League competition.

As a final commendation to an outstanding teacher and coach, the Actuaries Club of the Southwest has selected Chenella as one of eight to be awarded a cash prize of \$300.

Meeting an hour before school each day during the semester, Chenella coached his students in mathematics and slide rule. One of his students, Dennis Sorrenson, was awarded an Interscholastic League Scholarship for the fall. At Bridge City High School in Beaumont, Chenella gave outside time and interest by sponsoring the Slide Rule and Number Sense Clubs and co-sponsoring the Mathematics Club. A graduate of South Park High School in Beaumont, the instructor received a bachelor of science degree in secondary education from Lamar State College of Technology in January, 1963.

***** October, 1964 ... Award Winner**



Mrs. Courtade Robinson, mathematics teacher at Aspermont, was awarded a \$300 Actuaries Club of the Southwest grant in recognition of excellence in teaching and coaching League Number Sense competitors. She has had four contestants in the State Meet contest. From 1951 to 1954 her contestants have won through to regional contests each year.

*** October, 1964 ... **ACTUARIES AWARD WINNER**



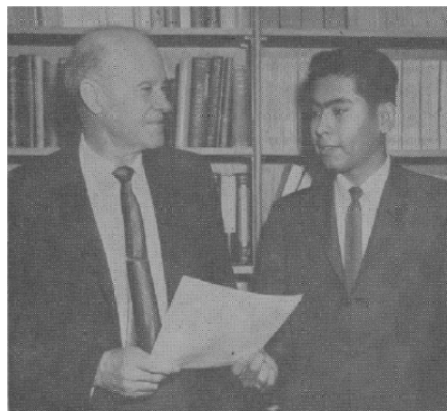
Miss Marie E. McCown. Mathematics teacher at Pettus, was given an Actuaries Club of the Southwest award of \$300 in recognition of her superior work in teaching math and coaching League Number Sense competitors. She was a Natural Science Foundation winner in 1963.

*** November, 1964 ... **Irvin Teacher Given Award**

A teacher and coach for more than 30 years whose **first contestant in 1937 broke the state record**, Mrs. Odie Lee Bounds was selected as one of the winners of a \$300 award presented by the Actuaries Club of the Southwest. Joining the staff of Irvin High School in 1960, Mrs. Bounds is coach for number sense with her students winning first, second, and third place in the last District meet.

Students interested in exploring computing short cuts and increasing accuracy as well as preparing for state competition met with Mrs. Bounds before school each morning for instruction.

*** January, 1965 ... **Moody Grant Winner Plans Three-Year College Stint**



DEAN ADVISES WINNER—Dr. John Arch White, dean of The University of Texas College of Business Administration, discusses a degree plan with Enrique Gonzalez. Enrique, winner of a Moody Foundation scholarship, plans to complete his work in three years.

An exceptional high school record was an important factor in securing for Enrique Gonzales one of the Moody Foundation scholarships providing \$1000 a year for three years.

Despite the fact that Enrique was the oldest of nine children and necessarily worked to assist his family, Enrique found time to compete in the League number sense and slide rule contests and finished McAllen High School seventh in a class of 355.

Won National Contest

Enrique in 1963 placed third in the National Mathematics contest, being high sophomore. That year he was first in the Pan American Mathematics Field Day in algebra and next year was captain of the winning math team. Also, Enrique was a member of the National Honor Society, president of the Number Sense Club and acted as student instructor for the slide rule club. Winning first at district and third at region in slide rule, he advanced to the State Meet by winning first in number sense at both district and region.

Outstanding Record

According to Marion Sell, his principal, Enrique achieved a "remarkable academic record," taking four years of English and of accelerated math, as well as two years of French and other required courses with a straight A record while finishing in three years. Besides his excellent mathematical ability, Enrique is considered by his teachers as a boy of "fine character, responsibility and industry."

In applying for the Moody award, Enrique wrote that he believed "pursuing a career in life insurance will help myself and others." He is majoring in mathematics, will study accounting and perhaps become an actuary. He is also laying plans for assisting his younger brothers to attend university.

"Texas schools have many such talented students," said Mr. Kidd. "We have discovered Enrique's talent

for math and developed it through the League contest program and have, fortunately, been able to assist Enrique with a Texas Interscholastic League Foundation scholarship in his accomplishments."

*** April 1965 Leaguer article:

Prof. Hurt's Tests Don't Hurt a Bit

Mental Math Director Resigns After 13 Years of Test Work by Sara Speights

It takes more than number sense to create and direct the Interscholastic League Number Sense Contest. It takes time, sensitivity to changes in mathematical concepts, and a liberal sprinkling of imagination. Since the fall of 1952, James Mann Hurt, assistant professor of mathematics at the University of Texas, has been the man responsible for the contest, unique in Texas. But, unfortunately for high schoolers across the state, after the May Interscholastic League meet Hurt will resign his directorship.

Popular Contest

Number Sense is one of the oldest League contests and is probably second only to the Spelling Bee in popularity. The affable Prof. Hurt has devoted much of his busy schedule to developing the program into the success it is today. In the past 13 years, he has made up the eight or nine tests in each of the senses, M through X, the present group of tests used. Besides just making up the tests and administering them, Hurt has "inspired teachers all over the state to get students into the program," Rodney J. Kidd, director of the League, said.

Japan Trying Number Sense

Other states have similar programs, Hurt said, but "ours is unique in that it is solely mental calculation. The only writing is in the answers." Japan, with a similar program, has recently requested information about Hurt's famous program. The purpose of the contest is to "bring mathematics to the attention of high school students across the state in both urban and rural areas. A contest is the best way to reach them," he said.

Natural Ability Shown

Many students, the League feels, could never excel on the basketball court or the debate team, but have natural mathematical talents that need to be discovered. Kidd said that Hurt's tests are so well prepared that they have been used in many other states and by the Armed Forces.

Tests are not always an indication of aptitude, but Kidd said a profound correlation between performance on Hurt's tests and college mathematic performance has shown up during the last few years.

Problems Everywhere

How does Hurt come up with the questions for the test? "I find them just waiting for me everywhere I go," he said. "For instance, I was reading a National Geographic Magazine not too long ago and came across a ready-made question in an advertisement for mail order steaks." The question he developed from the ad reads: "Eight boneless sirloin strip steaks each weighing 14 ounces sell for \$29.96. Find the price per pound."

"The most important thing is that the problem must be capable of mental solution by the students toward whom the program is directed," Hurt said, "and it must concern topics with which they are familiar."

Gateway to College

He feels many students who participate in the contest come to the University because of their League competition. "Some big scholarships are given through the League to Number Sense winners," Hurt said.

He cited the Henry Beckman donation and the Welsh scholarships from Houston.

While Hurt has been director, eight \$300 scholarships have been established as grants to the Texas teachers who promote interest in mathematics and the Number Sense program. The Actuaries Club of the Southwest provides money for these grants.

Teacher, Counselor, Lecturer

Hurt teaches two courses at the University besides his League work and somewhere in between acts as a counselor in the Dean's office. Mathematic analysis is his main interest but he also works with modern abstract algebra and geometry. With the exception of one year spent as a guest lecturer at the University of Southern California, Hurt has been on the UT staff since 1942. He received both a BA and an MA from The University. The mathematician also teaches for the University's Field Service Bureau, a program designed for elementary school teachers. He feels elementary teachers require advanced instruction to keep them up with modern math developments.

Research Work

Like all University professors, Hurt must also publish in his field.

"Most of my research involves work directly related to my students, however," he said.

Two sons are on campus daily with their father. A 19-year-old is a musicology major and a 21-year-old has chosen chemistry as his field.

Dr. Weaver Takes Post

Dr. Milo W. Weaver, associate professor of mathematics at the University, will replace Prof. Hurt after the League events in May. Hurt plans to work with Dr. Weaver for at least the first few months.

Besides being involved with a heavy work load, Hurt is leaving his top position with the League because he feels his questions might start getting stale. "There are only so many variations on the same old type question," he said. One thing he hopes Dr. Weaver will do in his new capacity is to write a new Number Sense information booklet. The last one was written in 1945 and never brought up to date.

Contribution to Youth

Mr. Hurt's devotion to Interscholastic League and the Number Sense Contest has demonstrated his awareness of the needs of Texas youth. His contribution has been not only to the 15-16,000 students a year who take his tests, but also to the struggle for academic excellence throughout the State.

**PROF. JAMES M. HURT**

After 13 years as director of League high school Number Sense Contests, Prof. Hurt will resign, effective May 31. The genial mathematician has compiled 110 contests containing 8,800 problems. These contests have spurred thousands of high school students to study math, and they have been distributed all over the world. They are serving as models for similar contests in other states and in foreign countries.

===== Dr. Milo W. Weaver era Fall, 1965 – Spring, 1968 =====



Dr. Milo W. Weaver, new director of the League Number Sense Contest, just plain likes mathematics and the contest. "I look forward to interesting experiences in the Number Sense Contest," Dr. Weaver said. "This event attracts top students and I will enjoy working with them." He is well acquainted with the problems of teaching in public schools, having served with the Jasper Public Schools in 1933-34, and in the Austin Public Schools from 1935 to 1945 when he came to The University of Texas. He is now an associate professor of mathematics. Dr. Weaver was assistant director of the Saudi Arabian Training Project in 1961-1962. He served as Texas director of the high school math contest sponsored by Mathematics Association of America in 1961-62. Dr. Weaver is author of several original papers on modern algebra and number theory. "We are fortunate to get Dr. Mile Weaver as Number Sense director. R. J. Kidd, League director, said. "He is a fine man and is deeply interested in students and their progress in mathematics."

Items of interest 1965-1968

>>> Note: Prof. James M. Hurt, assistant professor of mathematics will assist Dr. Weaver.

>>> Note: Dr. Dale E. Walston, assistant professor of mathematics is the director of the Elementary Number Sense contests at this time.

>>> Note: the number sense tests were labeled as series Y, Z, and AA. The Y-Z-AA series consisted of 8 tests labeled Y-1 to Y-8 thru AA-1 to AA8.

*** September, 1965 ...

TILF Scholarships Total \$85,000 Plus \$66,000 In Continuing Grants

Texas Interscholastic League Foundation directors have worked vigorously for five years to secure funds for the Texas high school students of outstanding achievement, who have competed in the literary or academic events of the 1965 or previous state meets. As a result of their efforts, 61 of the University Interscholastic League state meet competitors have been awarded scholarships.

These new awards total \$85,800 and range in amount from \$500 to \$4000 (\$1000 a year for four years).

Foundation directors point out that this figure does not include amounts from previous years. The 24 continuing or "unexpired" scholarships involve an additional \$66,000.

85 former Interscholastic League award recipients are still in college or university who began their higher education with Texas Interscholastic League scholarships. The foundation is still working and officials hope by next year to provide \$100,000 in new scholarships. Most of the awards were "incentive scholarships" of \$500, such as the three Henry Beckman number contributes a \$200 slide rule competition award. The Texas Laundry and Dry Cleaning Association provided two \$500 scholarships and extended two last years awards by \$300 each. Others were the Bedichek Memorial Award, the Elizabeth Memorial award contributed by J. O. Webb, the Reynolds Memorial Award, and the T. H. Shelby Memorial Award. The League Foundation presented three awards of \$500 each and the Houston Endowment, doubling the number of available scholarships, provided twenty in that amount, plus one award not utilized last year.

Among the larger scholarships were the five Brown-Lupton awards of \$1000 each, the Joe Cook Debate scholarship of \$1000, the four Kleberg scholarships of \$800 each, the five Moody Foundation awards of \$4000 each (plus accumulated unused funds of \$2500), and the ten Welch Foundation awards also of \$4000 each.

Number Sense competitors receiving scholarships included:

Richard G. Ancell, Mertzon; Oliver C. Brown, Quanah Dennis Ralph Flentge, Rosebud; David T. Griffin, Marble Falls; Richard A. Gruhlkey, Adrian; Fred A. Rylander, Katy; Tim Dee Sturdivant, Matador; and Thomas M. Tonkin, Andrews

*** September, 1965 ... **Actuaries Club Honors 8 Top Math Teachers**

Eight cash awards of \$300 each have been awarded for the ninth year by the Actuaries Club of the Southwest to outstanding high school mathematics teachers. The awards are presented to those with notable coaching records in the Interscholastic League Number Sense Contest to encourage interest, both on the part of the sponsor and of the students he coaches in the study of mathematics.

The 1965 winners are Randell L. Bradley, Wichita Falls; James M. Perkins, De Leon; Damon D. Stearman, Evadale; Kenneth A. Palmberg, Furr High School of Houston; Hubert L. Kuempel, Pflugerville; Bennie R. Pinson, Bishop and Maurice Fite, Monterey High School of Lubbock.

*** October, 1965 ... **Number Sense Contest Grows**

Phenomenal growth of the number sense contest was observed last year. While no statistics are available on the actual number of contestants who entered the contest, the amount of interest can be judged from the demand for contest material. Last year, the number of bulletins sold was greater than in any previous year, while more than 75,000 copies of practice test sheets were distributed to the member schools. This is evidence that the number sense contest is one of the most popular of League events.

*** October, 1965 ... **Actuaries Award Winners**



Randell L. Bradley (left), teacher of mathematics at Wichita Falls High School was selected winner of a \$300 Actuaries Club of the Southwest Award.

Eight of these grants are made each year to mathematics teachers who have effectively coached League Number Sense competitors and had a winner in the regional meet.

Bradley, a graduate of Dalhart High School and Midwestern University, was a B-17 pilot in World War- II. He parachuted from a burning plane over France in 1944 and was held captive by the Germans for a year.

He taught in Reagan Junior High of Wichita Falls for three and one half years. He has now taught ten years at Wichita Falls High. In those ten years he has had contestants advance to State Meet for nine consecutive years in Slide Rule, winning two first places at State. His Number Sense contestants advanced to regional meets nine times and to the state competition six times. Two of his Number Sense students won second places at State Meet.

Bradley is married and has two daughters in Midwestern University, a son in Wichita Falls High and a son in elementary school. He credits Prof. Chester Duncan of Midwestern for inspiring him in the study and teaching of mathematics.

James M. Perkins (right), mathematics teacher at De Leon High School, was selected winner of a \$300 Actuaries Club of the Southwest for outstanding work in coaching Number Sense competitors. He has taught Number Sense for 13 years, during which time he has had five high school district champs, five regional contestants, and sent a competitor to the State Meet in 1965. For eight years his students took first, second and third places in elementary school division.

*** October, 1965 ... **State Winner**

Rayford Smith, junior at Alto High School, won the Conference A Number Sense Contest at the State Meet in 1965. Coached by G. R. (Bobby) Wallace, took first place in District Number Sense competition both as a freshman and as a sophomore. He won fifth in State Meet as a freshman. As a sophomore, Smith won third place in District Slide Rule contest. He has not yet decided upon a career, but is considering Insurance as his field of study.

*** January, 1966 ... Leaguer article:

Few 'New Math' Problems In Number Sense Contests

by Dr. Mile W. Weaver, State Number Sense Director

Professor J. W. Calhoun, in his "Developing Number Sense" bulletin, put the Number Sense Contest on a solid foundation. The tests have been slightly generalized over the years, but they are still composed mostly of problems of the types listed in the bulletin. Jim Hurt, Number Sense director for many years, did an excellent job in including many problems of practical interest.

"New Math" Problems

With the advent of the 'New Math,' there has been some agitation toward the inclusion of problems involving simple set theory and simply logical number theoretic statements. Undoubtedly, if any fundamental changes are made in the near future in the contests, they should involve the "New Math" on account of the emphasis given it in the public schools. However, since the contestants are encouraged to drill and study for the competition, they should be warned before any great changes are made; certainly mental numerical calculation should always occupy an important part of any "number sense contest."

New Type Problems

The 1966 tests are similar to the previous ones, but contain a few problems involving ordered pairs and the number of subsets of given sets. Also they contain some problems which require for their solution a knowledge of the terms: Prime Number, Relatively Prime Numbers, Greatest Common Divisor, and Least Common Multiple. Prior to 1966, few, if any problems had negative or zero answers. Such answers do occur in the 1966 tests. Also some of the problems require the solution of simple algebraic equations.

Comments Requested

The present director is anxious to hear from the contestants and their coaches and to get written comments and suggestions from them to assist him in making tests in future years.

*** February, 1966 ... Leaguer article:

He Had To Go Through College - Teacher Wouldn't Let Him Quit
by Max R. Haddick



A high school graduate with talent, a high school teacher with determination, and a friend with faith were a winning combination for Mickey Bryan Montgomery. He just graduated from The University of Texas with a bachelor's degree in physics, and is now sorting through numerous job offers.

Cleburne High School Mathematics Teacher E. Rex Arnold furnished the determination. Mickey had plenty of talent. R. J. Kidd, League director, was the friend.

Number Sense Winners

Mickey was a top League Number Sense competitor on the Cleburne High team coached by Arnold for three years. The first year he was on the team just for practice. In the next year he won first in district, first in regional and second in state meet. In his third year he repeated with first in district and regional and second in state. Mickey also took a turn at Slide Rule competition. In two years he won first in district and third in regional and then first in district and regional and was a State Meet competitor. He dropped Slide Rule to concentrate on Number Sense work.

Toughest Teacher

"Mr. Arnold was the hardest teacher I ever had," Mickey said. "I got into his class when I was a sophomore at Cleburne High. He made me get interested in math. It had been my hardest subject," Mickey said that Arnold was convinced that any student of his was at least good for a bachelor-of-science degree.

While in high school Mickey worked part time for Dr. John G. Little of Cleburne. He did lab assistant chores and clerical work.

Money a Bit Short

When he graduated from high school, college seemed rather remote for Mickey. He had saved about enough money to see him through one semester. Thinking that he at least had to try for a college education, Mickey enrolled at The University of Texas as a freshman in September, 1963. After one year he found that his money didn't stretch quite as far as his ambition. He transferred to Arlington State College so he could live at home and commute to college.

Had To Drop Out

To pay the bills Mickey took a job as an order-filler for Walls Manufacturing Company of Cleburne. He stayed at it for 12 months. Then he dropped out of school. Math teacher Arnold wondered why Mickey was not in school. He and R. J. Kidd conferred. Kidd wrote promising Mickey a job if he would come back to the University. Kidd also found a way to award Mickey a \$500 Houston Endowment- Jesse H. Jones Scholarship.

Scared, But Trying

Mickey came to see Kidd in March, 1964. He reported that he was scared stiff that someone would slam a door in his face. Mickey came to work for the League, again as an order filler, in 1964. He worked at the League until January, 1966 when he finally got the long-sought sheepskin.

'Sure, I had a lot of worries while I was going to College. Mostly worried about things that didn't happen," Mickey mused. "It is a lot easier to stay in college than to get in," he advised. "If a kid doesn't have much money, but has a high school record that will get him into college, he should go ahead and start. There will be ways for the money problem to be solved, if he does good work in college. There will always be men like Mr. Kidd and Mr. Arnold."

Mickey's parents, Mr. and Mrs. Rolan S. Montgomery of Cleburne, are proud of their son's college record and the determination he showed.

Job No Problem

"Getting a job is no problem now that I am about to graduate. I have several fine offers. I will make more than \$650 a month. I haven't decided yet, but I know that the positions are open for me. I wouldn't have had a chance at any of them if Mr. Arnold and Mr. Kidd hadn't helped me to come back to college," Mickey added.

Mickey appreciates the real value of scholarships. "The main value of scholarships," he said, "is that they relieve the student of heavy worries during his first semester or year in college. Few are large enough to carry a student through, but they give him the start he needs so badly."

Contests of Value

He is different than most people in that he believes the Number Sense and Slide Rule contests have great value for the average student. "My work in these contests improved my standing in math considerably," he said. "In the contest practice I worked first for speed and then developed accuracy. The drill and the competition sharpened my skills in all areas of math. I think the contests are of real value to students who aren't tops in math. These contests help an average student to become a superior student in math."

TILF for Talent

R. J. Kidd said that he always felt that Mickey would make it in college. "He was scared and hardly knew how to look for a job when he first came here, but he had the talent and the desire. I knew he would make it. Mickey Montgomery is a fine boy. Our Texas Interscholastic League Foundation was founded just to help deserving boys like Mickey," Kidd concluded.

***** September, 1966 ... Actuaries Club Give \$2,400 To 8 Number Sense Sponsors**

For a decade, the Actuaries Club of the Southwest has been awarding scholarships to those number sense sponsors who have been especially active and outstanding during the previous year in interesting students in and coaching them for the number sense contest. These grants are a means of interesting both students and teachers in pure mathematics. These recipients are selected by the various regional executive committees.

Those named to receive \$300 each this year were: Messrs. Charles Crane, San Saba; Ray Pruitt, Sidney, James F. Atchison, Lake Worth; Don Griffin, and Douglas McLemore, Orange; and A. E. Aguirre of San Diego; Mrs. Mary Meade of Gladewater; and Mrs. Dixie Davenport of Del Rio.

***** October, 1966 ... Leaguer article:**

New Bulletin, Test Changes Cited in Number Sense Event by Dr. Milo W. Weaver, State Number Sense Director

The 1966-1967 Number Sense tests will contain some minor changes, as follows:

1. A larger percent of stated problems.
2. As in 1965-1966, problems involving primes, relatively prime numbers, greatest common divisor, and least common multiple are included.
3. Problems are included involving set intersection, set union, Cartesian product of sets, and power sets. Problems of these types will occur only on the latter half of each test.

New Booklet

The new Number Sense Supplement to Dr. Calhoun's Developing Number Sense Bulletin goes into more details on the above points and gives a list of practice problems with answers. It will be useful to contestants to have copies of this supplement. Price is \$.05 each. Schools may order from the University Interscholastic League, Box 8028, University Station, Austin, Texas 78712.

Practice Tests

Three different new practice sheets have been prepared for student activities conferences and for local meets.

Test 1967A will be used for student activities conferences. It will be released for sale on Jan. 1, 1967.

Test 1967B will be used for local invitational meets held through February, 1967. This one will be released for general sale on March 1, 1967.

Test 1967C will be used for invitational meets held after March 1, 1967. It will be released for general sale on March 15, 1967.

Each of these three tests may be obtained from the League. Price is \$.02 each, in multiples of ten.

Scholarships

A number of valuable scholarships are available to top rated Number Sense contestants. The Actuaries Club of the Southwest annually presents eight \$300 grants to Number Sense sponsors and coaches. These grants are detailed in the Constitution and Rules, pp. 195-197.

*** October, 1966 ... **Math Champ From Andrews**

Louie Ramirez worked 77 problems in Number Sense in ten minutes to win the Conference AAA State Championship for 1966. He was a sophomore at the time he won. The mathematically inclined youngster has a hobby of working math problems mentally. This is just what he had to do to win the championship. Competitors are permitted to write only the answers. All computation must be done mentally.

Ramirez was coached by Aaron McCrackin, Jr. and represented Andrews High School. He is a member of Tau Mu Kappa math club, Mustang Band, and an altar boy in his church. He made the honor roll in his freshman and sophomore years.

*** December, 1966 ... **Number Sense Sets**

All Number Sense, Slide Rule, Science, Typing and Shorthand contests used in the 1967 District, Regional and State Meet competitions will be released for general sale on June 1, 1967.

Eight new high school Number Sense tests will be available and five new elementary tests added. The high school tests, including Z-1 through Z-8 will be bound into packs: eight of each test plus answer keys to the pad. Pads will sell for \$1.50 each. Elementary tests will be sold individually for \$.02 each, with answers provided.

*** March, 1967 ... **Spring Hill Records 14 Wins In Slide Rule, Number Sense**

Slide rule has had a small, devoted number of participants at Spring Hill High School since its inception eight years ago. Interested students meet early in the school year and form an extracurricular class that meets after school or at night, working problems, and sometimes engaging in work sessions and contests with classes in nearby schools. A coach willing to spend many extra hours and lend aid and encouragement is a vital factor in both slide rule and number sense at Spring Hill. Competition in number sense was begun six years ago.

Slide Rule

1958-1959 Morris S. Buggies, 2nd Place in State, is now with the Control Data Corporation and doing graduate work at Stanford University. He has a BS degree in Electrical Engineering from the University of Texas.

1959-1960 Donald Ruggles, 2nd Place in State, will receive his BS degree in Electrical Engineering from the University of Texas this spring and is employed by the Texas Research Associates, Inc., of Austin.

Joe Younger, 4th Place in State, is currently serving in the U. S. Navy.

1960-1961 Donald Ruggles, 1st Place in State, making the highest score in all divisions.

1961-1962 Donald Ruggles, 1st Place in State, making the second highest score in all divisions.

1962-1963 Ernie Younger, 1st Place in State, is attending Kilgore College. Jimmy Clemens, 2nd Place in State, is a student at Lamar Tech, Beaumont.

1963-1964 Ernie Younger, 1st Place in State. Jimmy Clemens, 2nd Place in State.

1964-1965 Bill Daniel, 3rd Place in State, is attending Chapman College, in California. Bill Rogers, 3rd Place in Regional competition, is attending Kilgore College.
1965-1966 Bill Daniel, 1st Place in State. Bill Rogers, 2nd Place in State.
During the past eight years Spring Hill has had five 1st place, five 2nd place, 1 third place, and 1 fourth place winners in state Slide Rule competition.

Number Sense

1961-1962 Donald Ruggles, 2nd Place in State.

1962-1963 Bill Rogers, 3rd Place in Regional.

1964-1965 Bill Rogers, 3rd Place in State.

During the past six years, Spring Hill has had one 2nd place and one 3rd place winners in state Number Sense competition. Volunteering to participate in slide rule and number sense early in the school year has become-traditional. The coach has only to announce a practice session and the students come eager and ready to work.

Mr. Morris Ruggles is one of the outstanding math teachers in East Texas. In 1962 he was the winner of the Actuary Award Scholarship. He has been a member of the Spring Hill High School faculty for the past 14 years.

***** October, 1967 ... Three Contest Sponsors Win Actuaries Club Awards**

Three Actuaries Club number sense award-winning sponsors have been teaching for 8, 18 and 23 years, respectively.

They are Miss Mary Elizabeth Vance of Clear Creek High School in League City; C. H. Evans, formerly of Agua Dulce but now assistant superintendent at Bastrop; and Mrs. Juanita McConathy of Whitney.

Miss Vance says, "It has been a pleasure to work with three to ten boys and girls each year in number sense, and it was a great thrill to receive the Actuaries' Club award." Miss Vance is a graduate of Southwest Texas State College and formerly taught in Dickinson.

Evans said he has worked with number sense contestants for 18 years and with slide rule competitors for 11 years. He said he expects to continue sponsoring the mathematics contests. It was a great honor to receive the award, he noted.

Mrs. McConathy, a graduate of North Texas States University and Baylor University, has taught in both elementary and high school. Last year, she sponsored high school mathematics and spelling, with her students placing first in both events at district.

"These extra man-hours and woman-hours devoted to coaching the extra-curricula activities are invaluable in training talented young boys and girls," said UIL Director Rodney Kidd; "and we appreciate these mathematics teachers, as well as the unnamed scores of other sponsors who may never find their efforts acknowledged, and who must depend for their satisfaction upon knowing that they have done their jobs well."

***** October, 1967 ... Leaguer article:**

Math Training Sessions Key To Winning Contests

by Dr. Milo Weaver, State Number Sense Director

Most of the 1967 coaches and number sense contestants agreed that the 1967 contests contained enough Modern Mathematics and technical mathematical terminology and that no further changes in those directions should be made soon. I have made the 1968 tests with this agreement

in mind. As a preparation for the 1968 contests, I recommend a study of all old tests, the 1966-1967 Appendix to "Developing Number Sense", and especially the Y and Z tests for 1966 and 1967. Further, I recommend strongly that each contestant attend the number sense section of the student activities conference to be held in this area. (Schedule of conferences is given on Page 1). At these conferences more time than usual will be spent in suggesting short cuts and methods applicable to the 1968 tests. We will be careful to discuss problems students have difficulty with, or cannot solve." A special sample 1968 test will be given out. If you plan to be a number sense contestant, I hope to see you in a few weeks at one of the conferences.

***** November, 1967 ... Actuaries Winners Have Wide Experience**



Number sense sponsors who were selected to receive awards from the Actuaries Club of the Southwest have from 2 to 30 years of experience in coaching the Number Sense contest. Miss Ruby Kathleen Jones (no picture available) reports that she has taught mathematics for more than 30 years, and this year coached 19 students who were working with the Number Sense contest. She has had entrants in the regional meet for 14 years and in the State Meet for four. Her contestants represent Permian High School at Odessa.

Mrs. Dorothy Brandon of Quanah reports that she has taught for many years, moving frequently since her husband was pursuing his career in the Navy. When he retired in 1965, she began teaching in her hometown, Quanah. She writes: "I had no experience with Number Sense until 1965. I was fortunate to inherit some good students from the previous math teacher, Garland Jones, now my principal. I have had contestants in the district, region, and State Meets the last two years. One placed first last year."

Miss Sue Burden, presently teaching mathematics in Temple, has also worked with Number Sense contestants in Bonham. "My students were," she reports, "enthusiastic, hard-working and competent.

I encouraged them and guided them toward their goals. I consider it an honor to have been selected to receive the Actuaries Award."

Melvin E. Strey, who teaches at Schertz, has taught for seven years, qualifying students to the State Meet in 1965 and again in 1967. In Schertz, 22 students were working with the contest.

George R. Wallace of Alto says: "In 1964, I began to emphasize Number Sense and Slide Rule. I have always encouraged my students to participate in Interscholastic League events." He has frequently had contestants at Regional and State meets. He began his teaching career at Jane Long Junior High School in Houston, but is now teaching at Alto.

***** February, 1968 ... TILF Scholarships Grows To 139 Plus**

The Texas Interscholastic League Foundation will award \$137,450 in scholarships to League academic and literary competitors in June. This is the largest scholarship pie the group has ever

had to share with Texas high school graduates. The grants will go to Texas high school students who compete in League literary and academic contests at the State Meet to be held May 2, 3, 4. Some will be awarded to students who competed at the regional level.

Number Sense competitors can apply for the following scholarships:

Houston Endowment: 20 awards of \$750 each, payable \$500 the first year, \$250 the second year.

Robert A. Welch Foundation: 10 awards of \$4,000 each, payable \$1,000 a year.

Brown Memorial Trust: 5 awards of \$1,000 each.

Joe B. Cook Scholarship: \$1,250, payable \$500 the first year and \$250 for each of the next three years.

Kleberg Foundation: 4 awards of \$800 each, payable \$500 the first year and \$300 the second year.

Myra Pryor Awards: 10 tuition scholarships of \$100 each.

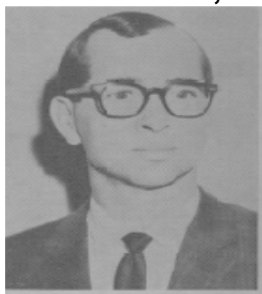
Clark Foundation Scholarships for Students: 22 awards of \$750 each, payable \$375 each semester of first year.

Henry Beckman Number Sense Scholarship: 1 award of \$500.

Tarleton State College: 14 awards of \$50 each.

Actuaries Club of the Southwest: 8 awards of \$300 each, given at region, for number sense teachers or coaches.

===== Dr. Dale Edouard Walston era Fall, 1968 – Spring, 1970 =====



Dr. Dale Edouard Walston, assistant professor of mathematics at The University of Texas in Austin, has been named director of high school Number Sense by the League.

Dr. Walston has been director of elementary Number Sense for a number of years. He succeeds Dr. Milo Weaver who headed the high school number sense program for three years.

Dr. Weaver served as a consultant at the League student activities conferences and prepared the high school number sense contests.

"We are grateful to Dr. Weaver for his fine work," said Dr. Rhea H. Williams, League Director.

"He contributed greatly to the education of thousands of Texas youngsters.

We are proud to have Dr. Walston to take over this work. Our Number Sense contests attract many thousands of students. These professors are making a significant contribution to education."

Dr. Walston was born in Woodsboro, and graduated from Woodsboro High. He earned the Bachelor of Arts at Texas A&M University in 1952. After a two-year hitch in the Army, he returned to Texas University where he earned the Master of Arts in 1959 and the Ph.D. in 1961. He has done research for the Manned Spacecraft Center of NASA in numerical analysis.

Items of interest 1968-1970

>>> Note: the number sense tests were labeled as series BB and CC. The BB-CC series consisted of only 6 tests labeled BB-1 to BB6 thru CC-1 to CC-6.

*** October, 1968 ... Leaguer article:

Coach's System Makes Winners *Algebraic Proofs Help Number Sense Students*
by James Batts

When a coach, any kind of coach, puts together a 19-year winning streak, his opinions regarding his specialty command an extra measure of respect.

Such a man with such a record is J. B. Kempson of Levelland High School. His specialty is number sense, and his record is one of the best in the history of the competition.

For 19 consecutive years his students have won district number sense competition seven times at Morton and 12 times at Levelland.

Four of these champions have advanced past regional to the state meet.

Actuaries Award Winner

This spring Kempson was recognized for his almost two decades of contributions as a number sense coach by being given a \$300 Actuaries Award. Eight such awards are given annually by the Actuaries Club of the Southwest to coaches who have students in regional competition.

Kempson is quick to transfer credit for his successes to the students.

"I have had some awfully good students, and if it were not for the fact they were good students I would not have had this record," he said.

His record, though, apparently has been built on more than the raw talents of the students.

Kempson has honed these talents with special techniques and by establishing a rapport with the young people that makes them want to win.

This Work is Fun

"I really enjoy working with teen-agers," he explained. "If my heart wasn't with the teen-agers, I wouldn't be in the school system."

Desire, the willingness to compete, is important, too, Kempson said. "If it wasn't for the fact that all my students were interested in it and were striving to do their best to make a name for themselves I would not have the record I have today."

Talent is the Difference

In the final analysis, though, winners in number sense are produced when talented students are taught how to think clearly, accurately and rapidly. It is at this point that Kempson excels.

As do most number sense coaches, he teaches his students short cuts to problem solving. Number sense problems must be worked mentally no paperwork is allowed and such short cuts build valuable speed.

Proof of Short Cuts

Kempson gives his students an extra edge by refining the short cut process. He insists that his students learn algebraic proofs for the short cuts. Thus they not only have knowledge of the technique, but the confidence that comes from knowing why it will work in every instance.

"If a student understands the proof of why things work, he can see behind it and the way it is set up like it is," Kempson said. "And if he cannot see why it works, then he will not know how to apply the short cut."

"A short cut is not a short cut unless you can recognize where and how and why to use it," he continued.

Efficiency Math Class

Kempson teaches these techniques in a class called efficiency math. In it he teaches slide rule two days a week, number sense two days a week and gives the last day to instruction in application of interest in everyday life situations such things as simple interest, compound interest, discount interest, add-on interest.

He also teaches trigonometry, Algebra III, analytical calculus and solid geometry.

Incidentally, his slide rule students have a record of high achievement, too. Ten times they have advanced to regional competition. One measure of his devotion to helping young people expand their talents is that all of his coaching and traveling outside of the efficiency math class is given without charge.

Part of his reward has been seeing the students win scholarships for advanced study and gain placement in important jobs.

Pour students, for instance, have won scholarships through a foundation associated with the White Sand Missile Proving Ground. Each told him he could not have finished the test if he had not taken number sense and slide rule.

In the 19 years he has been turning out winners, Kempson has seen number sense competition develop and toughen. In his opinion, students are getting better and better.

Students Are Better

"My meet records have been fairly good, but the problems are a lot harder now than they used to be and the scoring is still going higher than it used to," he explained. "I can remember the time when I had a student to win district with 25, but this past year the student won it with a 250." Although his student teams change from year to year, Kempson does not take a short-range view of his work. He sees definite carryover value into later life for students who work and compete in number sense.

"A person who has entered a contest and has won anything has been able to shut out the rest of the world, except what he is concentrating on in his field," he explained.

Extra Work Pays

"I encourage my students and try to tell them that any time they enter one of these academic or literary contests they will have a better chance of making a living by doing the extra work," he continued.

Another source of satisfaction has been seeing the development of "non-winners," of students who never get past district or who never make the team at all. He remembers many who made remarkable progress.

The students' work at school is only part of the basis for success, Kempson feels. "The students' home life is largely responsible for their competitive attitude in their classes and their Interscholastic work," he said.

League Teacher is a Champ

Thus, from a master coach's point of view, the student who competes in number sense is a winner in many respects.

"It improves his home life and his friendship with other students . . . they have created more friends than they would normally," he said.

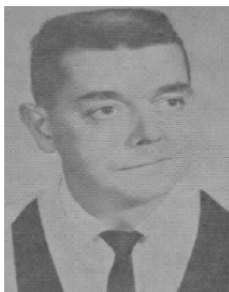
And J. B. Kempson, a champion in his own right for 19 years, should know.

*** October, 1968 ...



Reynaldo Chapa Jr. ... recipient this past summer of a \$300 Actuaries Club of the Southwest award. He has coached number sense competitors at Benavides High School for five years, producing two first and two seconds at district, two seconds and one third in regional and two fourths in state competition.

*** December, 1968 ...



James T. Smith ... a slide rule coach for eight years and number sense coach for three years, was recipient this past summer of a \$300 award given annually by the Actuaries Club of the Southwest. He teaches at Mission High School, Mission, Texas.

*** February, 1968 ... **TILF Scholarships**

Two more scholarships added to the list of TILF scholarships that number sense competitors can apply for.

Department of Chemical Engineering, University of Texas: 5 awards of \$400 each.

Carl B. and Florence E. King Foundation: \$4,500 total. Number and amount of awards to be determined by TILF board.

*** September, 1969 ... Leaguer article:

Scholarship—Key To Education

Moody Scholar Tells How Grant Made Honor Graduation Possible

by Larry Earl Meyers

(Editor's Note: Larry Earl Myers, a 1968 Moody Scholar, built an outstanding record in high school and college. He was a Number Sense State Meet champion, valedictorian of his Schulenburg High graduating class, student council president, FFA chapter president, Class president in 1963 and 1964, Junior Class Favorite, National Honor Society Treasurer, two-year letterman in football and track, and competed in League Number Sense, Typewriting and Extemporaneous Speaking.)

One Spring morning five years ago I was one of a room full of nervous competitors awaiting the start of the Regional Number Sense Meet. I had worked long and hard for that day. Suddenly I remembered just exactly why I had worked so hard there was a chance for a big scholarship waiting for me if I won that contest. My nervousness vanished. I tore into that Number Sense test, won the Regional Meet and later the State Meet to boot.

A month later I received a Moody Foundation Scholarship for \$4,000 and headed to The University of Texas. For the next four years, the Moody Scholarship was to provide financial support for a college adventure that brought me to emotional, intellectual, and social maturity. To a green kid out of a South Texas town, The University of Texas in 1964 was a huge, throbbing place of never-ending excitement, full of unusual people and new ideas that wouldn't let you sleep at night. Classes were interesting, but the real excitement of The University of Texas took place outside of class.

There was a never-ending whirl of lectures, concerts, discussions, plays, and plain stimulating people just waiting to be taken advantage of.

I dived into that whirl of activity and devoured new ideas and experiences at a rate possible only to one who has just discovered the extent of his own ignorance. The new ideas kept coming: classical ideas, futuristic concepts, screw ball notions, the likes of which I had just never

encountered before. I couldn't sleep nights for the excitement of it all, and when I visited home, my parents listened patiently to my excited babbling about things they did not understand. And there were people: enthralling professors, angry SDS types, beautiful blondes who were also brilliant. The variety was endless, and each seemed to have a deliciously new insight into the world. Bull sessions about every conceivable topic popped up spontaneously and lasted indefinitely. Love affairs blossomed overnight and then died as quickly, like the West Texas Yucca plant. Other acquaintances slowly mellowed into friendships that will last a lifetime. Group stereotypes about people just didn't hold any more. Sons of poor Valley Mexicans displayed astonishing energy. There were worthless sons of rich parents, and brilliant Negroes whose insights into American affairs were just different from the rest of ours.

The University of Texas was a concentrated microcosm of Texas and America. Bright young people from all of the diverse groups which make up our state and country were poured together into a corner of Austin and told to develop their minds. As their different dreams and prejudices clashed together, driven by the exuberance of youth, there often resulted situations which appalled parents, preachers, and politicians. But those young people who took part will never forget the terrible intensity of their discovery of people, ideas and their contemporary world. When I graduated with honors from The University of Texas in 1968, I was a profoundly different and better young man. I was able to take advantage of the rich opportunities at The University of Texas because finances were no problem for me. I did not have a rich father, but rather a generous scholarship, The Moody Scholarship that I had won for doing well as a Number Sense Contest competitor in high school. By working summers and using old savings, I was able to support myself fully during my first two and a half years at The University of Texas without part-time work.

In four years at UT I did not have to ask my parents for financial support, which was a terrific benefit for them, because they had two other children in college at the same time. In my case, the Texas Interscholastic League Foundation scholarship helped not one, but three students. Every time I cashed a Moody Scholarship check, I was reminded of the direct role of the donor in enabling me to carry on my fulfilling student life.

During my years at UT I encountered many excellent students who were trapped in a cruel regimen of studies and outside work. Because of simple lack of finances, they were unable to take advantage of the rich outside-of-class diversity of UT.

It always struck me as ironic that such excellent students in our state universities, our "institution of higher learning," could be severely hampered by lack of finances while athletes of similar capabilities were assured of air-conditioned comfort.

The best Texas athletes are always recognized and rewarded. In high school I won two letters each in football and track, and thoroughly enjoyed the attention and applause accruing thereto. But the achievements of the best Texas students are too often forgotten when the applause is heard and the money handed out. For all the desirability of a good athletic program, the first purpose of any high school or university is still to develop peoples' minds, not their bodies. The skills of a well-educated engineer or professor or executive will be of service to the people of Texas much longer than the skills of any left tackle, which was my position on the high school team. The TILF scholarship program is an enlightened way of recognizing and rewarding students who excel in that for which all schools are established, academic pursuits.

The method of distributing the TILF scholarships, based on statewide scholastic competitions, is sound. When talented young people develop their capabilities because they see a financial reward for doing so, the American incentive system is working at its finest. Hopefully the TILF

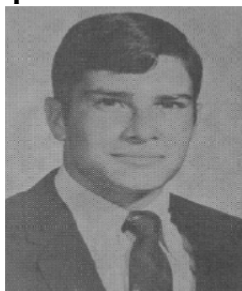
scholarship program will expand to stimulate even more young Texans to develop their scholastic capabilities.

The gratitude of TILF scholarship winners to their donors is profound and unfortunately too rarely expressed. A very famous Texan named Walter Prescott Webb knew a similar feeling of gratitude. He once received from an anonymous donor a grant which enabled him to come off a West Texas ranch to get a college education, and eventually become a historian of international renown.

Late in his life, Mr. Webb wrote an article for Reader's Digest about his gratitude to his anonymous benefactor. An editor sent back the article, saying it was too sentimental, and instructed Mr. Webb to rewrite it. The author of The Great Frontier stomped and fumed and said he didn't want to change a word of it. Gratitude was a deeply moving emotion for that great Texan, and still is for hundreds of contemporary TILF scholarship winners.

If they are too shy to express their gratitude personally, perhaps their excellent records in Texas universities will speak for them.

***** March, 1970 ... Number Sense Top Winner**



Carl Wayne Dale of Imperial hopes to secure a degree from The University of Texas and to become an electronics engineer. Dale was first-place winner from Buena Vista High School in number sense at the 1969 State Meet.

Dale has been freshman class vice president, junior class president, varsity football captain, officer in the National Honor Society, as well as playing in the band and on the basketball team. He also came out for track for three years, served as sophomore class reporter and senior class treasurer.

He has been a competitor in the League number sense, slide rule, science, spelling, and speaking contests, winning second at State Meet in 1968 and first in 1969. He received the West Texas Outstanding Scholar Award, the Mathematics Association of America Award, has been on the Honor Roll throughout high school and was class Valedictorian. He has worked in the oil fields, in service stations, as a newspaper carrier, and as a construction worker. His hobbies are reading, sports, skiing and swimming.

***** April, 1970 ... Wink Student Sets Record In Contest**



Coached by Mrs. Lillian Hawkins of Wink, Dan Lee Glover placed first in number sense at the 1969 State Meet, scoring 390, the highest mark in the meet.

Glover placed first in his district for four years; first, second and third at regional in three different years, coming to state in 1967 and placing third that year.

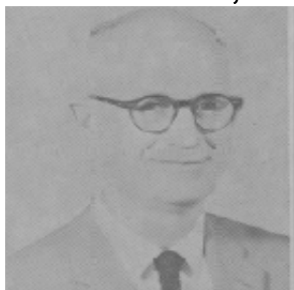
He has also been president of the sophomore class, secretary-treasurer of the juniors, and business manager for the seniors. He is a member of the National Honor Society, earned the Bausch and Lomb Science award, and was valedictorian of the senior class.

In addition, he played football for four years, basketball for two, and tennis for four, being district champion for two years; he also came out for track. During the summers, he helps coach Little League baseball.

"I am interested," he says, "in most types of sports, especially football, and in models. I would like to attend The University of Texas at Austin and major in the field of mathematics."

>>> Special note: There were 80 problems on the test. 5 points are given for each correct answer and 5 points are subtracted for each incorrect or skipped problem up to the last problem attempted. In order to score 390 in by the time the 10 minute time limit elapsed, the student had to work only the first 78 problems correctly or work 79 problems with 78 correct and 1 incorrect or work all 80 problems with 78 correct and 2 incorrect . Quite a feat! ***

===== Dr. Milo W. Weaver returns Fall, 1970 – Spring, 1974 =====



Dr. Milo W. Weaver will serve as the League's Number Sense Contest director this year. He was, many Number Sense sponsors will recall, Number Sense director from 1965 to 1967. Deeply interested in mathematics and in the fine young students who compete in the Number Sense contest, Dr. Weaver is well aware of the problems and difficulties they will encounter, having served two years with the Jasper public schools and ten years with the Austin public schools. Dr. Weaver is now Associate Professor of Mathematics at The University of Texas at Austin.

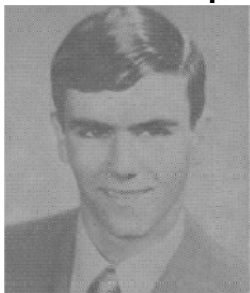
Dr. Weaver was assistant director of the Saudi Arabian Training Project in 1961-1962. He served as Texas director of the high school math contest sponsored by the Mathematics Association of America in that year also.

"We are very fortunate to have Dr. Weaver with us again," commented the League director, Dr. Rhea Williams. "I am sure all Texas Number Sense sponsors will be grateful for his interest in and devotion to the League program."

Items of interest 1970-1974

>>> Note: the number sense tests were labeled as series DD, EE, FF, and GG. The DD-GG series consisted of 6 tests labeled DD-1 to DD-6 thru GG-1 to GG-6.

*** September, 1970 ... **State Number Sense Champion**



After competing four years in the League number sense contest, Kyle White of Stowell found that he had placed first at district four times, first at regional twice, second and third at regional one time each, and in three years at State Meet ranked, seventh, second and first. Mrs. Essie Espinosa was his coach.

Further, he served as class president for four years, was president of the National Honor Society, and served on the annual staff. He came out for football one year and for track four years. He was in the East Chambers WHO's WHO for three years, and also is in WHO's WHO AMONG

AMERICAN HIGH SCHOOL STUDENTS. He likes swimming and collects record albums. He would like a career in engineering.

*** October, 1970 ... Leaguer article:

**Number Sense Director, Assistant Bring Test Problems Up to Date
by Milo Weaver, State Number Sense Director**

I enjoyed being Number Sense director in 1965-68. When I accepted the position this year, I asked that Mrs. GeNelle Beck be appointed assistant director, and she was. We think that "two heads are better than one," and we know that much judgment and thought should go into preparing the tests.

The 1970-71 Number Sense tests have been designed to retain the principle of mental calculation while also emphasizing a wide variety of problems within the scope of modern high school mathematics.

We hope that good students will be able to make scores of more than 100. The scores, however, will be somewhat lower than in past years.

Some Rule Changes

The rules have been changed some to allow answers in the best modern form. At present, it is customary for slopes, ratios and coordinates of points to be expressed in reduced improper fractional form. Accordingly, answers to test problems involving these concepts are given both in improper and mixed fractional forms. Answers involving dollars and cents are given in both exact and rounded off form. Those for probability are given, according to custom, in both improper fractional, mixed fractional and decimal form. Per cent answers are given in both mixed fractional and exact decimal form. All answers involving radicals are given in the simplest forms (according to the simplification rules of the usual texts).

Test Range Broad

The tests include problems in arithmetic, algebra, plane geometry, trigonometry and coordinate geometry which are expected to be encountered in high school studies.

The more advanced problems are usually not included in the early part of the tests to allow non-seniors to make good scores. Some of the problems are rather difficult to do mentally, but appropriate mental methods of attack should yield correct answers.

We hope that you find the problems interesting, instructive and challenging, but solvable mentally.

Contest Conferences

Either Mrs. Beck or I will serve as University of Texas consultant at most contest conferences. Number sense selections will be held at: Odessa, Oct. 10; Houston, Oct. 17; Kilgore, Oct. 31; Austin, Nov. 14; Wichita Falls, Nov. 21; Kingsville, Dec. 5. We plan to give suggestions for working the more difficult problems, especially those kinds of problems which are new to the contests. Also a practice test will be given as usual. You will benefit by attending, and we urge you to do so.

*** January, 1971 ... Leaguer article:

**Coach of Champions Cites Tricks To Help Students
by J. B. Kempson, Levelland High School**

Persons adept in the art of mental calculation often agree that a number of tricks can be of help.

After choosing a trick appropriate to a given problem, it is best to use it unfalteringly, without question to solve the problem.'

The Number Sense contestants coached by the writer have found the following tricks useful in squaring two and three digit numbers.

Proofs are given (restricted in some cases to two digit numbers) since people are more apt to accept a trick which they can understand.

Numbers Ending in Five Rule: Add one to the ten's digit, multiply it by the original ten's digit and attach 25 to the right side.

This way it is not necessary to multiply by a hundred and add twenty-five.

Proof: Let a = ten's digit. Then $10a + 5$ is the number. $(10a + 5)^2$ is the number squared.

$100a^2 + 100a + 25 = 100a(a + 1) + 25$ factoring $100a$ from the first two terms. Now a is the original ten's digit and $a + 1$ is one more.

Example: $65^2 = (60 + 5)^2 = 100(6)(7) + 25 = 4200 + 25$ or 4225.

Numbers Ending in Zero Rule: Just square the digit or digits to the left of the zero and attach two zeros to the right.

Example: $150^2 = 22500$.

Numbers Ending in One or Six Rule: Square the whole number just smaller and add the sum of the two numbers to it.

Proof: Let x be the whole number just smaller that ends in a zero or five, and $2 + 1$ be the number. Then $(x + 1)^2 = x^2 + 2x + 1 = x^2 + x + (x + 1)$

Example: $71^2 = 70^2 + (70 + 71) = 5041$.

$86^2 = 85^2 + (85 + 86) = 7396$.

Numbers Ending in Four or Nine Rule: Square the whole number just larger that ends in a five or zero and subtract the sum of the two numbers from it.

Proof: Let y be the number just larger that ends in five or zero. Then $y - 1$ is the number.

$(y - 1)^2 = y^2 - [y + (y - 1)]$.

Example: $54^2 = 55^2 - (55 + 54) = 2916$.

$69^2 = 70^2 - (70 + 69) = 4761$.

Numbers Ending in Two or Seven Rule: Square the number just smaller ending in zero or five and add four times the average of the two numbers.

Proof: Let z be the number just smaller that ends in zero or five. Then $z + 2$ is the number.

$(z + 2)^2 = z^2 + 4z + 4 = z^2 + 4(z + 1)$.

Example: $80^2 = 80^2 + 4(81) = 6724$.

$77^2 = 75^2 + 4(76) = 5929$.

Numbers Ending in Three or Eight Rule: Take the number just larger that ends in five or zero and square. Then subtract four times the product of the average of the two numbers.

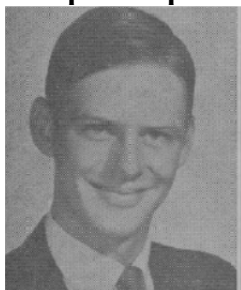
Proof: Let w be the number, just larger, that ends in five or zero. Then $w - 2$ is the number.

$(w - 2)^2 = w^2 - 4w + 4 = w^2 - 4(w - 1)$.

Example: $113^2 = 115^2 - 4(114) = 12769$

$128^2 = 130^2 - 4(129) = 16384$.

*** March, 1971 ... **Number Sense Championship On Third Try**



After winning third place twice in the State Meet for Conference B, Fred Speck of Rocksprings in 1970 won first in the Number Sense competition. "It was," he said, "a goal I had been seeking for some time. Much of the credit goes to my coach, George Johnson."

*** December, 1971 ... Leaguer article:

Number Sense Champs Score Amazing Records

by Dr. Milo W. Weaver, State Number Sense Director

My colleague picked up a Number Sense test from my desk and looked it over. He glanced back at the instructions in the heading, and asked me what kind of scores our champions make in the ten minutes allowed. He whistled when I told him: "150 to 270". Such conversations about the ability of our Number Sense competitors are typical.

I, myself, am certainly amazed. These high scores are due to two things: First, our competitors include students with some of the best minds in Texas who are willing to work hard at Number Sense study; Second, our Number Sense coaches are among the best coaches in Texas. Coaching Number Sense is as important as coaching in any athletic event, if not more so.

A successful coach will order all available material from the UIL, and he and his students will spend vast amounts of time working out methods and shortcuts for the types of problems occurring on the various tests. Then the coach schedules regular practice sessions and practice competition with students from other schools. This ladder keeps down "competition fright" during the district, regional and state contests. Special attention is paid to those test series made by the present state director: Y, Z, AA, and DD.

Number Sense competitors are loud in their praise of their coaches, for the great help they give in their coaching and for their influence on the students' lives.

*** February, 1972 ...

Scholarship Fund Raised to \$163,900 Plus TILF Grants Exceed 160 For Contestants

More than \$163,900 will be awarded this year to participants in University Interscholastic League academic and literary competition. The Texas Interscholastic League Foundation will award more than 160 scholarships to high school graduates selected from runners up in regional meets and competitors in the State Meet.

TILF Keeps Growing

"The continuing growth of the TILF is due to the records set by previous grant winners. These are Texas' finest students. They are living proof of the value of scholarship money, properly administered," said R. J. Kidd, TILF secretary.

"Foundations and individuals who continue to support the TILF scholarship fund," Kidd added, "are convinced, as we are, that Texas' best students deserve every opportunity to develop their

talents to the highest degree, whether they are wealthy or not. We want these talented and energetic individuals to develop into talented and energetic citizens. We will continue to seek out funds to help them. "Unfortunately, talent and financial strength do not always go together. We want no talent to go to waste through financial need. I will knock on every door to find funds to help these students who, through competition of the highest standards, have proved that they are academically talented."

More Talent Each Year

Every year the League academic and literary winners prove they are the blue chip scholars, Kidd said.

He surmised that their steady application to learning the contest material, plus their willingness to work hard and their tenacity in losing, then trying again until they win are the keys to their success in college work.

"We are grateful to all the foundations and individuals who have supported the work of TILF," Kidd said. "They provide all the money used for scholarships. The TILF operates without any paid staff or overhead. All the funds go into scholarships, without exception."

Requirements Applicants for the grants must meet the following requirements:

1. Graduate during the current year.
2. Compete in State Meet academic or literary contests, or be a runner up at regional meet. A student who met this requirement last year but who graduates this year will be eligible.
3. Submit College Entrance Examination scores, or equivalent.
4. Have complete application in to League Office by May 30.

Applications will be mailed to principals of each student who competes in the 1972 State Meet. Those who qualified at regional meets or competed in earlier state meets must write for application blanks to: Texas Interscholastic League Foundation, Box 8028, University Station, Austin, Texas 78712.

List of Awards

HOUSTON ENDOWMENT 20 awards \$750 each, payable \$500 the first year, \$250 the second year.

For contestants in journalism, speech, science, **number sense**, slide rule, spelling or ready writing. Recipients must attend The University of Texas at Austin. The University of Texas at El Paso or The University of Texas at Arlington. For students in Conferences AAA, AA, A or B schools only.

ROBERT A. WELCH FOUNDATION 10 awards of \$4,000 each, payable \$1,000 a year.

For contestants in journalism, speech, science, **number sense**, slide rule, spelling or ready writing. Recipients may attend any Texas college or university which currently has a Robert A. Welch Foundation grant. These are listed on the application blank. Recipients must major in chemistry and evidence a desire to engage in research in chemistry at the graduate level in Texas.

MOODY FOUNDATION 10 awards of \$4,000 each, payable \$1,000 each year,

Recipients may attend any accredited four-year college or university in Texas. Awards will be made to students planning to major in government, finance, science, mathematics or general business.

BROWN MEMORIAL TRUST 5 awards of \$1,000 each.

For contestants in journalism, speech, science, **number sense**, slide rule, spelling or ready writing. Three recipients shall attend Texas Christian University and two shall attend Baylor University. All shall evidence a desire to engage in research and shall major in mathematics or science.

JOE B. COOK SCHOLARSHIP \$1,250, payable \$500 the first year and \$250 for each of the next three years.

For contestants in informative and persuasive speaking, debate, science, **number sense**, slide rule or ready writing.

ELIZABETH MEMORIAL SCHOLARSHIP (by J. O. Webb) \$500 award, payable \$300 the first year and \$200 the second year.

Recipient may attend North Texas State University or Texas Woman's University at Denton, Sam Houston State College at Huntsville, West Texas State University at Canyon or Southwest Texas State College at San Marcos. Preference given to students planning to enter the teaching profession.

T. H. SHELBY SCHOLARSHIP \$500 award, payable \$250 a semester.

Recipient must attend The University of Texas at Austin. Funds provided by Mrs. Dorothy Shelby Casey, in memory of her father.

KLEBERG FOUNDATION 4 awards of \$500 each.

For contestants in journalism, speech, science, **number sense**, slide rule or ready writing.

Recipients may attend any accredited four-year college or university in Texas.

(No new grants for 1972)

CLARK FOUNDATION SCHOLARSHIPS FOR STUDENTS 58 awards of \$750 each, payable \$375 each semester of first year.

For contestants in journalism, speech, science, **number sense**, slide rule, spelling or ready writing. Applicants may attend any accredited four-year state college or university in Texas

CARL B. AND FLORENCE E. KING FOUNDATION 10 awards of \$600 each.

For contestants in journalism, speech, science, spelling, **number sense**, slide rule or ready writing. Applicants may attend any accredited four-year state college or university in Texas.

HENRY BECKMAN SLIDE RULE PROFICIENCY AWARDS 2 awards of \$200 each.

High school seniors in the upper 25 per cent of their graduating classes who participated in the State Meet slide rule contest may apply. For additional information, write to Mrs. Margaret Baker, 401-C Engineering Lab, University of Texas, Austin, Texas 78712. Recipient must attend The University of Texas at Austin, and major in Engineering.

DEPARTMENT OF CHEMICAL ENGINEERING 5 awards of \$400 each.

For contestants in journalism, speech, science, **number sense**, slide rule, or ready writing.

Recipients must enroll in Chemical Engineering at The University of Texas in Austin.

Subsequent awards will be made depending of the student's performance at the University. A limited number of other awards are also available to entering Freshmen.

KIETHA MORRIS MEMORIAL FUND

To be awarded to the Outstanding Actress in Region 1A One-Act Play Contest held at Texas Technological University each year.

Other Awards

HENRY BECKMAN NUMBER SENSE AWARD 1 award of \$500.

Applicants must have participated in the League **number sense** contest at the State Meet and must attend The University of Texas at Austin. For additional information, write Committee on Loans and Scholarships, The University of Texas, Austin, Texas 78712.

TEXAS WOMAN'S UNIVERSITY \$250 scholarships, for girls.

Scholarships are available for first place winners in any of the five journalism contests and to first place winners in speech, one-act play, ready writing, and to winners or runners-up in debate,

and to tennis singles or doubles winners. For additional information write to: President, Texas Woman's University, Denton, Texas.

BLINN COLLEGE *5 awards, \$100 each.*

Blinn College will give tuition credit of \$100 to five applicants who participated in the literary or academic contests at the State Meet. For additional information, write to the Registrar of Blinn College, Brenham, Texas.

TARLETON STATE COLLEGE *14 awards of \$50 each.*

Tarleton State College will give 14 scholarships, valued at \$50 each, to regional Interscholastic League winners in typewriting, science, shorthand, one-act play (best actor and best actress), ready writing, journalism, speech, number sense or slide rule. For further information, write to the President, Tarleton State College, Stephenville, Texas.

DEPARTMENT OF DRAMA THEATRE AWARDS *12 awards of \$500 each.*

Five awards will be given for the best actors, five for the best actresses, and two for the best crew members or technicians at the State Meet one-act play contest. Recipients must attend The University of Texas are also available to outstanding League one-act play contest participants.

*** November, 1972 ... **Director Honored**



DR. MILO WEAVER, UIL State Number Sense Contest Director, was presented an appreciation plaque by League Director Rhea H. Williams at the Legislature Council meeting in November. Dr. Weaver prepares the contest material and instructional publications for the Number Sense competition. He attends nearly all of the Student Activities Conferences all over the state to help contestants and teachers to gain maximum educational benefit from the contests. "The League is deeply indebted to Dr. Weaver for his outstanding contributions," said Dr. Williams. "All of the League academic and literary contests are outgrowths of the school curriculum. The state directors keep the contests up to date and of maximum value to all who take part."

*** December, 1972 ... Leaguer article:

Honors To Teachers, Schools

Number Sense Director's Survey Shows Superior Teachers, Schools

by Milo W. Weaver, State Number Sense Director

When one speaks of the "Coach of the Year," it is usually understood that he is describing a football coach; however, the records "hung up" by the Number Sense' coaches listed below make them true owners of the title. Which coaches in other events can boast of taking their teams to the State Meet so many times with so many wins? These teachers have earned the love, admiration, and respect of students they have coached, and the praise and appreciation of principals, superintendents, and school boards.

They spent much time after regular school hours in figuring shortcuts for various types of problems and coaching their students.

Their record listed here speaks for itself. I nominate them as "Coaches of the Decade, 1963-72."

The first number after the coach and his school is the number of times he has had a student in the State Number Sense contest. If a second number appears, it is the number of times his students have won first in the State Meet. Only coaches are listed who have had representatives in the State Meet three or more times.

Special congratulations are due to Don Boles whose students won in five of the seven years they went to the meet, and to Dorothy Brandon whose students won in four of six years.



All the information on coaches was obtained from answers to letters sent out to various high schools of Texas. No reply was received from eight of the top schools.

A. E. Aguirre, San Diego, 4	James Alexander, Silverton, 4
Don Boles, Andrews, 7, 5	Randell Bradley, Wichita Falls, Wichita Falls, 4
Dorothy Brandon, Quanah, 6, 4	Lucille Brummett, Hico, 6
Margaret Carver, McAllen, 5	Ann Casey, Carrollton, Turner, 3
Renaldo Chapa Jr., Benavides, 5	Chas. Chrane, San Saba, 4, 2
Winnie Coker, Holland, 3	Reba Collins, Alvin, 3
Fred Crabtree, Stephenville, 3	Charles Engel, Rosebud, 3
Maurice Fite, Lubbock, Monterey, 5, 2	J. B. Hardaway, Pettsburg, 5, 1
Margaret Harris, Austin, McCallum, 3, 1	Lil Horner, Wink, 6, 2
Ruby Jones, Odessa, Permian, 5, 1	Bert L. Karrer, Marion, 3
Bobby Kennedy, Gladewater, Gladewater, 5	A. L. King, Daingerfield, 3
Caton Lake, Freeport, Brazosport, 4, 2	A L. McCrackin, Andrews, 3
Mary A. Meade, Gladewater, Sabine, 3	Howard Neeb, Windthorst, 5
Kenneth Palmberg, Houston, Furr, 5	Jas M. Perkins, DeLeon, 4
Rex Pinson, Bishop, 5, 1	Nathan Pruitt, Roby, 5
Mrs. Courtney, Robinson, Aspermont, 4	Morris Ruggles, Longview, Springhill, 4
George Scott, Rock Springs, 4, 3	Donald Skow, McAllen, 3
Melvin Strey, Schertz, Schertz-Cibolo, 3	Geo. Swain, Temple, 4
Geo. R. Wallace, Alto, 5, 1	Glen Wooldridge, Wichita Falls, Rider, 3, 1

One of the most complete competitive successes that can come to a high school is to have students compete or win in a literary event. Where can one find more imposing records than those listed below?

These achievements usually mean that one or several of these statements are true:

- (I) Brilliant students have gone to it
- (II) The mathematics department is staffed with excellent teachers.
- (III) At least some of these excellent teachers have enough interest in their profession and students to work long extra hours.

(IV) Behind the school are a school board, superintendent, and principal who know where to place emphasis and how to achieve their goals.

Here is a list of Texas high schools that have won my nomination as "Schools of the Decade, 1963-72." The number coding is the same as that used for coaches.

I congratulate them and list them for the pride and appreciation of the patrons of their district. They are truly great. None are listed that have had students in the Texas Number Sense meet fewer than three times. One notices that Andrews, Rock Springs, and Quanah were the top three schools in Number Sense, 1963-1972, followed closely by several others.

Alto, 6, 1	Alvin, 3	Andrews, 10, 6
Aspermont, 4	Austin McCallum, 3, 1	Beaumont Forest Park, 3
Benavides, 5	Bishop, 5, 1	Blooming Grove, 3
Bonham, 5	Carrollton Turner 3	Colmesneil, 3
Daingerfield, 4	De Leon, 4	Farmersville, 4
Freeport Brazosport, 4, 2	Gladewater, Gladewater, 7	Gladewater Sabine, 3
Hico, 6	Holland, 3	Houston Bellaire, 3
Houston Furr, 6	Imperial Buena Vista, 3, 1	Longview Spring Hill, 4
Lubbock Monterey, 5, 2	Marion, 3	McAllen, 8
Odessa Odessa, 3	Odessa Permian, 5, 1	Pittsburg, 5, 1
Quanah, 7, 4	Rio Grande City, 3	Rocksprings, 8, 4
Rosebud, 3	San Diego, 4	San Saba, 4, 2
Schertz Schertz-Cibolo, 3	Sidney, 5	Silverton, 4, 2
Stephenville, 3	Sulphur Bluff, 5, 1	Temple Academy, 4
Waco Robinson, 4, 1	Weinert, 3	Wichita Falls Rider, 7, 2
Wichita Falls Wichita Falls, 5	Windthorst, 5	Winnie East Chambers, 3, 1
Wink, 6, 2		

Which schools will be represented in the State Number Sense Meet of 1973? One may be assured that most of the students appearing will represent coaches and schools mentioned above. Some will represent small schools with few students and poor budgets with which to hire teachers, but in spite of this have achieved greatness. Will some of them represent some of those larger schools in the state whose claims for fame rest solely on athletic achievements? Will school boards have demanded educational success in their education institutions? Will the superintendents curb their fear of having their school beaten and recognize the importance of literary and academic competition and demand that some of their teachers assist the students in competitive literary enterprises?

*** December, 1972 ... **Wall Student Wins First In Math**



Russell Gully of Wall High School placed first in the Conference B number sense competition at State Meet in 1972, repeating his accomplishment in the 1971 contest.

A member of the Future Farmers, the National Honor Society, Future Teachers, and the Student Council, Russell reports that he plans to major in mathematics at the university and will probably attend Angelo State.

Also, he won first place in the Region II Texas Conservation Essay contest in 1972, and has served as treasurer, secretary, president and vice president of several of the organizations of which he is a member.

Russell will be a senior this year and hopes, he says, to be a competitor again this year.

***** November, 1974 ... Number Sense, Slide Rule Test Release Dates Set**

Release dates have been set for the special Number Sense and Slide Rule contests for use in practice meets.

Slide Rule release dates are: 1. Test S-31 Nov. 13, 2. Test S-32 Jan. 15, 3. S-33 Feb. 12.

Number Sense release dates are: 1. 1974-A Nov. 13, 2. 1974-B Jan. 15, 3. 1974-C Feb. 12.

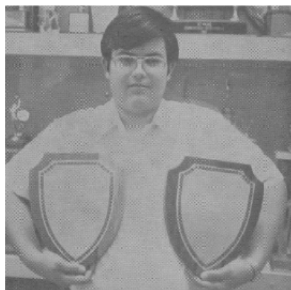
Number Sense Test 1974-A is the one used in the fall Student Activities Conferences.

Slide Rule Test 213 was used in the fall Student Activities Conferences.

Slide Rule tests are 10 cents each and Number Sense tests are 2 for 5 cents. Answer keys will be furnished.

Tests can be mailed to practice meet directors earlier than the dates designated, but are not to be used until after the release date.

***** November, 1974 ... JOSE ELOY CUELLAR - DOUBLE WINNER**



Jose, son of Mauro Cuellar, of Zapata High School was a double winner at the 1974 State Meet, taking first places in AA Number Sense and Slide Rule. His coach, Eliseo Perez, is very familiar with State Meet, having taught the 1973 state slide rule winner. Jose makes all A's in school. His hobbies are swimming and fishing. He plans to major in engineering at Texas A&M University after he finishes high school. He has two more years to try to add more championships at State Meet to his record.

===== Mrs. GeNelle Beck era Fall, 1974 – Spring, 1980 =====



Mrs. GeNelle Beck, University of Texas mathematics instructor takes over as the district Number Sense director. Dr. Milo Weaver will serve as the assistant director.

In 1970-71 she was appointed the assistant director under Dr. Milo Weaver. She served a second stint as the director in the fall of 1985 through the spring of 1987.

Items of interest 1974-1980

>>> Note: the number sense tests were labeled as series HH through MM. The HH-II series consisted of 6 tests labeled HH-1 to HH-6 thru II-1 to LL-6. The JJ series consisted of only 4 tests JJ-1 to JJ4. KK-MM series consisted of 7 tests labeled KK-A,B,C to KK-1,2,3,4 thru MM-A,BC to MM-1,2,3,4.

***** 1975, September ... Number Sense Rule Change Lowers Error Penalties**

Penalty for wrong answers or skipped problems in the Number Sense Contest is now four, instead of the five-point deduction required in past years.

"This change was made at the request of many Number Sense coaches," said State Director GeNelle Beck. "We feel that this change is valid and will contribute to the conduct of the contests." Five points credit will still be allowed for all correct answers. The "starred" problems will still allow for a five per cent variance in answers. Ten per cent of the problems will require the approximate answers. All other answers must be exact to be counted correct.

"I consider the Number Sense Contest one of our most valuable events," said Dr. Rhea H. Williams, League director. "The competitors learn mental computation and develop real number sense. This fits them better to be intelligent consumers and is of real vocational value. There has been some criticism of today's system of teaching mathematics, and I think that work in Number Sense will fill a great need for many students."

High School, Elementary Tests

Williams added that he hoped that more elementary school, junior high and high school students would take part in the contest. Each year new contests are prepared for both high school and elementary levels. The problems are designed to help students become proficient in the manipulation of figures. The problems requiring approximate answers seem to develop a student's ability to know when an answer is within a reasonable range of accuracy.

Number Sense Book

The League publishes a special "Developing Number Sense" booklet designed to help teachers and students to gain maximum educational advantage from the contest work. The booklet

contains hundreds of problems with suggested ways of solving them. "The many Number Sense competitors who have been awarded Texas Interscholastic League scholarships have earned outstanding records in the state's top colleges and universities," said Prof. Beck.

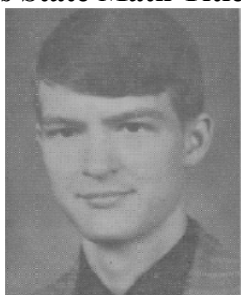
"We are convinced that the Number Sense contest work is partly to be credited for their outstanding performance."

Practice Tests

Hundreds of practice contests are available through the League's Publications Order Library.

"I will be happy to furnish further information about this contest to any interested persons," said Dr. Williams. "This contest is one that I really believe in. I am convinced that a study of the bulletin and work with the practice tests will be of value to any student."

***** 1975, September ... Giesecke Gets State Math Title**



Motley County High School graduate, Charles Giesecke, son of Mr. and Mrs. R. C. Giesecke of Matador, won first place in the State Meet in Number Sense in Conference B.

Charles participated in science, journalism, number sense, basketball and tennis. He enjoys doing card tricks and playing table tennis. He has worked part-time as a welder for a local welding shop. He is attending West Point Academy at West Point, New York.

***** 1975, November ... Slide Rule, Number Sense Release Dates Scheduled**

Release dates for special Slide Rule and Number Sense contests have been set by the state directors.

Number Sense Contests

1975-1976 Test A -- This contest will be used at all student activities conferences. It will be released for invitational meets and to individuals on or after Dec. 1, 1975.

1975-1976 Test B -- This contest will be released for invitational meets held on or after Jan. 5, 1976, and for sale to individuals for practice on or after Feb. 9, 1976.

1975-1976 Test C -- This contest will be released for invitational meets only on or after Feb. 9, 1976, and for sale to individuals for practice on or after Mar. 8, 1976.

Slide Rule Contests

Test S-34 -- This contest will be released for invitational meets only on or after Nov. 19, 1975, and for sale to individuals for practice on or after Jan. 14, 1976.

Test S-35 -- This contest will be released for invitational meets only on or after Jan. 14, 1976, and for sale to individuals for practice on or after Feb. 9, 1976.

Test S-36 -- This contest will be released for invitation meets only on or after Feb. 9, 1976, and for sale to individuals for practice on or after Mar. 8, 1976.

Slide Rule Contest 218 was used for all the fall student activities conferences.

All Number Sense and Slide Rule contests will be ten cents each. Answer keys will be furnished with each order. Tests can be mailed to practice meet directors earlier than the designated dates, but are not to be used until the release date. The listed contests are all that will be available for invitational meets this school year.

*** 1976, November ... **Slide Rule, Number Sense Release Dates Scheduled**

Release dates for special Slide Rule and Number Sense tests have been set by the state directors.

Number Sense Tests

1976 Test A -- This test will be used at all student activities conferences. It will be released for invitational meets and individuals after Nov. 23, 1976.

1976 Test B -- This test will be released for invitational meets held on or after Jan. 11, 1977, and for sale to individuals for practice on or after Feb. 15, 1977.

1976 Test C -- This test will be released for invitational meets only on or after Feb. 15, 1977 and for sale to individuals for practice on or after March 8, 1977.

Slide Rule Tests

Test S-37 -- This test will be released for invitational meets only on or after Nov. 23, 1976, and for sale to individuals for practice on or after Jan. 11, 1977.

Test S-38 -- This test will be released for invitational meets only on or after Jan. 11, 1977, and for sale to individuals for practice on or after Feb. 15, 1977.

Test S-39 -- This test will be released for invitational meets only on or after Feb. 15, 1977, and for sale to individuals for practice on or after March 8, 1977.

Slide Rule Contest 223 was used for all the fall student activities conferences.

All number sense and slide rule tests will be 10 cents each. Answer keys will be furnished with each order.

Tests can be mailed to individual meet directors earlier than the designated dates, but are not to be used until the release date. The listed contests are all that will be available for slide rule and number sense invitational meets this school year.

*** September, 1977 ... Leaguer article:

Pre-High Schoolers Catching Number Sense Contest Fever

by Dr. Max R. Haddick

The League Number Sense Contest has achieved great popularity in Texas high schools, but students below ninth grade are just now catching the mental mathematics fever.

One of the oldest UIL contests, Number Sense develops in the competitors the ability to rapidly solve many numbers problems without resorting to scratch paper and pencil calculating. The students, following the methods described fully in the Developing Number Sense book, achieve startling speed and accuracy in handling simple calculations.

One sixth grader, seeking a means of showing off his newly acquired skill, asked his dad, "Can you tell me what 45 times 45 is?" The father started to scribble down the numbers, but before he could get the problem written down his son proudly announced, "It is 2025, and I can multiply a lot of numbers ending in 5 by themselves in my head." "OK," Dad said dubiously, "What is 65 times 65?" "No sweat," bragged the boy. "The answer is 4225."

That stumped the man for a moment, but the boy proudly explained the trick involved in squaring numbers ending in 5 and the father was impressed.

"But that is a bit limited in use," dad said. "You don't have that many occasions to multiply numbers ending in 5 by themselves."

"Sure," the boy countered, "But I can use that trick in many other problems. For instance if I have to multiply 24 times 25, I just multiply 25 times 25 and then subtract 25. That gives me 600."

In the conversation that followed the boy proudly demonstrated how he could divide by 25 by multiplying by 4, divide by 12 $\frac{1}{2}$ by multiplying by 4, extract square roots of small numbers mentally, and check answers by a simple estimation process.

Students Take Pride In Computation

"The League Number Sense Contest can be of great value to elementary and junior high students as well as high school students," said Dr. Rhea H. Williams, former director of the UIL.

"Thousands of youngsters develop a sense of numbers by following the simple directions in the League booklet. They seem to lose their dread of computation and take real pride in handling numbers. I hope that we can encourage more elementary and junior high schools to give their students the chance to study the book and work the exercises that are available at very low cost." Williams added that the study of Number Sense is of great value by itself, but if combined with interschool, intra-school or other competition plans has proved to be an excellent motivator for students at many levels.

Learn To Match Skills Against Mates

"Students give their all in competition in Number Sense in the same way that they do in athletic competition." Williams said. "They learn to match their skills against classmates and against the same grade level students in other schools. Win, lose or draw in the competition, they are all winners in the increased understanding of computation processes, and they all derive great enjoyment from the contests.

"I heartily recommend the Number Sense program at all levels. It can be one of the most valuable of enrichment aids in mathematics instruction."

The League "Developing Number Sense Book," 42-pages of instruction, is available from the League for 25 cents per copy. It contains a thousand problems and detailed instructions for developing the skills to solve them.

There are seven pads of elementary Number Sense practice problems available for \$2 each.

These pads each contain eight copies each of eight different practice tests and answer keys. The League Constitution and Contest Rules book contains full rules and procedures for contests in Number Sense at all levels.

***** 1977, October ... Slide Rule, Number Sense Test Release Dates Given**

Release dates for special Slide Rule and Number Sense tests have been set by state directors Jack Lenhart and Genelle Beck respectively.

Number Sense

Test A -- This test will be released to individuals on or after Nov. 23, 1977.

Test B -- This test will be released for invitational meets on or after Jan. 11, 1978 and to individuals on or after Feb. 15, 1978.

Test C -- This test will be released on or after Feb. 15 for invitational meets.

On March 8, 1978, all tests will be released to anyone desiring them.

Slide Rule

Test S-40 -- This test will be rereleased for invitational meets on or after Nov. 23.

Test S-41 -- This test will be released for invitational meets on or after Jan. 11, 1978.

Test S-42 -- This test will be released for invitational meets on or after Feb. 15, 1978.

State Slide Rule Director Jack Lenhart said contests can be ordered for invitational meets on their release dates but are available to anyone after the designated release date has passed. All slide rule and number sense tests will be 10 cents each and answer keys are furnished with each order.

Tests can be mailed to individual meet directors earlier than the designated dates, but are not to be used until the release date. The listed contests are all that will be available for slide rule and number sense invitational meets this school year.

***** 1978, April ... Crane's Bizzak League Number Sense Champion**

David Bizzak, a senior at Crane High School, placed first in the 1977 State Meet number sense contest, held last May in Austin.

David, son of Mr. and Mrs. Ed Bizzak, finished fourth at the 1976 State Meet debate contest and in 1975, placed fifth in the regional meet.

He is a member of the National Honor Society and was listed in Who's Who Among American High School Students in 1977. David was also on the student council and was treasurer of the American Industrial Arts Student Association. He plans to attend Texas A&M University and major in mechanical engineering.

***** 1978, November ...** The council voted to eliminate tie-breakers in the number sense, slide rule, and science contests.

***** 1978, November ... Directors slate slide rule, number sense release dates**

Release dates for special slide rule and number sense contests have been set by state directors John Cogdell and GeNelle Beck respectively.

Slide Rule

Test S-43 will be release to invitational meets only on or after December 5, 1978. On January 9, 1979, contest S-44 can be released for invitational meets only and contest S-43 can be released to individuals.

On February 6, 1979, contest S-45 can be released for invitational meets only and contest S-44 can be released to individuals. On March 6, contest S-45 can be released to individuals.

Number Sense

Contest LL-A will be released to individuals only on or after December 5, 1978. Contest LL-B will be released for invitational meets only on January 9, 1979. On February 6, 1979, contest LL-B will be released to individuals and contest LL-C for invitational meets only. On March 6, 1979, all test material will be available for release.

***** 1979, November ... C&CR RULES CHANGES**

Page 67 of the Number Sense Contest, the third paragraph should read:

"First place goes to the contestant making the highest net grade, second place to the contestant making the next highest grade, third place to the next highest and so on.

No ties are to be broken. Should there be a tie for first place, there is no second place. Should there be a tie for third place, there is no fourth place; and both third place winners advance to the next higher meet."

Any reference to a tiebreaking contest in either the Number Sense or Slide Rule Contests shall be disregarded. No ties shall be broken at any level.

*** 1979, December ... **Practice number sense release dates given**
by GeNelle Beck, Number Sense Director

As we conclude the student activity conferences, many of you are preparing for the spring meets with new ideas and renewed enthusiasm. This is great. For those of you who were unable to attend a conference in your area, I will try to inform you of what's happening.

In the past, the elementary number sense tests were designed for junior high students (sixth, seventh and eighth grades). This year's tests, series E115 through E118, include material for the fourth and fifth grades as well.

The first 35 problems on each test contain the concepts which are taught at the fourth and fifth grade levels. The last 35 problems on the tests will be of the same nature as those found on the elementary tests of preceding years.

I feel this will be beneficial to both groups of students. It will give the elementary schools a chance to participate and the junior high students will welcome an easy start on the tests.

There have also been some revisions in the 1979-80 high school number sense tests. In this series, MM-A through MM-4, you will find the first 35 problems on each test much less difficult. These problems contain more arithmetic and less stated problems. In general, they are much easier.

This should allow your freshmen students to make a good score and not become discouraged.

The final 45 problems on the test will be of the same nature as those problems found on the tests of the preceding five or six years.

I would advise you to become acquainted with the types of problems on these tests and to obtain all the practice tests that were written for this year.

The release dates for these tests are as follows:

January 4, 1980—MM-A, invitational meets.

January 22, 1980—MM-B for invitational meets and MM-A for individuals.

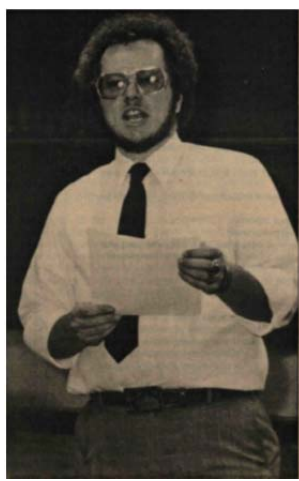
February 12, 1980—MM-C for invitational meets and MM-B for individuals.

March 4, 1980—All practice tests are available.

I urge you to attend as many invitational meets as possible. They will help your students learn to take the tests under conditions similar to those at the spring meets.

If by March 4, 1980, you do not have copies of all the practice tests, you may order them from the League office. The practice tests, MM-A, MM-B and MM-C, are similar to the tests that will be given at the district, regional and state meets this spring. I hope to see many of you at the state meet in May. As I've said before, "We can't all win at state, but all of you are winners."

===== Dr. Charles Lamb era Fall, 1980 – Spring, 1985 =====



Charles graduated with Bachelor of Science degrees in Mathematics and Physics from Frostburg State College in Frostburg, Maryland, in 1969. He completed his Master's and Doctor of Education in Mathematics Education degrees at the University of Georgia.

In 1975, he moved with his family to Austin, Texas, where he was an assistant and associate professor of Mathematics Education at The University of Texas at Austin.

In 1994, he moved to College Station, Texas, where he completed his career as a professor of Mathematics Education at Texas A&M University. He taught many undergraduate courses and supervised countless graduate students during his academic career. He was named a Professor Emeritus in 2000.

Items of interest 1980-1985

>>> Note: the number sense tests were labeled as series NN through RR. The NN series consisted of 7 tests labeled NN-A,B,C to NN-1,2,3,4. The OO-RR series consisted of 8 tests labeled OO-A,B,C,D to OO-1,2,3,4 thru RR-A,B,C,D to RR-1,2,3,4.

*** October, 1980 ... Three number sense tests will be released for practice meets NNA, NNB, and NNC. Number sense test NNA and calculator test 81A will be given at the student activities conferences. NNB, NNC, and NND will be available for invitational meets. All tests, both practice and competition, will have 80 problems.

*** September, 1981 ... **Release schedule for 2 contests announced**

Release dates for the number sense and calculator applications contests have been announced, according to number sense director Dr. Charles Lamb.

The release schedule is as follows:

Jan. 8, 1982 — Number sense test 00-B for practice meets.

Jan. 29, 1982 — Calculator test 82-A to individuals; number sense test 00-C for practice meets.

Feb. 19, 1982 — Calculator test 82-B to individuals; number sense test 00-D for practice meets.

March 12, 1982 - Calculator test 82-C for individuals.

Lamb said number sense test 00-A and calculator test 81-G will be used at the student activities conferences this fall.

*** 1981 ... **TMSCA**

Texas Math and Science Coaches Association is organized by Texas math and science teachers to promote excellence in math and science through competition. It was formed to promote uniformity in the practice meets held to prepare students for University Interscholastic League competition in the spring. Through its efforts grade-level competition is now the norm at practice meets. Team competition, originally promoted at practice meets, is now included in most of the University Interscholastic League's academic events. The originators of the Texas Math and Science Coaches Association were Andy Zapata (Azle HS) and Ford Roberson (Andrews HS).

*** September, 1982 ... Leaguer article:

**Academics should adopt 'sportsmanship first' credo
by Dr. Charles Lamb, Number Sense Director**

As I make preparation for my third year as number sense director, I want to take this opportunity to share some thoughts and concerns with the coaches and participants of our contest.

As long as I am director, there will be four practice tests. One will be used for the activities conferences, with the remaining three available for invitational meets. Release dates will be printed in the Leaguer announced at the fall student activities conferences. All tests, both practice and competition, will have 80 problems. I believe this will lead to more uniformity in tests and test preparation. Many district and regional directors were unable to locate me this past contest season. Every effort will be made to remedy this in the future. Directors will be provided with phone numbers where I can be reached during district and regional weeks. There were some typos in last year's tests and answer keys. I apologize. We are taking steps to make certain that all contests are correct. However, let me go on record as having said that winners should be determined by correct answers and not faulty answer keys. Please share your thoughts on the following matters: If the answer is 16, is 16.000 correct? Why or why not? Is the current elementary level series of tests appropriate for junior high, elementary, both or neither?

Please send your replies to me at Curriculum and Instruction, EDB 406, The University of Texas at Austin, Austin, TX 78712. Phone (512) 471-3747 (office) or 836- 1835 (home).

Also, please share your thoughts on the "Developing Number Sense" booklet. I have received suggestions that the tests should be more uniform. That is, similar in format and maybe getting increasingly more difficult as the years progress. While I agree in principle, it seems that too much rigidity would lead to a type of number sense knowledge that is controlled by pattern and rote memorization. I would like to keep a little mystery in the contest. There is much concern over using the same problems over again. An effort will be made to eliminate this approach. However, some problems may be seen again. For example, problems from a state test might be on the following year's practice tests, and so on. UIL's academic competition is often overshadowed by the athletic competition. While this is unfortunate, there is something that the

academic participants could learn from the athletic side of the coin. Athletics are supposed to instill a sense of fair play and sportsmanship in those who compete. I would hope that the same is true of the academic and literary participants. In the past two years, I have seen and heard some things that do not seem to be in the best interest of UIL number sense.

For example:

- People implying that because a school or student has been competing for several years, others with less experience and/or background have less right to make it to the State Meet.
- People gaining access to competition tests prior to meets, thus gaining an unfair advantage for some students.
- People implying that because a student does very well at district and/or regional that he/she has every right to expect to win at State.

I believe that such attitudes and/or practices are not in the best interest of UIL competition.

Please work with me to eliminate these and other negative attitudes which might blemish the just right to pride that we should all have regarding our contest.

A final note on last year's State Meet: Some said it was too easy and I tend to agree. However, that does not mean that it was unfair to students who were faster, but not as accurate as their opponents. The test calls for both speed and accuracy. Both are necessary. Neither is sufficient alone. Please share your thoughts with me. I'm looking forward to hearing from you soon.

*** September, 1982 ... The league staff has been requested to poll schools on a request by the Texas Math and Science Coaches Association that calculator applications, number sense and science contests be given on the same day throughout the state.

*** October, 1982 ... Leaguer article:

Number sense meeting successful

by Dr. Charles Lamb, Number Sense Director

On Saturday, September 25, the UIL Central Texas Student Activities Conference was held on the University of Texas at Austin campus. As usual, the number sense session was held from 9 to 10:30 a.m. in Robert Lee Moore Hall.

Happily, and for the second year in a row, we had an overflow crowd. We even had people from as far away as McAllen.

As well as giving my usual pep talk, a practice test (PP-A) was given. The test is a lot like the last year's state test. However, I promise that other tests this year will get increasingly harder.

Please watch the *Leaguer* for forthcoming tests.

I know the summer was too short and maybe you've been dreading the need to get cranked up again for school and UIL competition. But if you're like me, one look at those bright, eager faces of UIL competitors and you know why it's worth the effort. After all, that's what keeps us all so young. Be sure to write me with your concerns and comments on UIL number sense. Also, send me dates of meets and watch the *Leaguer* for a listing of those dates.

*** November, 1982 ... **Release dates for number sense listed**

Notes of interest to number sense coach and participants:

1) The Conference for the Advancement of Mathematics Teaching was held November 11-13 on the UT-Austin campus and was a great success. More than 2,200 attended, and major areas of

discussion included the current math teacher shortage and solutions to that problem, and the use of computers in the math classrooms.

2) Release dates for the number sense contests are as follows:

December 6 — Release Test A to individuals;

January 7 — Release Test B to invitational meets;

January 28 — Release Test B to individuals. Test C to invitational meets;

February 25 — Release Test C to individuals, Test D to invitational meets;

March 11 — Release Test D to individuals.

3) There are three manuals available for helping students prepare for the UIL number sense contests. They are *Developing Number Sense*, which is available through the League office; *No Sense in Mathematics*, available from Don Skow, Math Department, Pan American University, Edinburg, Texas 78539; and *A Booklet for the Elementary Level of Competition*, available from Frances Walzel, Rt. 1, Box 173, Cameron, Texas 76520.

>>> 1981-82 State Number Sense contest is won for the fourth consecutive year by Jeff Draper in class 3A from Powderly North Lamar.

*** January, 1983... Leaguer article:

Number sense suggestions

by Dr. Charles Lamb, Number Sense Director

On competition:

- Please make certain that contestants have ample writing room and space.
 - Allow for the possibility of left-handed contestants.
 - Do not allow students to bring into the room objects which may distract or disturb others.
- Questions have been raised relative to the use of timers. While no one should object to the contestant looking at his watch, the key is to prohibit any loud ticking or bell ringing-timer.
- At the start of the test period, papers should be laying flat on the desk and should not be touched by the contestants. This rule should be administered across the board.

On answers and their format:

- An attempt is made, as tests are written and printed, to remove from the shoulders of the test-take the writing of symbols. For example, symbols such as $^{\circ}$, % and & are printed on the sheet. Therefore, answers usually require only the writing of numerals. However, if by chance a symbol is omitted, it is the responsibility of the contestant to make sure the answer is complete. For example, if 360° is the answer, the $^{\circ}$ symbol must be included. If not printed, the student must include it in his answer.
- In agreement with the philosophy that answers should be complete, all dollars and cents problems must have complete answers. That is, twenty-three dollars must be written as \$23.00 (with \$ and .00). Sixteen cents would be written \$.16 or 16c, depending on the answer blank format.
- Numerical answers should be written so that the answers are complete (as in the two examples above). However, the answer should be written in the most efficient form possible. For example, if the answer is 16, the written answer 16.000 is not acceptable for the purposes of the number sense competition. In general, extraneous zeros are not to be used.
- An answer such as $3 \times 10'$ should be expressed as 3000 and not left in exponential form.

If you have other questions or comments, please write Dr. Charles E. Lamb, C&I, EDB 406, UT-Austin, Texas 78712- 1294. Or call 512/471-3747.

*** October, 1983... Leaguer article:

Mental short-cut

by Dr. Charles Lamb, Number Sense Director

In the spring of 1983, I received the following number sense algorithm from Pamela Kajs and her teacher, Jimmie Gafford of Crowell. If you have any additional tricks or comments, please send them to me at C & I, EDB, UT-Austin, Austin, TX 78712-1294.

Mental short-cut to the multiplication of any two numbers whose last digit is five:

- Subtract the preceding digits to five of the smallest number from the preceding digits to five of the largest number.
- If that difference is odd, the last two digits of the product is 75. If that difference is even, the last two digits of the product is 25.
- Multiply the preceding digits to five of the smallest number by the preceding digits to five of the largest number.
- Take one-half of the difference of step one. Use only the integral quotient (forget about the remainder).
- Add the integral quotient from step four to the preceding digits to five of the smaller number.
- Add the product of step three and the sum of step five together. This sum will be the digits which precede the two digits from step two.

There are currently several commercially available materials relating to number sense competition. Information may be obtained by writing:

Senior high materials —

Don Skow, Math Dept., Pan American University, Edinburg, TX 78539;

Leo Ramirez, 3103 West Hwy 83, Lot 24, McAllen, TX 78501;

Kyle Longley, Rt. 1, Box 144, Midland, TX 79701.

Elementary/junior high materials —

Frances Walzer, Rt. 1, Box 173, Cameron, TX 76520;

Donna Smith, 501 Blue Bird, DeSoto, TX 75115.

*** October, 1983... **Number Sense, Calculator release dates given**

As in previous years, the League will make available a number of invitational calculator applications and number sense tests, according to John Cogdell and David Bourell, calculator applications contest directors, and Charles Lamb, number sense director.

Invitational number sense tests will be released for use by schools hosting invitational meets January 7, February 4, and March 3. The tests will be released for use by individuals on January 27, February 24, and March 30 for the respective tests.

Complete invitational calculator applications tests will also be released for use by those hosting invitational meets on January 7, February 4, and March 3. These tests will be released for individual's practice on January 27 for the first test, February 24 for the second test, and March 30 for the third test.

Seven partial calculator applications tests will be made available for invitational use only. Those who choose to use the partial test, creating the rest of the test themselves, are required to send a copy of their test to Dr. Bourell at the Department of Mechanical Engineering, the University of

Texas, Austin 78712. For help in creating the tests, please contact the League Office for guidelines.

The release dates for the partial calculator applications tests are as follows: October 15, October 29, November 12, December 3, January 21, February 18, and March 17.

Full tests are mailed at library rate unless special provisions are made. The partial tests are sent first class.

Partial tests may be purchased for \$1.00 and include two masters of the seven-page test, two copies of the front page, and two answer keys. Complete tests cost 25c per copy. The number sense and calculator applications invitational tests may be ordered using the invitational meet order form which will be mailed to schools November 1.

*** November, 1983... **Elementary number sense samples given**

Beginning this year, Dr. Charles Lamb, number sense director, will be writing a number sense test for grades five and six and one for grades seven and eight.

"This should be welcome news for elementary sponsors, who in the past have been forced to use junior high test material," Lamb said. "Sponsors interested in seeing sample test materials may obtain them by writing the UIL."

To get copies of the elementary and junior high sample tests, send a stamped, self-addressed envelope with your request to Janet Wiman, academic activities director.

The problems below represent examples from the elementary sample test. Examples from the junior high test will be run in the January Leaguer.

Input from sponsors relative to the materials for any of the contests is always welcomed, Lamb said, adding that all correspondence should be directed to Dr. Lamb in care of the UIL, Box 8028, UT Station, Austin, TX 78712.

- $14 + 18 =$ _____
- $31 - 17 =$ _____
- $119 + 96 =$ _____
- $203 - 84 =$ _____
- $1.7 + .3 =$ _____
- $2.8 - .7 =$ _____
- $1/2 + 1/3 =$ _____
- $41/2 \times 30 =$ _____
- $42 \times 30 =$ _____
- 14 divided by what number gives 7? _____
- 6% of 150 is _____
- 600 centimeters = _____ meters.
- The next number in the sequence 1, 2, 3, 4, ... is _____
- What number added to 27 gives 33? _____
- Which is larger: $1/4$ or .26? _____
- $697 + 343 =$ _____
- 6 feet 7 inches is _____ inches.
- $9^4 =$ _____
- The average of 27, 19, 18, 16 is _____
- $2^8 =$ _____
- Write LXV in Arabic numerals _____

- Change 34 base five to base ten. _____
- Change 23 base ten to base seven. _____
- 3 is _____ % of 15.
- The sum of two primes is 5. The smaller is _____
- The sum of two primes is 5. The product is _____
- $43 \times 27 - 1 =$ _____
- $x + 14 = 28$. $x =$ _____
- $2x - 1 = 9$. $x =$ _____
- $\sqrt{441} =$ _____
- $-13 + 14 =$ _____
- $(9 \times 11) + (11 \times 14) =$ _____
- $1/2 + 1/3 =$ _____
- $1/4 + 2/3 =$ _____
- Using 1776, write the maximum four-digit number. _____
- A cube has edge 3". Its volume is _____ cu. in.
- A circle has a radius of $1/22$ ". Its area is _____ sq. in.
Use $\pi = 22/7$.
- Express $2/5$ as a decimal. _____
- 12 pounds = _____ ounces.
- $16 \times 24 =$ _____
- $.45 =$ _____ %.
- The greatest common factor of 4 and 5 is _____
- The least common multiple of 4 and 5 is _____
- The reciprocal of $4 \frac{1}{2}$ is _____
- $\$2.16 - \$1.07 =$ _____
- A radio is \$25.00. Tax is 5%. The selling price is \$ _____
- 200 hours is _____ minute

*** February, 1984... Leaguer article:

Who needs a computer? Not number sense whiz Draper

(Editor's note: The following article, by Carta Rheudasil and Cathy Terrell, originally appeared in the June 12 issue of The Paris News.)

In what has become an age of computers, with elementary students using calculators to complete math tests, it seems rare to find students competing solely on the basis of their mental prowess.

That is, however, the framework of University Interscholastic League Number Sense competition and a Paris area youth is one of, if not the best, competitors that event has ever seen. Jeff Draper, North Lamar High School's 1983 valedictorian, is a four-year state medalist in UIL Number Sense competition, the first person in Texas to take first place honors in UIL competition for four years.

In a recent interview centering on his UIL record, Draper said that calculators are banned during that competition.

"If we showed any scratch work, erasures or mark-overs on the test, we would be disqualified," Draper said. "All the questions had to be answered in your head, with one answer written on the test."

The son of Mr. and Mrs. John A. Draper, of Route 2, Paris, Draper said he plans to attend Texas A&M University in the fall where he plans to major in electrical engineering. He will share an apartment with his brother, Charles, who is a senior civil engineering major.

Draper has received several scholarships, totaling \$18,000.

Scholarships include the valedictory scholarship given by the state, which pays for tuition the first year; the Lechner Fellowship Scholarship worth \$1,500 per year; the McDermott, Inc. Scholarship worth \$1,000 per year; and a \$2,000 per year scholarship given by a group of local donors, who wish to remain anonymous.

Draper was also awarded a four-year Cook Foundation Scholarship UIL Scholarship, and is now attending Texas A&M University.

Draper, who said he has always been good in math, has been interested in competition since the fifth grade when Charles was involved in number sense competition. The elder brother brought home tests that Draper would practice on.

He competed in his first contest when he was in the sixth grade. During junior high school there was only one test per year, but during his four years in high school, Draper estimates that he was involved in 50 competitions.

UIL competitions are held in several different subject areas on district, regional and state levels. Elementary, junior high and high schools throughout Texas participate in the program.

After winning his first state competition as a freshman, Draper set a goal — he would win the state competition for the remaining three years of his high school career.

Number sense competition is a test composed of 80 problems. Competitors are given 10 minutes to complete as many of the problems as possible. If a student completes all 80 problems, he has spent an average of 7.5 seconds on each one. The problems range from simple addition to differential calculus, according to Draper.

Draper said he prepared for the tests by working some old tests and looking over a few problems before the tests. The important thing, he said, was not to "over-study."

During the last few competitions, Draper said he finished the entire test. He did the problems in order because each skipped problem is counted wrong. Every 10th problem is an estimation, he said, and an answer within a certain range is counted correct.

Joyce Johnson, North Lamar UIL coordinator and number sense coach, encouraged Draper in UIL competition, he said.

The number sense coaches around the state shared techniques and information, Draper said, and Mrs. Johnson and Charles developed many "short-cuts." Draper said he used these short-cuts while taking the tests, and he added that Charles used them to finish his college tests.

Draper was also involved in calculator competition. The tests were 80 problems, but because the problems were longer, he said, the student was given 30 minutes to complete as much as possible of the test. The test had three word problems on each page and some geometry problems.

Draper said that he encourages students to participate in UIL contests.

"I'm glad that North Lamar encourages the competition," he said. "Academics are becoming more and more important.

While athletics are great, there are very few high school students that can make a career of it."

*** April, 1984... Leaguer article:

**Clarification of decimal, fraction use provided
by Dr. Charles Lamb, Number Sense Director**

I would like to make a point of clarification concerning acceptable formats for answers which require decimals or fractions in the Number Sense contest.

Page 96, 22-3-4(2) of the Constitution and Contest Rules states that all fractions in test papers must be written in lowest terms, that improper fractions are permitted, and that decimal answers are permitted for starred problems and for those unstarred problems whose answers are exactly expressible as decimals.

Because this wording has been causing some confusion, I have begun specifying the format of many answers on the test. When the format is not specified, decimals, fractions, or mixed numerals are acceptable.

For example, the answer to the problem 27.5 may be written 27.5 or $27\frac{1}{2}$ or $55/2$.

The following would also be acceptable answer formats:

$3\frac{1}{2}\sqrt{7}$, $7/2\sqrt{7}$, $7\sqrt{7/2}$ and $3.5\sqrt{7}$.

While there may be rationalizations for desiring one format over another (because of problem context), there appears to be no clear cut consensus among the many coaches and educators I have talked to. Therefore, for the purposes of the UIL Number Sense competition, any of the formats listed above are to be scored as correct.

Good luck to all of the students competing on the regional level this month. I hope to see you at the State Meet in Austin. We will be holding our Number Sense conference on Friday, April 27 from 10:00-11:30 a.m. in the Thompson Conference Center. The State Number Sense contest will be held in Belmont Hall, room 204, from 2:00-5:00 p.m. that day.

*** September, 1984... **Fall conference format changed**

This year, student activity conferences will operate under a new format according to Dr. Charles Lamb, Number Sense director. Instead of a single hour and a half session as we have had in the past, we will be presenting two one hour number sense sessions. One of the sessions will be geared toward elementary and junior high students and any high school novices. The other will offer only high school material. Hopefully, this approach will serve all interested students in a more efficient manner.

Be sure to check *The Leaguer* for information on this year's student activity conference sites. I look forward to seeing you there. I am happy to answer your questions or concerns throughout the year.

*** October, 1984... **4 Texans win math/science awards**

Number Sense Contest director, Dr. Charles Lamb announced the following information.

Tests E-133 and J-3 are being used for Student Activities Conferences. In addition to distributing these tests at the conferences, I will also be handing out corresponding answer keys. Please check your answer keys. The following are the correct answers:

E-133 #47 1169 --- #52 4

J-3 #53 $1/4$ --- #66 10

A recent issue of *Education Week* announced the finalists in the 1984 Presidential Awards for Excellence in Science and Mathematics Teaching program. Four Texas teachers have been so

honored. They are: Audrey Martin Henderson, Texas HS (Texarkana); Linda J. Oldham, Houston Stratford HS; John R. Hamilton, Fort Worth Paschal HS; and Marjorie Valentine, San Antonio Jay HS.

***** November, 1984... Extraneous marks prove troublesome**

by Dr. Charles Lamb, Number Sense Director

Concerning the number sense contest format, the rules state that answers should be complete but that no extraneous marks should be made. Therefore, if an answer blank is of the form _____ ¢ and a contestant writes an answer of 16¢ in the blank, e.g. 16¢, then answer will be considered incorrect.

However, according to Rule 1009 (e)(3), if the ¢ is not printed, the student must include it as part of the answer.

While I believe that this type of scoring would be detrimental in a mathematics classroom, it seems to be consistent for test purposes. Now, I need for you to respond to two questions:

- Should the elementary and junior high tests have 80 problems to make them more consistent with the high school tests?
- Should elementary and junior high competition advance to the regional and/or state level?

Please send your comments to me at C&I EDB 406, UT-Austin, Austin, TX 78712-1294.

***** March, 1985... Math group to hold convention at Austin's Wyndham Hotel**

The 12th annual conference of the Research Council for Diagnostic and Prescriptive Mathematics will be held April 13-15 at the Wyndham Hotel in Austin.

UIL number sense director Dr. Charles E. Lamb will serve as conference chairman. "We have plans for more than 50 workshop, thematic and research sessions, including several international speakers and three main addresses," Dr. Lamb said. The registration includes three meal functions. The meeting will begin at 2 p.m. April 13 and will conclude at 2:30 p.m. April 15. In addition, arrangements are being made for a bus tour from Austin to San Antonio on April 15. Rooms will be \$45/single and \$60/double for this conference, Lamb said.

***** January, 1986... Number sense resource materials available**

by Dr. Charles E. Lamb, Number Sense Director

One of the questions most frequently asked of the State Number Sense Director is, "Where can I get more materials for practice?" Fortunately, there are several answers to this question.

First and foremost, one should consult the publications available from the League office in Austin. These include sample tests and answer keys for elementary, junior high, and secondary levels of competitions.

Also, there is a newly-revised edition of *Developing Number Sense* which contains test guidelines, number sense tricks, sample problems, and sample tests.

Secondly, there is a wealth of material available "commercially." Several people interested in number sense have taken the time and effort to produce practice materials at each of the different participation levels. Names and addresses are provided below. Please write to individual addresses for further information. A final source for aid to number sense participants and coaches is the Texas Mathematics and Science Coaches Association (TMSCA). This

organization provides practice materials and competition opportunities throughout the state. Their monthly newsletters help to keep coaches informed of new developments in Number Sense, Science, and Calculator Applications. The address for TMSCA is given below. Please use these sources to help aid your students in UIL competition. In that way, the producers of materials will have attained some of their much deserved thanks for their efforts on behalf of school children in the state of Texas.

- **Texas Mathematics and Science Coaches Association (TMSCA)**

c/o Andy Zapata Azle High School 1200 Boyd Rd Azle. TX 76020

- ***No Sense in Mathematics*** (mainly for high school)

Don Skow, D&R Enterprises Rt. 3, Box 213-A-1 Edinburg. TX 78539

- ***Mental Mathematics for the Number Sense Contest***

(mainly for elementary and jr. high) Frances Walzel Rt. 1. Box 173 Cameron. TX 76820

- ***Applied Number Sense*** (mainly for high school)

Kyle Longley Rt. 1. Box 144 Midland, TX 79701

- ***Computer Activities—Junior High Number Sense***

Donna Smith S01 Bluebird eSoto. TX 75115

- ***Test Packets***

Leo Ramirez 3103 W. Hwy. 83. Lot #24 McAllen. TX 78501

- ***Elements of Number Sense*** (middle school — high school)

1. T. Curnmings 724 Ethridge Drive Azle. TX 76020

- ***Tests***

Michele Waelti Baylor University 502 S! Russell Waco. TX 76706

- ***Computer Materials***

Edward Wees Rt. 3. Box 188 Clovis. NM 88101

- ***Computer Disks*** (generate different tests for high school level)

David Parrel! 3012 Keystone Dr. Longview. TX 75605

- ***High School Test Materials***

Sidney Childress 503 Rothlynn Dr. Longview. TX 75601

*** October, 1986... **New contest directors named**

Academically inclined – Janet Wiman, Academic Director

The UIL academic program is fortunate to have been able to attract highly qualified, talented and energetic contest directors who have given countless hours to designing and directing the contest events. The League solicits the services of at least 16 professors and staff who will agree to work with the events throughout the year.

Fortunately, each year some renew their commitment while several new directors join the ranks. New directors often give the program a shot-in-the-art by providing new energy and ideas.

With the experience and knowledge of the returning directors coupled with the enthusiasm of the new directors, this year should prove to be an exciting academic experience for thousands of students throughout Texas.

In a recent kick-off luncheon for academic contest directors, Dr. Bailey Marshall, Director of the League, welcomed five new directors to those that have been with the program for a number of years.

Jan House, a graduate of Texas Tech University currently teaching shorthand at Jacki Nell Executive Secretary School in Austin, will replace Dr. Nelda Garcia as director of shorthand. Dr.

Garcia is now teaching at University of Arizona at Tempe. House shares the philosophy held by Garcia that shorthand is a basic skill for today's business world.

GeNelle Beck, University of Texas Department of Mathematics, will direct the number sense program with Don Skow, Pan American University Department of Mathematics, serving as associate director. Neither Beck nor Skow are new to the area of number sense. Beck worked in the early seventies with Milo Weaver and served as director of number sense from 1974-1981. Skow is the author of *No Sense in Mathematics*, a widely used high school number sense book. Beck and Skow are replacing Dr. Charles Lamb who is pursuing academic responsibilities at the University of Texas.

Dr. Alice Reinarz, University of Texas Microbiology Department, joins Dr. Peter Antoniewicz and Marvin Hackert to head the science contest. Dr. Reinarz received a Ph.D. from the University of Texas at Austin where she now teaches introductory classes in biology, both organismal and molecular, and introductory microbiology. Reinarz also teaches an upper division course in animal virology.

Dr. James Kinneavy has asked Dr. Sue Rodi, University of Texas Department of English, to join him as co-director of the ready writing contest. Dr. Rodi teaches the Rhetoric and Composition for High School Teachers of English classes, several writing courses, and British and American Literature. She has taught in English Education and the Department of English at UT for the past 14 years.

Dr. Fred Tarpley, Department of Literature and Languages, and LaVeme Funderburk, Department of accounting, East Texas State University, will again serve as consultants to the literary criticism and accounting contests.

These new directors join Drs. John Cogdell and David Bourell, calculator applications; Bobby Hawthorne, journalism; Dr. Elizabeth Bell, spelling, speech and debate; Dr. Alan Thompson, typewriting, and Lynn Murray, one-act play to direct the 20 different UIL academic contests for the coming year.

In addition to the directing and test writing responsibilities, the contest directors will travel to eight student activity conference sites throughout the state between September and December introducing the activities of hundreds of teachers and sponsors. Persons wanting to have an opportunity to meet some of the contest directors may do so at these conferences.

===== Don Skow era Fall, 1985 – Spring, 2002 =====



Don Skow was born and raised in Edinburg, Texas. He graduated from Edinburg High School received his BS degree from Pan American College (now University of Texas Rio Grand Valley) with a major in mathematics and a minor in physics. He received a master's degree in mathematics from East Texas State University (now A&M-Commerce) in August, 1971. He taught thirteen years in McAllen ISD, 1966–1979, twelve of those years at McAllen High School. He coached number sense from 1970-1979.

He wrote two booklets: *No Sense in Mathematics*, 1980–81, a book on number sense shortcuts and mathematical topics and *Common Sense in Mathematics*, 1983, a problem solving book for mathematics teachers.

In 1986-87 Don and GeNelle Beck were appointed co-directors of the Texas UIL Number Sense contest before he took over as the state director of the number sense contest from 1987-2002. He wrote all of the number sense tests during these years on the high school, junior high (middle school) and elementary school levels. He was instrumental in helping to edit the rules requiring that answers to every tenth problem (estimation problems) on the test had to be an integer and in was instrumental in helping to get the “team” concept going.

In 1991-1992, he helped get the Texas UIL Mathematics contest started. He was the original director and test writer of the UIL Mathematics contest from 1991 to 2002. Don stated, “We needed a UIL Math contest event. A lot of high school students that were good in mathematics didn't care for the number sense contest because of the ten minute time period and having to learn a lot of short cuts.”

Items of interest 1987-2002

>>> Note: the number sense tests were labeled as series SS -ZZ from 1987 to 1993. The SS series consisted of 8 tests, SS-A,B,C,D to SS-1,2,3,4. The TT – VV series consisted of 8 tests, TT-A,B,C,D to TT-1,2,3,4 thru VV-,A,B,CD to VV-1,2,3,4. The WW – ZZ series consisted of 7 tests, WW-SAC,A,B, to WW-1,2,3,4 thru ZZ-SAC,A,B to ZZ-1,2,3,4. Test labels were changed to the year form, 1993-94 through 1999-00. These were labeled 934SAC,A,B to 9341,2,3,4 thru 990SAC,A,B to 9901,2,3,4. Test labels were changed again to 201 SAC, Invitational 201 A, Invitational 201 B, District 1 2001, District 2 2001, Regional 2001, and State 2001. The 2002 tests were labeled Fall 2001 SAC, Invitational A 2002, Invitational B 2002, District 1 2002, District 2 2002, Regional 2002, and State 2002. (see Timeline)

>>> Note: the rule change requiring the use of ' integers only ' on the estimation problems began with the TT-series (1986-87).

>>> **Special note: Interesting comments provided to me by Don Skow in 2019.**

"Beck and I worked together from 1985-1987. She wrote the tests the last year or two and I just traveled to SAC for her. She did the state meet and I never saw the tests except for the SAC test. I started writing them in fall of 1987. She quit after the 1987 state meet. I think you remember or you at least heard about the 1987 state meet where the girl from Sweetwater flipped her paper and it was blank. Mrs. Beck did not check the papers before the state meet or have one of her graders check them before the contest. Before I started, the director generally got graduate students to help grade or, once in a while, teachers. But, the girl from Sweetwater, if I remember hearing about the state meet still placed. When I started in the fall of 1987 as director, Janet Wiman and I had an agreement that the teachers (sponsors) could grade if they wanted to. First they would be better graders and if there was an error, they would find it. My student won 1st place in 1973 in 4A number sense (no 5A or 6A in those days). But it was only because we found an error on his paper when checking it during the unofficial inspection period. He went from 2nd to first because of an error on the answer key. They had to pick them all up and re-grade one problem. They didn't check the answer key very close but when I brought it to the attention of one of the graduate assistants, he agreed. Anyway, that's why I always let the teachers grade the papers when I began as director. Janet agreed because I was not teaching at UT and she knew it was right or wrong on a problem in math. ***

*** October, 1987... **Number sense test release dates**

- HIGH SCHOOL -				
Invitational Release Dates	December 5, 1987	January 9, 1988	January 30, 1988	February 27, 1988
Individual Release Dates	January 8, 1988	January 29, 1988	February 26, 1988	March 14, 1988
CONTEST	TEST NAME AND NUMBER			
Accounting	"	"	A - 880C	A - 880D
Calculator Applications	CA - 88-A	CA - 88-B	CA - 88-C	CA - 88-D
Informatics/Personalive	IP Topics-Set A	IP Topics-Set B	IP Topics-Set C	IP Topics-Set D
Literary Criticism	"	"	LC - 880C	LC - 880D
Number Sense	NS-A	NS-B	NS-C	NS-D
Ready Writing	"	"	RW Topics-Set C	RW Topics-Set D
Science	"	"	SS - C	SS - D
Shorthand	"	"	SH - 88-C	SH - 88-D
Spelling	**	**	**	**
Typewriting	"	"	TH-C	TH-D
* - No tests will be available on these dates. ** - The UIL does not provide invitational tests for spelling; however, tests can be obtained from: ASW Enterprises 1802 Sycamore Ardmore, Texas 79602 (No copies of these spelling tests can be obtained from the League office.)				
- JUNIOR HIGH -				
Invitational Release Dates	February 6, 1988		March 11, 1988	
Individual Release Dates	March 10, 1988		April 10, 1988	
CONTEST	TEST NAME AND NUMBER			
Calculator Applications	Practice #1		Practice #2	
Impromptu Speaking	IMP - 88-C		IMP - 88-D	
Number Sense	J-17		J-18	
Ready Writing	RW - 88-C		RW - 88-D	
Science	SC - 88-C		SC - 88-D	
Spelling	SP - 88-C		SP - 88-D	
- ELEMENTARY -				
CONTEST	TEST NAME AND NUMBER			
Listening	LIS - 88-C		LIS - 88-D	
Number Sense	E-147		E-148	
Ready Writing (3-4 grades)	RW/34 - 88-C		RW/34 - 88-D	
Ready Writing (5-6 grades)	RW/56 - 88-C		RW/56 - 88-D	
Spelling (3-4 grades)	SP/34 - 88-C		SP/34 - 88-D	
Spelling (5-6 grades)	SP/56 - 88-C		SP/56 - 88-D	

*** October, 1987... **Integer answers should not pose problems**

by Don Skow, Number Sense Director

You should be aware by now that this fall there will be four six-hour Student Activity Conferences. Six hours of Advanced Academic Training Credit will be offered for the teachers who attend seven mathematics sessions and the assessment session. Information and requirements will be available at the first 9:00 am session. It would be a good idea to bring a sack lunch.

If you cannot attend one of the conferences, send a self-addressed, stamped (440) envelope to the UIL Office requesting the material that will be handed out. It would be helpful if the number of the test being requested is written on the bottom left-hand corner of the envelope; for high school, request UU-SAC and for junior high, request J-SAC. If you want both tests, send two envelopes requesting the material separately. You will receive:

- (1) a copy of the test and answer key
- (2) a copy of the test problem sequencing for each level of the contest
- (3) a release date information sheet for the upcoming practice tests, and
- (4) any other material that might be handed out.

This year the main new idea on all of the tests will be that every starred problem marked with a (*) will call for an integer answer on all levels of the test. Last year it was only on the high school level. This shouldn't cause the student any particular problem except when writing the answer. For example, suppose problem #10 was: *10) $198 \times 201 = \underline{\hspace{2cm}}$ (Integer).

The exact answer is 39,798 and in the past, the 5% interval on the answer key would have been 37,808.1 - 41,787.9. On the answer key this year it will read, "An integer between 37,809 - 41,787 inclusive (inc.)."

On the tests, some answers are requested in a particular form at the end of the problem. If a problem specifies:

- (1) (decimal), we mean a decimal fraction,
- (2) (fraction), we mean a common fraction or an improper fraction, and
- (3) (Mixed Number), we mean a mixed number and not an improper fraction.

EXAMPLES:

(A) $2.3 = \underline{\hspace{2cm}}$ (fraction). The answer is $\frac{7}{3}$ and not $2 \frac{1}{3}$.

(B) 101 divided by 9 = $\underline{\hspace{2cm}}$ (Mixed Number). The answer is $11 \frac{2}{9}$ and not $101/9$.

I hope the above ideas will help you have a successful number sense year.

*** November, 1987... **Excerpt from *Academically Inclined* by Janet Wiman**

... This past week I talked with Mrs. Williams from Ingram whose son scored a perfect score on the math portion of the PSAT. She reported that he believes his preparation for number sense played a great part in his achieving a perfect score. She said he not only used the mathematical knowledge he learned from preparation for number sense but also benefitted from the techniques of working rapidly and doing calculations mentally. I hope that number sense sponsors will share this story with their students so they can see the practical applications of the activity to their present needs.

*** October, 1988... Invitational MATH/SCIENCE Meets

Invitational meets offer opportunities for large numbers of students to accept the challenge of UIL academic competition prior to the UIL District Meets in March.

There are several organizations other than the UIL that write test materials for invitational meets. The Texas Math Science Coaches Association has selected dates to complement the UIL invitational meet dates of November 19, December 10, January 21, and February 18. Their tests include number sense, calculator applications, and science for grades 9-12 on the following dates:

Tests #1 - November 5, 1988

Tests #2 - November 12, 1988

Tests #3 - December 3, 1988

Tests #4 - December 17, 1988

Tests #5 ~ January 14, 1989

Tests #6 - January 28, 1989

Tests #7 - February 4, 1989

Tests #8 - February 11, 1989

Tests #9 - February 25, 1989

Tests #10 - March 4, 1989

Each test from TMSCA sells for \$25.00. A check made to TMSCA should be mailed with the order to *JoNell Kesner*, Box 1485, Breckenridge, TX 76024. Calls may be made before 9 p.m. to Kesner at 817/559-9534.

The UIL does not offer high school spelling tests for invitational meets; however, spelling tests may be purchased from ASW Enterprises, 1802 Sycamore, Abilene, TX 79609 or by calling 915/677-9030.

Because the support organizations such as TMSCA and ASW Enterprises understand the difficulty invitational meet hosts face in writing tests and the desire they have to use fresh tests at their meets, the service they provide can make hosting an invitational meet on dates other than when UIL has materials, much more palatable.

*** October, 1988... Official Notices

Section 1009: Number Sense and Section 1045 Elementary/Junior High Number Sense:

(e) (3) Symbols. If a symbol is omitted from the printed sheet, it is not the responsibility of the contestant to include the missing symbol in the answer. Answers require only the writing of numerals.

(e) (5) Numerical Answers. Extraneous zeros are not to be used. For example, if .16 is the answer, 0.16 is not an acceptable answer.

*** February, 1989... **Team concept adopted for two math contests**

Academically Inclined by Janet Wiman

Beginning with the 1989 spring meets, both the number sense and calculator applications events will be expanded to include a team concept. The three entries to the district meet from each school will be the school's team.

The team score is determined by adding the scores of the three members of the team. The first place team from each district in number sense and in calculator applications will advance to regional **in addition** to the first, second and third place medalists in each event.

The results from each district will be different as it will be possible for between three and six persons to qualify to advance to regional in each of the two events. For example, if one or more of the medalists is a member of the team, fewer than six will advance to regional. If the first, second and third place medalists are from the same school they will be the first place team, and only three persons will advance to regional. It is predicted that the new concept will increase the number of qualifiers at each level by approximately 25 percent.

After district, team members who are not also medalists will compete only for a team honor. For example, the score of a person who advances to regional as a team member will not be considered when determining regional medalists. This may cause some difficulties in the beginning because it is different from science. In the science event, the top scorers who were not medalists have a chance at becoming a medalist at each level of competition.

The opposite is true of number sense and calculator applications where only medalists compete for first, second and third at regional and at state.

This new concept has several positives. It allows a larger number of contestants to advance, it requires no new tests, and it allows the contest to be administered with only a minimum of change. The district and regional contest directors have tally sheets to handle team scores.

Instructions will be included in the packets; however, sponsors are asked to be patient and help contest directors work out the details during this first year.

*** 1989 ... **First Number Sense Team Championships Crowned**

1A Plains – Chad Guetersloh, Lance Morrow and Layne Morrow. – Richie Cullins, coach

2A Shallowater – Karrie Alewine, Kevin Gravett and Heather Jordan – Gay Bratton, coach

3A Quitman – Jim Davis, Sam Hartin, and Evan Wilson – ???

4A Wichita Falls: Hirschi – Chad Gamble, Stephen Stringer, and Phi A. Tran – ???

5A McAllen – Homero Gutierrez, Oscar Cano, and Robert Vargas. – Leo Ramirez

Number Sense Team Event	
Conference A	
1.	Plains - Lance Morrow, Nieves Garcia and Layne Morrow
2.	Sterling City - Nicole McDonald, L. D. White and Manuel Lujan
Conference AA	
1.	Shallowater - Heather Jordan, Jon Jackson and Karrie Alewine
2.	Archer City - Chris Gray, David Foster and Derek Patton
Conference AAA	
1.	Orangefield - Robert Byerly, Bryan Oswalt and Douglas Wilson
2.	Wylie - Mark Lanman, David Doyle and Jody Bean
Conference AAAA	
1.	Wichita Falls: Hirschi - Chad Gamble, Stephan Stringer and Phi Tran
2.	Dayton - Curtis Daniels, Deane Webb and Jacqueline Darneille
Conference AAAAA	
1.	Mission - Fernando Rivera, Fafael Gonzales and Rene Reyes
2.	Lubbock: Lubbock - Linda Barker, Tom Zavisca and Nirjar Sridhara

*** September, 1989... Leaguer article:

Dropping the zero ... Time factor makes extra digit wasteful

By Don Skow, Number Sense Director

I agree textbooks use 0.27 instead of .27. But both forms are mathematically correct. In teaching elementary and junior high mathematics, it is important that students use 0.27 in their working of problems. The zero helps them in understanding the positional values of a digit. But once they know and understand the positional value of a digit, it is not necessary for them to write the zero. Remember a number sense test is only 10 minutes long. Placing a zero in the answer space takes time which a student does not have on the test.

You, as a coach, should be teaching your students how to take a number sense test.

For instance, leave an answer in improper form if the answer does not call for it in a particular form. Also, the average number sense student is not the average mathematics student in your classroom. It is easier to win at some UIL contests than it is for the student to win at a number sense contest.

At the UIL Student Activities Conferences held around the state last fall, no one objected to the rule change that I can remember. In fact, at the coaches' session, nobody seemed to care. If coaches have a comment, they should attend the student activities conference in any UIL event and let their voices be heard.

The rule change is to keep from letting a student have a margin of error over other students. This margin of error comes into being when the problem involves a decimal or percent problem. Let me give you an example.

Suppose problem #15 on a test reads, $.15 \times .18 = \underline{\hspace{2cm}}$. To work this problem, a student would use the double and half method; he would think $.30 \times .9 = \underline{\hspace{2cm}}$. The student thinks automatically of 270 and writes down a zero. He then realizes, "Oh no, it's .27!" and writes the answer as 0.27 and gets the problem correct.

That's the reason for the rule change and the margin of error.

*** November, 1989... **Excerpt from *Academically Inclined* by Janet Wiman**

... Persons not serving as graders will not be permitted in the science, number sense, and calculator applications grading rooms. Members of a number sense and calculator applications team may be substituted and a team competition will be added to science.

>>> Note: sometime in the early 1990's the original "**Problem Sequencing**" chart was created to help guide the new sponsors and coaches. See Addendum for the current chart.

*** February, 1990... Leaguer article:

Building a champion ... Notes from state team math winners

by Janet Wiman ... Academically Inclined

State championships carry prestige for the school as well as for the students and coaches. Such accomplishments verify that students are willing to work harder than usual, coaches are putting in extra hours, and the administration and community value achievement.

During the 1989 UIL Academic State Meet, the first state team champions were crowned in number sense and in calculator applications. Bishop, Port Neches- Groves, Quitman, and Wichita

Falls Hirschi each had a state championship team. Believe it or not, Plains (A), Shallowater (2A), and McAllen (5A) high schools won the state team championships in both number sense and calculator applications.

•*What is at work in these schools that produces math team champions?*

Leo Ramirez, math coach at McAllen High School, says his school has built a tradition around excellence. Traveling with his teams to meet the best and planning for success from the beginning rank high on his list. He says his teams set goals which focus on individual and team needs. His students work harder to maximize their individual abilities in order to help the team reach its full potential.

"The participation in UIL has aided his students in getting scholarships, Ramirez says. "During the 1980's, McAllen number sense and calculator applications students have accepted approximately \$600,000.00 in scholarships. It should be evident why each team member makes the sacrifices necessary to be successful!"

From the two McAllen High School 1989 championship teams, Homer Gutierrez is at MIT and Robert Vargas is at Stanford. Oscar Cano is at the University of Texas Pan American, and Javier Nino is currently a sophomore at McAllen High. Gutierrez and Vargas were on both teams. Richie Cullins, Plains number sense coach, said the math and science events complement each other, and he gives credit to coaches Macky McWhirter, Larry Devitt and Eric Banfield for working together.

He also commends all of the Plains teachers for helping. The administration at Plains has also demonstrated its support and approval of the program. "Without administrative support, a math and science competitive program would be difficult, if not impossible, to maintain," Cullins said. "The people of Plains have also shown tremendous interest and support of our UIL program. It makes a big difference to know that the work and the time that is invested is appreciated by the community."

The same three Plains students won the state championships in both number sense and calculator applications. Lance and Layne Morrow are still in high school. Chad Guetersloh, who currently is a freshman at Baylor University, said, "Number sense and calculator applications helped my reasoning and thinking ability, as well as my test-taking ability."

He added that the competition he went through in UIL helped to lower his test anxiety and, therefore, increased his efficiency in test taking. In addition to helping them with ACT and SAT tests, both Morrows said they believe that number sense and calculator applications exposed them to more math concepts than they might see in the standard math curriculum.

Gay Bratton, Shallowater coach, said that her team members' willingness to make sacrifices of personal time in order to excel was critical to Shallowater's success as the students were also involved in other school activities such as athletics, band and twirling. Bratton said he believes that attending math and science tournaments throughout the year helped her students show great improvements.

Both Shallowater and Plains coaches indicated a friendly rivalry with neighboring schools is highly motivating, and each coach cited the other school as a 'friendly rival'.

Kevin Gravett, Shallowater, summed it up when he said, "It was a real thrill to be on the first UIL championship team in both number sense and calculator applications."

Team member Heather Jordon sent a message to the 1990 contestants: "We hope to win again."

All three coaches said they believe that the teams' successes have had positive influences on their schools and their belief in the importance of the pursuit in academic excellence.

All three agree that building a program takes a long term commitment, and they recognize teachers, parents, school administrators and community support as key elements of success. Individual state championships are tremendous honors for schools. Developing a program that produces a team championship is especially difficult and rewarding. Having dual championships is absolutely phenomenal!



Plains ... 1A



Shallowater ... 2A



McAllen ... 5A

***** February, 1990... Sound off! Watches that emit audible beeps banned**

There have been numerous questions about the use of watches/timing devices that emit audible signals in the number sense and calculator applications contests. For the 1990-91 school year, the wording has been clarified.

For the 1990 Spring Meets, however, contestants must follow the wording as it appears in the C & CR. The wording states "Students shall not use a timing device that emits an audible signal."

For this year, contestants should not plan to use such a device, even if the timing feature is turned off.

The instructions to contest directors reflect this wording, and the Contestant Certification Form will read: *This is to certify that during the contest I will abide by the instructions to refrain from using tape players, radios, and timing devices watches that emit audible signals. I also understand that timing devices/watches that are not equipped to emit audible signals are permitted.*

For district, regional and state competition, students and sponsors are requested to adhere to the current wording and to assist contest directors to make this rule easy to implement.

UIL rules are enacted to solve problems. This rule was initiated to provide a quiet, uninterrupted testing period for the students.

***** October, 1990... THE NUMBERS TELL THE STORY.**



Mission High School sophomore Fernando Rivera III (left) tied with Todd Biesel of Longview and Linda Barker of Lubbock for the 1989-90 Conference 5A state number sense championship. In addition, Rivera — shown here with his coach, Adelina Alaniz — won the Texas Math/Science Coaches Association state meet, and led the Mission number sense teams to sweepstakes trophies in both TMSCA and UIL meets. Since winning his first trophy at Los Fresnos, he has won 85 trophies, 11 gold or silver medals, and numerous ribbons and plaques. Alaniz teaches at K. White Jr. High, but coaches the high school team.

*** November, 1990... **Excerpt from *Speaking of Which* by Treva Dayton**

The proposal to add number sense competition for the third grade was not approved, although strong interest was evident.

Concern was expressed that number sense, in the current format that requires quick computation without the use of pencil and paper, was not the most appropriate math contest for students at this grade level. The proposal has been referred to the UIL staff for further study, and we will be working with elementary math educators to decide what contest format would best meet the needs of these younger students

*** September, 1991 ... **1991 Denius-UIL Sponsor Excellence Award**

Fourteen teachers and activities sponsors have been selected as finalists for the 1991 Denius-UIL Sponsor Excellence Award, UIL Director Dr. Bailey Marshall announced.

The group was reduced to 14 from a list of 113 by a panel of judges.

In its first year, the Denius-UIL Sponsor Excellence Award seeks to highlight the contribution of sponsors to UIL scholastic competition.

"The award was created to identify and recognize outstanding sponsors who assist students in developing and refining their extracurricular talents to the highest degree possible within the educational system while helping them to keep their personal worth separate from their success or failure in competition," Marshall said. In mid-September, a panel of judges will select 10 winners, each of whom will receive a \$1,000 check.

- Leo Ramirez, McAllen HS, Number Sense and Calculator was selected as one of the 10 winners of the first ever Denius-UIL Sponsor Excellence Award.

Other number sense sponsors nominated:

James M. Anderson, San Antonio Roosevelt I IS, Number Sense and Calculator;

Jack E. Barton, Lubbock Dunbar-Struggs US, Number Sense and Calculator

Patricia Kelley, Cleveland Tarkington HS, Number Sense and Calculator

Larry D. White, Sterling City HS; Number Sense and Calculator

Joan Clark, Utopia HS; Number Sense and Calculator

Esther Harrison, Shelbyville HS; Number Sense

Leroy Kanemeier, Lockhart HS; Number Sense and Calculator

Erminie C. Minard, Alvin HS, Number Sense

Marilyn Rollins, Midlothian HS, Accounting and Number Sense

*** September, 1991 ... **Study packet for first-year math contest is available**

by Don Skow, Number Sense Director and now the new Math Contest Director

First, I would like to say how excited I am about this new UIL event and the fact that I am going to be the director of this new contest. For those of you who are number sense sponsors, do not worry, I will still be the director of that contest. I hope this new contest will add new sponsors and students to this contest that do not necessarily compete in the Calculator Applications, Number Sense or Science Contests.

The new event will be known as the Mathematics Contest.

If you have not yet received or read this year's UIL Constitution, the contest procedures will be as follows.

First, it will be open to all five conferences and it will also have a team competition. The test will consist of 60 problems in a time limit of 40 minutes. No calculators will be allowed on the test. Only pencil or pen and scratch paper will be allowed. Each question will be multiple-choice, A through E, where E will always be "None of these." Each correct answer is awarded 5 points and each incorrect answer loses 1 point. If a problem is left unanswered, no points will be deducted or added for the problem. The test covers Algebra I through Elementary Calculus. There will no set pattern on how the problems are arranged on the test or how many of each type of problem from each subject area will appear on the test.

Since this is a new contest, no previous tests are available. But, you are lucky! Check this year's UIL Academic Order Form. I have written two tests that the UIL will offer for your students to take them during the 40 minute time limit. This way your students will have an idea of what the contest is like.

Besides buying the two practice tests, meet me at one of the four Student Activities Conferences this fall. We will have a one hour session and I will give a mini-test during the session. It will consist of a special 15 minute test that contains 23 problems. You will enjoy it! Do not miss the Student Activities Super Conference in your region.

*** November, 1991 ... **Ex-number sense champ says thanks**

Editor's note: The following letter was received by Janet Wiman, UIL academic director, from Kevin Massaro, a graduate of Ingleside High School.

Dear Ms. Wiman:

Thank you for your help regarding the UIL academic competition program. It is exciting to hear the program has grown to its present level. I hope we can arrange a similar program for Colorado.

My own experience with Number Sense tells me the value of the program. What you learn in UIL competition stays with you long after you leave high school.

I competed in Number Sense from 1972-1974. I had a goal of winning the 2A state championship. I came close...third, anyway. It taught me to focus on a goal, and to direct my activities toward that goal — even over the summer.

The actual skills learned help me now. I use them every day. Remembering a phone number is easy once you've trained yourself to remember the powers of 2 up to 2^{20} (1,048,576), and literally dozens of formulas.

I can still do (most) math in my head faster than most people can enter it into a calculator.

That helps when you are negotiating, and people try to slip one by you. (Buying a car is an everyday example. I caught a \$750 "inadvertent" mistake when I tried to buy my last car just from calculating the payment in my head. That was not the first time, either.)

This is 17 years after I competed. You are also correct in saying that Number Sense raises SAT scores better than anything else, but don't stop there. The Graduate Management Admission Test (GMAT) was a series of 25 minute tests, resembling little number sense tests. I could finish and check my work in 11-14 minutes and spend the next 10-15 minutes watching everyone else in the room sweat until the bell rang.

Business school wasn't for me, so I applied to the University of Denver School of Law.

Standing in the way was the Law School Admission Test (LSAT). While it was considerably more difficult than the GMAT, the analytical and logical reasoning sections comprising 2/3 of the test were just more complex number sense word problems. The ability to think and reason quickly...under pressure...is finely honed by those little 10 minute tests.

There was a note on the board at Law School recently offering to pay for help to get a certain score on his second try at the LSAT.

My advice was to just get a pile of Number Sense tests and work until you're good at it.

I did well enough on the LSAT to get a tuition reimbursement scholarship of \$2000 per year for 4 years. Add that to my \$1250 from the Houston Endowment, and I can directly attribute \$9250 to Number Sense.

I had help, of course, and I am also a good student. Dolly Crawford of Ingleside High School was a world class coach. Without her hours and dedication, I could not have done nearly as well.

Does Number Sense work? One of the skills you develop is pattern recognition. If I see 69×51 , I immediately see the familiar $(a^2 - b^2)$ and know that the answer is 3519.

Troubleshooting electronics, you look for patterns. In law, you look for patterns, too. The term in law school is issue spotting. It is pattern recognition all over again. Instead of looking for a binomial, you look for the elements of assault, or unconscionability or.... Number Sense teaches you to think...quickly and under pressure. Its value transcends the mathematical problems you learn to solve. I would recommend it to anyone planning to get a graduate degree, or go to a competitive school, or anyone who wants to learn to think analytically and quickly.

I was surprised to see that Colorado did not have a similar program. Perhaps with your help, the climate in Colorado is favorable toward starting a similar program. I can't imagine a better use of school money than copying the UIL academic competition program. Thanks again

*** January/February, 1992 ... **UIL/Denius Award recipients profiled**

LEO RAMIRES, SR. is a math teacher at McAllen High School in the Rio Grande Valley. He has coached number sense for 18 years and calculator applications for 11 years. In 1989, both his calculator applications and his number sense teams won the first state team championship offered in these two events.

Because he saw, first hand, the value and motivation math competition can have for students, he helped organize the Texas Math /Science Coaches Association and served as its first president.

His peers say he is a "mover and shaker of mathematics in Texas" and describe him as a dedicated teacher who loves what he does. His interest in and ability to work with both high and low achievers has become his trademark. Superintendent Pablo Perez says, "Leo's flexibility in working with students, teachers, and the community has earned him an enviable reputation as an excellent teacher who truly cares."

Leo says he knew as early as the first grade that he wanted to be a school teacher.

"Coaching has allowed me to impact many individuals," he said. "Students that I coach, teachers that I assist through lectures and materials that I write, and direct involvement with UIL in its legislative process all revolve in my love of education. I love what I am doing. I have tried to demonstrate that love in everything I do and for everyone that I meet."

He said he works to make contests fun for his students.

"Students are taught that competition is fun; it is not a life or death situation," he said.

"Students learn that the focus of competition should be on preparing for success but being satisfied at giving your best effort. Students never dwell on failure, instead they learn how to use failure to become a better individual."

During the past 18 years, his UIL students have been awarded more than \$750,000 in scholarships with \$250,000 going to his 1991 graduates. His graduates are pursuing higher education all across the nation: many in prestigious Texas universities as well as MIT, Princeton, Penn State, and 12 have gone to Stanford. "As a testament to his portraying the teaching profession in such a positive light, from this group, half have expressed interest in becoming teachers," Wiman said. "It is a pleasure to recognize this dynamic and enthusiastic teacher."

*** April, 1992 ... Leaguer article

Sharing the Journey to Excellence by Andy Zapata, Azle High School



EDITOR'S NOTE: The following article first appeared in the January, 1992 issue of the Texas Math/Science Coaches Association newsletter.

My daughter, Elizabeth, is a 5th grade student. Recently we had a conversation related to her joining the elementary math team that represents her school. Part of me was proud and part of me harbored a tinge of regret. I've been working with UIL math and science students for sixteen years and I realized that my daughter is going to have to learn that there is a price to pay to become good at something. Right now she's still into dolls and playing "teacher" or "nurse" or "mommy" to her younger brothers. Now at the same time our elementary school is beginning to open this child's eyes to piano lessons, choir, school skits, and yes, math team competition. Don't get me wrong. I would be very happy to see my eldest participate in what I believe is the best way to learn about competing in our sometimes harsh world. I just wanted her to ease into it a little later.

Elizabeth doesn't have an HP in her purse, nor does she remember her multiplying by 25's rule very well. She does enjoy going to some of the math meets with me but usually as grader helper. Maybe one day she will become more concerned about competing, but for now visiting with the "big" kids on math trips and helping dad eat donuts at the tournaments in the grading room seems to suit her fine.

Sometimes I feel that some of the student competitors that I work with have my daughter's present attitude toward work and competition. It frustrates me to watch a student with obvious

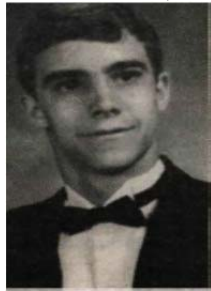
math and science abilities just sit there. I've been in this coaching business long enough to have bushels of ways to motivate them, and yet it seems the logic of self-improvement for scholarships or standardized tests is defeated by a baseball or a clarinet, or just plain greed. Needless to say I don't see a lot of appreciation for delayed gratification. The part of my motivational speech that deals with working 10 tests a day to get up their number sense score in a month only seems to turn the students off and not on.

After thinking about their apparent lack of dedication, I decided that one of the problems I had to solve was finding out each child's reason for being on the math team, so that I could personally as well as collectively motivate each child on the team. Then I considered my own reasons for working with the students to see if there was a connection. In most cases I found that the students shared pretty much the same goals as me.

Knowing this and sharing the similarities with the students seems to get them motivated. I've learned not to look so far down the road in the math team competitions, and I tailor the practices to allow as many students as possible to reach a personal goal. This doesn't guarantee that my students practice super hard every time we get together as a team, but it does make them aware that I share some of their goals, and yes, some of their frustrations. It doesn't mean that I quit trying to motivate my students. No, I just try to use the dialogue of goal setting to be more aware of what their goals are so that their journey to excelling in math and science competition can be shared.

Yes, my daughter one day will have to give up her play time with the dolls to achieve some goal. Hopefully she will have someone with the insight and ability to help her sort out her goals and push herself to achieve those goals. I hope she does stay with the math team program here in Azle. It should be an interesting learning experience for both of us.

***** April, 1992 ... Testimonial from Dennis Haar, Sterling City High School Conference A**



"The four years of my high school UIL experience have meant a great deal to me. The competition gave me a new thirst for knowledge. I not only gained knowledge outside the classroom that benefited my contest, but I learned to take the information that I gained in my regular classes and apply it to my contest. This is where I realized how to take my knowledge and apply it to the real world. Without the UIL I would not be where I am today, and I would like to thank you for that."

***** May, 1992 ... TILF's Stark scholarship 'changed my life**

Dr. Marshall:

I am writing to thank the Texas Interscholastic League Foundation and the donor/administrator of my scholarship for choosing me as a scholarship recipient. I received the Nelda C. and H.J. Lutcher Stark Scholarship in 1988.

When I received the Scholarship in 1988, I was appreciative but I did not realize how big of an impact the scholarship would have. Today, I am beginning to see how the scholarship actually changed my life.

I will be graduating with a degree in electrical engineering from Texas Tech in May.

I will also begin working for Amoco Chemical Company near Alvin, Texas, in June. The Stark Scholarship shares in the credit of these two accomplishments.

The scholarship did several things for me. First, the scholarship enabled me to not have to work to pay for the majority of my college expenses. Since I did not have to work, I was able to devote all of my time to my studies. The extra study time permitted me to major in electrical engineering. Without the scholarship, I would have been forced to select a different major.

Competing in the UIL academic events of number sense, calculator applications, and science in high school prepared me for the college environment. The Texas Interscholastic League Foundation gave me the opportunity to further my education in a field that I thought would not be possible. I will forever be indebted to the TILF for the scholarship that I received. I hope to be able to repay some of it in the future by contributing to the Texas Interscholastic League Foundation. Thank You, Shane McMinn

*** September, 1992 ... Legislative Council approves changing the mathematics contest scoring from 5 for correct and -1 for incorrect to 5 for correct and -2 for incorrect. Also, the number sense contest for 4th grade students was reinstated.

*** November, 1992 ... **Denius Awards presented to 10 outstanding coaches**

Second year grants highlights contributions of sponsors to UIL academic, athletic and fine arts competitions. Ten University Interscholastic League (UIL) sponsors in extracurricular activities, four in academics, three in athletics and three in fine arts, have been selected as winners of the 1992 Denius- UIL Sponsor Excellence Award, UIL Director Dr. Bailey Marshall announced today.

A panel of judges selected the 10 winners from a field of 89 nominees submitted by school principals and superintendents from across the state. The 10 winners will each receive a \$1,000 check from the UIL. In its second year, the Denius-UIL Sponsor Excellence Award seeks to highlight the contribution of sponsors to UIL scholastic competition.

The award was created to identify and recognize outstanding sponsors who assist students in developing and refining their extracurricular talents to the highest degree possible within the educational system while helping them to keep their personal worth separate from their success or failure in competition. Number Sense recipients were:

- **Erminie Minard** -- For 17 years Minard has been the sponsor, of number sense at Alvin High School and the last 12 years she has also coached calculator and science competitions. In addition, Minard has been the UIL academic coordinator since 1981. Minard has had a number sense student advance from district to regional competition every year for 17 years and the same in calculator for the past 12 years with the exception of 1990. In 1984, Minard coached state champions in number sense and calculator.

- **James Anderson** – Anderson, San Antonio Roosevelt High School, has been a sponsor of UIL activities for 33 years. He has been a sponsor of number sense since 1959, calculator since 1980 and current issues and events the past two years. Students of Anderson have won eight state

championships in three different UIL events. Anderson has produced 40 regional winners in several different events and he had 150 students win or place in district competition.

*** May, 1993 ... Excerpt from ***JH/Elementary Update*** by Treva Dayton

Another change for next year is that the number sense contest has been reinstated for the fourth grade. This grade level was deleted because many sponsors were concerned that the difficulty level of the test led to a negative math experience for some younger students.

But since then we have heard from a number of sponsors, and quite a few fourth graders as well, indicating that they are perfectly capable of acing the test, and in fact can be competitive with older students! So the fourth grade level is back in the contest plan, although the tests provided by the League will be the same as that used in fifth and sixth grade competition. Schools continue to have the option of selecting which elementary and junior high contests will be offered at local meets, and for what grade levels.

*** May, 1994 ... **1994-95 High School Academic Rule Changes**

Sections 920, 924, 928, 932, 940, 942, 944, 952, 960 and 1001: SUBSTITUTIONS: All Team Events: Accounting, Calculator Applications, Computer Science, Current Issues and Events, Literary Criticism, Mathematics, Number Sense, Science, Spelling and Vocabulary, and Cross-Examination Debate.

If a member of a school's winning team is unable to compete, ONLY ONE SUBSTITUTION MAY BE MADE IF MORE THAN ONE MEMBER OF A TEAM IS UNABLE TO COMPETE, THE ALTERNATE TEAM WILL THEN ADVANCE TO COMPETITION. (School district administrators will determine just cause for a substitution to be made.)

*** December, 1994 ... **Denius Award recipient**

• **David White** is UIL academic coordinator at Stamford High School, where he also coaches what is possibly the most successful math program in the state. Last year, on the strength of state winners in number sense, mathematics and calculator applications, Stamford won the 2A state academic championship. He has orchestrated growth in participation from only two high school math participants to a program that involves more than seven percent of the student body in grades 7-12.

*** November/December, 1995 ... **Legislative council approves proposals**

• Allow teams to add a fourth member at the district level in Accounting, Calculator Applications, Computer Science, Current Issues & Events, Literary Criticism, Mathematics, Number Sense and Spelling & Vocabulary.

The Texas Math and Science Coaches Association has requested four member teams for math events for the past three years. 1993 survey results indicated that schools were strongly in favor of having four-member teams at the district level. The academic staff joined in support of the TMSCA proposal for all team events, with the exception of Science, which already permits as many as six entries at the district level. Approval of this amendment is expected to increase contest participation at the district level by as many as 9,500 students, based on 1994-95 district participation statistics, without changing any rules or procedures at the regional and state level.

*** September, 1996 ... **Constitutional amendments effective this school year**

At the district level only, a fourth team member may now compete in accounting, calculator applications, computer science, current issues & events, literary criticism, mathematics, number sense, and spelling & vocabulary. To determine team scores, only the top three scores of each school's team will be tabulated. The top team of three students will then advance to the regional level of competition.

*** March, 1997 ... **Denius Award recipient**

- Longview High School math teacher **Hugh Bob Wylie** has had at least one student advance to the UIL Academic State Meet in either number sense, calculator applications or slide rule in 23 of the last 27 years. Wylie, who has taught at Longview since 1955, was named one of this year's 10 recipients of the UIL/Denius Excellence Awards. The school held a ceremony to commend him. Flanked by more than 100 trophies won by students over the years, Wylie accepts congratulations from UIL academic director Bobby Hawthorne.

*** September, 1996 ... **Committee rejects, tables team proposals**

Math competitions allowed to advance only one team to state

A Texas Math/Science Coaches Association proposal that would have allowed two Calculator Applications, Mathematics, Number Sense and Science teams to advance from region to state was rejected by the UIL Standing Committee on Academics.

Another proposal to add team points for journalism was tabled for further study. These actions highlighted the committee's deliberations, held June 11 in Austin. Its recommendations now go to the full council, which meets Oct. 19-20 in Austin.

The request to advance two teams from region to state has been offered several times in the past few years but rejected for a variety of reasons (see sidebar by David Trussell). Academic Director Bobby Hawthorne said the staff would not consider a proposal that did not include advancing second place teams in all team events.

"The problem will be securing classrooms for all team events," he said. "If large classrooms are not available, we'd be forced to conduct Conferences A through 3A in one room and 4A and 5A in another.

It would be a major change from current practice, but just because we've always done it one way doesn't mean we can't do it another."

The proposal would also impact judging and would greatly increase the pool of qualified applicants for TILF scholarships.

*** January, 1998 ... **Denius Award recipient**

- **Janet Doyle**, Pharr-San Juan-Alamo North High School, has served as UIL coordinator for PSJA ISD for 25 years, sponsoring prose and poetry interpretation, number sense, calculator applications, science, persuasive and informative speaking, literary criticism and one-act play. During her tenure, Doyle has sponsored 26 district winners in prose, resulting in eight state contenders and one state champion.

Eight of Doyle's former UIL competitors are now back in the PSJA school district teaching and coaching UIL events.

"There is nothing as important as self-confidence and self-esteem in a young person's life," Doyle said. "If I, as a UIL coach, can help a young student to stand in front of a group and read, recite or act with confidence and pride as they develop a love of good literature then I have done my job well."

• **Gary Hicks**, Fort Worth Dunbar High School, has served as sponsor of the math and computer science club for 16 years. He organized the first invitational number sense-slide rule meet for all Fort Worth high schools in 1970 and has been instrumental in Fort Worth's participation in UIL activities ever since. His computer science team had the distinction of never losing a written contest in any UIL practice, district, regional or state meet for seven consecutive years. In 1994, Dunbar was named UIL State Academic Champion.

"Our school motto is 'It Can Be Done.' Believing that we can succeed is critical to success," Hicks said.

"I have seen few students who are not motivated by the challenge to achieve or create something that is better than what exists. Winning is not coming in first place. Winning is leaving something better than you found it."

***** January/February, 2000 ... 15 receive honors for excellence from Southwestern Bell**

Fifteen University Interscholastic League (UIL) sponsors of extra-curricular activities, including nine in academics and three each in athletics and music, have been selected as winners of the 1999 UIL- Southwestern Bell Sponsor Excellence Award.

A panel of judges representing the areas of music, academics and athletics selected the 15 winners from nominees submitted by school principals and superintendents statewide.

Southwestern Bell will provide each recipient with \$1,000 and a symbolic memento.

In its ninth year, the UIL-Southwestern Bell Sponsor Excellence Award seeks to highlight the contribution of UIL sponsors. The award was created to identify and recognize outstanding sponsors who assist students in developing and refining their extracurricular talents to the highest degree possible within the educational system, while helping to keep their personal worth separate from their success or failure in competition.

"The benefits of interscholastic competition and student performance are made possible by dedicated directors, sponsors and coaches," UIL Director Dr. Bill Farney said. "The University Interscholastic League salutes all of these outstanding educators."

The UIL-Southwestern Bell Sponsor Excellence Award was originally made possible by a grant from the Effie and Wofford Cain Foundation, in honor of Frank W. Denius, who has been a director of the Cain Foundation since 1955 and Executive Committee Chairman from 1983 to the present time. The partnership between Southwestern Bell and the UIL began in 1997. Through this union, Southwestern Bell joins the UIL in its efforts to strengthen and promote the role of extra-curricular activities in Texas.

Southwestern Bell's support not only enhances the quality of the Sponsor Excellence Award but of all UIL programs. The UIL-Southwestern Bell Sponsor Excellence Award recipients for 1999 include (Number Sense recipients):

• **Dennis Cabaniss, Salado High School**

In the eight years Cabaniss has taught at Salado High School, he has sponsored three state champion math teams, three state champion number sense teams and, as UIL coordinator, one state academic championship.

"I believe in competition as an integrated part of a school's basic education mission," Cabaniss said. "I see it as a vehicle that drives students to levels of mental and physical fitness, which might not otherwise be reached.

The essence of competition lies in the improvement that results from practice and in the experience of measuring oneself against one's own potential and the skill of another individual." His principal, Mr. Marvin Agnew, sees the value of teachers such as Cabaniss.

"His work ethic and character are positive influences on the school and community and has been for years," he said. "A by-product of our UIL math program is a large portion of our students take the most challenging of math courses in high school, which resulted in 23 members (out of 75) of the class of 2000 scoring over 500 on the SAT math test."

• **Jose E. Cuellar Santa Rosa High School**

Cuellar, who coaches Number Sense, Calculator Applications and Mathematics, spends most of his Saturdays on the road taking students to over 20 invitational meets each year. He has taken students to state seven of the last eight years, and last year his Number Sense team won the state championship, earning the highest score in all conferences, 1A-5A.

"Our students have learned a tremendous amount of mathematics through UIL competition," he said. "Being UIL competitors, students are challenged and energized by competition. They develop confidence and improve their self-esteem. The UIL competition is a strong motivational tool that greatly enhances their education."

His superintendent, Dr. Roberto Rodriguez, sees a lot of good qualities in Cuellar.

"Because he has a vision for his students, he has the tenacity to get the job done," he said.

"Because he is dedicated, it is a pleasure to work with him. Because he is so focused, he is a great person to know."

*** January/February, 2001 ... **16 receive honors for excellence from Southwestern Bell**

Sixteen University Interscholastic League (UIL) sponsors of extra-curricular activities, including nine in academics, three in athletics and four in music, have been selected as winners of the 2000 UIL-Southwestern Bell Sponsor Excellence Award. The partnership between Southwestern Bell and the UIL began in 1997.

Through this union, Southwestern Bell joins the UIL in its efforts to strengthen and promote the role of extra-curricular activities in Texas. Southwestern Bell's support not only enhances the quality of the Sponsor Excellence Award but of all UIL programs. The UIL-Southwestern Bell Sponsor Excellence Award recipients for 2000 include (Number Sense recipients):

• **Jeanell Cole, Bridgeport High School**

Numbers rise to the top when talking about Cole. Under her direction, math students at Bridgeport swept all three math events three of the past five years at state competition. Between 1995 and today, students under her direction have won individual medals 10 times in Number Sense, seven times in Calculator and 11 times in Mathematics — and that's just at state competition where Bridgeport has won the state championship five of the last six years.

"Jeanell strives to use every resource available to her," principal William Thetford said.

"Probably her greatest resources are the time she devotes to her students and the dedication of her students in working to be the best they can be."

Cole strives to give her students the direction and resources to become successful not only in UIL, but in the classroom and life.

"Every student has some competitive spirit," she said. "We as educators must be driven to help them realize that success is not measured in victories, it is measured in how students feel about their performances. No student goes into a contest wanting to lose. I want to teach them to be proud of their best effort and to learn from their experiences in everything they attempt to do in life."

• **Erminie Barbara Minard, Hightower High School, Missouri City**

One of the first, if not the first, second generation Sponsor Excellence Award winners, Minard has spent the past 21 years coaching and training students for UIL number sense, calculator applications, mathematics, science and spelling. Her mother, Erminie C. Minard, was recognized with this same award in 1992. Erminie B. Minard began a program at a new high school and, without having a senior class, has taken six students to state in the last two years. In addition to her work on the high school level, she has worked all aspects of UIL, ranging from the second grade, through middle school and into high school.

*** April, 2001 ... *"Through my involvement in UIL Mathematics and Number Sense, I was able to drastically improve my math skills, and UIL Persuasive Speaking »helped in my English courses. I also found that UIL meets were excellent opportunities to meet people."* Nikki Clark Rankin High School

*** January/February, 2002 ... **15 receive honors for excellence from Southwestern Bell**

Fifteen University Interscholastic League (UIL) sponsors of extra-curricular activities, including nine in academics, three in athletics and four in music, have been selected as winners of the 2001 UIL-Southwestern Bell Sponsor Excellence Award. The partnership between Southwestern Bell and the UIL began in 1997.

Through this union, Southwestern Bell joins the UIL in its efforts to strengthen and promote the role of extra-curricular activities in Texas. Southwestern Bell's support not only enhances the quality of the Sponsor Excellence Award but of all UIL programs. The UIL-Southwestern Bell Sponsor Excellence Award recipients for 2001 include (Number Sense recipients):

• **Faye Parish, Bridge City High School, Bridge City**

For over 20 years, Parish has nurtured the talents of interested students through the Bridge City High School UIL math and science program. Under her guidance, the UIL academic program at the school has come from finishing last in district competition to being a perennial sweepstakes winner. In the last five years, Parish's teams have been first in number sense, calculator applications and mathematics in district. The calculator applications team has placed first for 10 years.

"The greatest thing we as teachers can do for our students is to teach them how to learn," she said. "Facts may be forgotten, but if we teach them how to learn we are preparing them for the future. Some of the careers that our students will work in are yet to be developed, therefore facts are not enough. Competition encourages students to learn."

Her principal knows her by another name. “In Bridge City, Faye Parish is known as Mrs. UIL,” he said. “Her knowledge of UIL rules and procedures are invaluable. When the district sought to expand the UIL literary program, Faye was the leading force in the recruitment of new teachers who shared her values and enthusiasm. She does not seek recognition for herself, rather is thrilled by the success of her students.”

*** November/December, 2002 ... Leaguer article

Taking the ‘tie’ out of tiebreakers

Amount of people advancing bring changes to methods to break deadlocks

by Bobby Hawthorne, Academics Director

For a guy who has avoided mathematics since the third grade, who has never balanced a checkbook in his life, who majored in journalism because its degree plan then required no more math than was needed to figure out the tip for a cup of coffee and a Manske roll at the old 2-Js on the Drag, I’ve been giving mathematics a lot of thought lately.

Not in any deep, abstract, philosophical way, of course. Oh sure, I’ve tried to understand the calculus that would allow Washington State to leapfrog the Texas Longhorns in the BCS standings, but I’ll fully grasp Godel’s Theorem before I understand college football rankings or any statistical equation that places UT behind Oklahoma in anything beyond poultry science or tornado studies. (*editor’s note: this column was written prior to the UT-Texas Tech football game*)

And recently, I read the liner notes of Stephen Hawking’s *A Brief History of Time*. So I’m not totally math challenged. Still, I don’t generally spend an inordinate amount of time contemplating ordinates. Or fractals. Or vectors.

All that’s changed, and I blame Jim Seale of Waco Midway. Here’s the story: last spring, I proposed that the UIL install tie-breakers in the various academic contests where they do not exist. Why? Because we’ve expanded participation to the point that we’re swamping district and region meets — and may deluge State Meet as well.

Consider, for example, District 30-A. It consists of 13 schools. Each school is eligible to enter four students in the academic contests that contain a team component. In number sense, for example, that’s 52 kids.

How many Conference A schools have classrooms large enough to seat 52? And even if they have one, do they have three more because they’ll need at least four in order to host a district meet, given that accounting, literary criticism, science and spelling and vocabulary take place simultaneously unless the district spreads the meet over two or three days.

My tie-breaker proposal wouldn’t change this, and I mention it only to buttress the point that participation in UIL academics continues to expand. The more pressing problem is at region. Each region consists of eight districts.

Again, let’s consider number sense. The top three individual winners advance as well as the first place team and one wild card team. Though it’s unlikely to occur, it’s possible that 60 students could advance to the regional meet (24 individuals, 32 first place team members, four wild card team members). While it may not stretch the facilities (and patience and stamina) of some of the larger universities, it poses a considerable challenge for the smaller ones.

Allowing ties to advance further strains the system. Last spring, one district advanced six individuals to region: first, second and a four-way tie for third. Granted, this happens rarely, and there’s a legal axiom that bad cases make for bad law. Still, eliminating ties can restore balance

to the program and calm a few of our regional directors' jittery nerves so I proposed tie-breakers for current issues and events, literary criticism, mathematics, number sense and science teams as well as calculator applications, number sense and science individuals.

I had it all worked out. In the event of a tie, judges would invoke the formula for percent accuracy, which divides the number of problems attempted by the number of problems correct. It's cumbersome but entirely doable.

This is where Jim Seale comes in. Jim correctly surmises that using the formula for percent accuracy would fundamentally change the delicate balance between speed and accuracy so critical to the nature of the number sense contest, and several of his colleagues with the Texas Math/Science Coaches Association agree. This is months after the Academic Committee of the Legislative Council passed the proposals, and less than a week before they're taken up by the full Legislative Council in mid-October.

So now I'm thinking about math a lot. I'm wondering, "How am I going to convince the Academic committee to table the proposals on the thin assumption that I know what I'm talking about, which, of course, I don't because *it involves math.*"

Fortunately, one of the TMSCA officers — and I honestly can't recall who — suggested another option: use the fourth team member's score to break the tie. It's brilliant, simple, so much easier than trying to figure out percent accuracy, plus it encourages and rewards team building. Best of all, it requires hardly any additional math.

Thus, in June 2003, the Academic Committee will entertain proposals that in the event two or more teams tie for first place, the highest overall net score of the fourth place member of the team will be used to break the tie. Should two or more contestants who are the fourth place member of their team have the same overall net score, then a tie will be declared and all involved in the tie shall advance.

What if a team does not contain a fourth member? It forfeits the right to participate in the tie-breaker. At the State Meet, a tie or ties for first place overall team shall not be broken.

We will also submit proposals to break ties for individual calculator applications and science places. As for ties for individual number sense, I've decided not to monkey with the delicate balance between speed and accuracy so if ties exist for first, second or third place, so be it.

Moving on...

===== Larry White era Fall, 2002 – Spring, 202? =====



Larry White takes over for Don Skow as the UIL Number Sense Contest Director and the UIL Mathematics Contest Director. After serving 4 years (1965-1969) in the U. S. Air Force during the Vietnam crisis, Larry got his Bachelor of Science degree in mathematics (1972) and Master of Arts in Teaching degree in mathematics (1979) at Angelo State University. He retired from teaching in public schools after 25 years. He taught at Winters ISD, Eden ISD, and Sterling City ISD. He taught in the math department as an adjunct lecturer at Angelo State University and served as the director of the Mathematics for English Language Learners (MELL) project for 7 years.

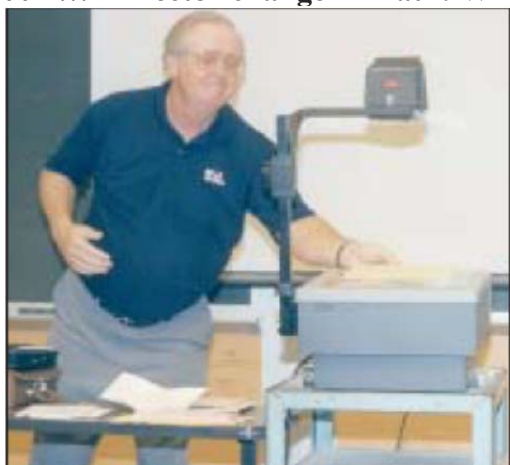
Larry coached number sense, slide rule, calculator, mathematics, physics, and computer science for 15 years, taking individuals and teams in multiple events to state for all but one year.

He designed and programmed **Number Sense Computerized** – software designed to teach and practice number sense shortcuts and strategies – elementary, middle school, and high school versions.

Items of interest 2002- 202???

>>> Note: the number sense tests were labeled as series 2002-03 through 2016 consisting of 7 tests. The 2002-03 tests were labeled 2002 SAC, Invitational A 2003, Invitational B 2003, District 1 2003, District 2 2003, Regional 2003, and State 2003 thru 2015 SAC, Invitational A 2016, Invitational B 2016, District 1 2016, District 2 2016, Regional 2016, and State 2016. Beginning in 2017 only one district test was written. The 2017 through 2023 series consisted of 6 tests. Each of these series were labeled 2016 SAC, Invitational A 2017, Invitational B 2017, District 2017, Regional 2017, and State 2017 thru 2022 SAC, Invitational A 2023, Invitational B 2023, District 2023, Regional 2023, and State 2023. (see Timeline)

*** November/December, 2002 ... **Director change in math: White assumes math position**



Check This Out

photo by Bobby Hawthorne

New math director Larry White explains a problem to students at the Student Activities Conference at The University of Texas-Pan American in Edinburg. White has assumed the position following Don Skow's resignation due to health reasons.

Loud silence. That's what Larry White loves to hear. The sound of young brains, crunching numbers.

"Years ago, I was in charge of the 250 or so freshman number sense competitors at the TMSCA State meet," said White, who this fall replaced Don Skow as director of the UIL mathematics and number sense contests.

"The room was so loud with all those freshmen talking and being excited. But then it was test time. When I gave the start signal not a sound could be heard. But the amazing thing was it was the loudest quiet I had ever heard. All those amazing brains crunching the mental math problems was deafening. Oh how I love that loud silence."

White taught 26 years, mostly in West Texas, coached football, basketball, track and field and all of the UIL mathematics contests. He retired in 1997 after a long and successful career. In fact, members of his math, number sense and calculator applications teams advanced to UIL State 14 of 16 years, from 1983 – 1998, compiling two individual and six team state championships and earning more than \$150,000 in TILF scholarships. In 1991, he received one of the first UIL Sponsor Excellence Awards.

An adjunct math lecturer at Angelo State University, White also develops software, operates a customized computer service and tutors via the Internet.

"Even after retirement, I continued to work on my number sense computerized program and work with kids across the state via the Internet," he said. "I loved to go to service centers, math conferences and schools to teach and work with kids, especially in the three math UIL events. I don't know of anything more that excites me than to watch the minds of a number sense kid cranking out mental mathematics.

So, when I was approached by several of my old cronies about taking the job, I didn't have to think long.

"Besides, someone had to carry on the great tradition that Don Skow bestowed upon us over the years. The juniors and seniors this year deserved to see tests in the same style as in the past after all of the work they have done to prepare. I have known Don Skow and studied his tests for many years. I only hope that I can create tests that are even 75 percent of what his were."

As for the contests, White said he thinks number sense may be reaching its limits of change, since it is a much older contest than mathematics.

“The evolving will probably take place in the varying ways old tricks can be seen. Don was the master at finding new ways to see an old trick,” he said. “I hope to do that as well.

“The math test is a relatively new test compared to number sense; hence it has room for growth,” he added.

“One of the major things I see happening — besides removing the ‘none of these’ answer — is the addition of graphing calculators to the test in the near future. There are so many great questions and problem analysis that can occur with the graphing calculators. Someday, perhaps, I see removing the 40-minute time limit and giving the students at least an hour so that we can see what their truer capabilities are in mathematics.”

Sounds like a lot of work for a retiree. White disagrees. “Retirement doesn’t come in to play here,” he said.

“Heck this ain’t work. This is a joy!”

*** October, 2003 ... Leaguer Article

Grading should be consistent in all math contests

by Larry White, Number Sense and Mathematics Contest Director

Grading Number Sense is not always an easy task. Whether something is right or wrong is sometimes in the eye of the beholder. Several things need to be kept in one’s mind as a number sense coach/grader.

First, all coaches/graders need to understand that there are three types of competitions available to them and their students: invitational competitions sponsored by host schools, TMSCA competitions, and UIL competitions. It is important to remember that TMSCA sanctions two contests, the high school state meet and the middle school state meet, both currently held in San Antonio. UIL contests are district meets, regional meets, and state meet. All other meets are invitational meets. In many cases, the invitational meets use TMSCA practice tests or UIL practice tests. However, since the competitions are hosted by local schools and done by invitation, then the local schools hosting the meet have the right to set whatever grading rules they choose to use. It is important that the local school provide grading procedures to their graders and the contestants. Likewise, TMSCA has the right to set its rules which are normally aligned fairly close to the UIL rules for their two state meets. And, of course, UIL has its grading rules in the *UIL Constitution and Contest Rules* for its contests. Many times coaches contact UIL or TMSCA for a rule interpretation for a local invitational contest. UIL and/or TMSCA have no control over what rules the local school chooses to set. Likewise, UIL has no control over the grading procedures that TMSCA chooses for its meets.

Second, competitions are usually set to provide practice for the UIL district, regional and state meets. If various competitions use different rules at different competitions, students will have a greater chance of being confused as to what rules apply. We must be careful to avoid hurting students’ success because of too many varying rules. However, each invitational meet has the right to do what they wish. Caution may be the key word and coaches need to be sure to keep their students informed as to which rules apply.

Third, we must recognize that we are here for students to succeed. We should avoid doing anything that destroys the desire for students to compete and progress forward toward success. Some invitational meets have set up certain rules that disqualify a student’s test. Instead of

grading a paper, a big “DQ” is written on the paper, and the student tends to feel like they did something bad. My personal thoughts about this is to not use the DQ but grade the paper and record a – 9 if the grade is negative. Also, it would be a great thing if the grader wrote something on the top of the paper such as, “working on the test is prohibited, see Rule #XXX.” I know this will take a little extra time, but I think our students are worth it.

Number Sense: Part 2 – UIL GRADING RULES

According to the *C&CR* the rules are spelled out and apply to district, regional, and state meets. Using any other rules at UIL competitions is forbidden. If any of the rules are unclear, the local contest director may want to contact the UIL or the state contest director for clarification. The following clarifications might be of some help concerning certain confusing issues:

Scoring problems. Problems containing erasures, mark-overs, mark-outs, or any extraneous marks will be counted incorrect. The rule does not allow for disqualification.

Symbols. Answers require only the writing of numerals. Writing symbols or leaving off symbols are not graded. Commas are not a required part of the answer, hence are not graded, even if it they are put in the wrong place. It is strongly recommended that students not spend time putting in commas. Also, if the comma is written in such a way that it may look like a decimal or a number, the local contest director can make the determination that it is an illegible number or a decimal. Thus the problem can be counted incorrect.

Special Notes:

- Sometimes the rules we have for the classroom are different than the ones in the *C&CR*, such as the comma. However, the UIL contests must be graded by all graders using the same rules, hence the *C&CR*. If coaches feel some rules need tweaking, they need to contact UIL and make the recommendations for change.
- The use of the “wild card” team puts a great deal of emphasis on all graders to grade according to the *C&CR* rules. If graders at district or regional competitions decide to alter the rules according to their district or region the “wild card” concept loses its validity.

It is crucial site contest directors and their graders become very familiar with the rules as stated in the *C&CR* and seek clarification when a situation warrants rule clarification.

Future articles concerning Number Sense and/or Mathematics tests will address how to handle bad problems and/or incorrect answers at UIL competitions, and, ethics, before, during, and after UIL competitions.

If coaches, graders, or contest directors wish to share comments or suggestions, I would be happy to hear from you. You can e-mail me at texasmath@aol.com.

I hope you all have a great year. See you at one of the SACs or somewhere down the line.

*** November/December, 2003 ... On Oct. 20, the Legislative Council approved the following academic proposals, which will go into effect Aug. 1, 2004 pending approval of the State Commissioner of Education

- Team tie-breaker procedures in current issues and events, calculator applications, number sense, accounting, mathematics, literary criticism, and science changed. In case two or more teams tie for first place, the highest overall net score of the fourth place member of the team will be used to break the tie.

Should two or more contestants who are the fourth place member of their team have the same overall net score, then a tie will be declared and all involved in the tie shall advance. A team that

does not contain a fourth member forfeits the right to participate in the tiebreaker. At the State Meet, a tie for first place overall team shall not be broken.

***** January/February, 2004 ... UIL recognizes 15 educators with special recognition award**

Whether it be in sports, music or academics, most Texas teachers know that their biggest success comes with the success of their students.

UIL recognizes this concept and 14 years ago created an award to recognize 15 teachers/sponsors who go “above and beyond” to make their students successful with the UIL Sponsor Excellence Award.

A panel of judges representing the areas of music, academics and athletics selected the winners from nominees submitted by school principals and superintendents statewide. Nomination forms were sent to schools in August.

The award was created to identify and recognize outstanding sponsors who assist students in developing and refining their extra-curricular talents to the highest degree possible within the educational system, while helping to keep their personal worth separate from their success or failure in competition.

“The benefits of interscholastic competition and student performance are made possible by dedicated directors, sponsors and coaches,” UIL Director Dr. Bill Farney said.

“The University Interscholastic League salutes all of these outstanding educators.”

The UIL Sponsor Excellence Award was originally made possible by a grant from the Effie and Wofford Cain Foundation, in honor of Frank W. Denius, a director of the Cain Foundation.

Southwestern Bell joined with the UIL in 1997 but dropped their support two years ago. At that time the UIL assumed full financial responsibilities of the award because it believes that a strong extracurricular program in all areas makes for a strong and successful school.

Each of the 15 recipients will receive a \$1,000 check and a symbolic memento from UIL for their outstanding contribution to the success of students in Texas.

The UIL Sponsor Excellence Award recipients for 2003 include (Number Sense recipients):

• **Joan Clark, Utopia HS, Utopia**

Clark has served as UIL academic coordinator for her K-12 campus for 15 years, and has coached Calculator Applications, Number Sense, Math, Literary Criticism, One-Act play, Prose and Poetry, and, as her principal puts it, serves as “spirit leader, promoter and spokesperson for the academic team the past 17 years.

“Since 1987, Mrs. Clark has been the force behind our academic team,” principal Jim Phillips said. “As a result of her efforts, dozens of students have had opportunities to reach for the stars and to excel far beyond the boundaries of classroom instruction into the realm of academic competition.”

Since 1987, Clark has sent at least one person to regional competition every year and last year helped 22 students qualify for regionals. Since 1987 she has helped students qualify for state 12 times, a total of 64 entries. Ten of her students have earned TILF scholarships.

In addition, she coordinates her activities with athletics so students of the high school are not forced to choose between athletic and academic activities. “We help youngsters become honest, responsible, accountable people of character,” she said. “We learn to lose with dignity and win with grace. We promote academic excellence. We foster an atmosphere where embracing learning is ‘cool’; and work is necessary for success. We know that the real reward is in the journey, in the effort, in participating, in the sense of achievement.”

• **Kelly Gazaway, Elkhart High School, Elkhart**

Gazaway has served as academic coordinator four years, and under his guidance, the program has progressed to the point where the “trophy case is full of awards in all academic areas and a bevy of successful students,” according to his principal, DeWayne Wallace.

“Many are the times that Mr. Gazaway and his students are still practicing when I leave my office in the early evening hours,” he said. “The efforts on behalf of his teams have paid off as seen by the number of district, regional and state honors his teams have received.”

Under Gazaway’s guidance, the school has earned State Champion Sweepstakes runner-up in both 2002 and 2003 and has state team championships in math, Calculator and Number Sense. His teams have won district championships the past three years.

“I believe that competition is an excellent form of motivation,” Gazaway said. “Students who set goals for themselves and strive to reach them quickly are much more inclined to surpass other’s expectations than are those who strive only to meet the district’s requirements for receiving a passing grade.

“Competition in academics stimulates thinking and encourages students to reach beyond what they think they can accomplish into the realm of what might be possible. Students who are involved in academic

competition are also more likely to have parents who actively participate in their education and celebrate their victories.”

• **David Rubac, Flour Bluff High School, Corpus Christi**

“Practice makes perfect” normally does not equal “have fun,” but to those students under the tutelage of Rubac, that is just what is accomplished. Rubac, who has coached the math contests for 30 years, has a specified time and for to practice each of those contests — Number Sense, Calculator, Mathematics and Computer Science.

During those 30 years, Rubac has brought home numerous trophies, including the district and regional champion Number Sense team from 1996 through 2003 and earned state championship honors in 2001 and 2002; regional and state champion Mathematics team in 2000 and 2003; and TMSCA team championships from 1999 to 2003 as well as Academic Decathlon state champion Super Quiz winners in 2003.

“David Rubac definitely believes in ‘practice makes perfect’,” principal Joe Kelley said. “(He) definitely, without a doubt, makes maximum use of existing resources available to him. He is also able to get the students to always do their best in competition along with exhibiting good sportsmanship and positive attitude.”

Rubac knows that success is not easy. “The one thing I want students to realize is that success is going to take a lot of hard work, and the students must have a never-giving-up attitude when trying to achieve a goal,” he said. “I tell my students to meet students from other schools and discuss the problems that were on the tests and share ideas and ways to solve the problems along with their solutions.

The one thing I teach my students to do is to ‘have fun’ because having fun is what it’s all about. If it is fun we will work harder to achieve success.”

• **Special Note:**

The UIL lost one of its most ardent supporters with the passing of Erminie Minard, who died Jan. 25 at her residence in Surfside. Erminie coached number sense, calculator applications, math and science, sending students to region and state almost every year, including state champions in calculator applications and number sense.

Trained as a geologist — she was the first female geologist to be hired by Gulf Oil — she worked with the Danbury, Alvin, LaPorte and Fort Bend school districts. She served as district UIL academic coordinator, directed dozens of invitational and district academic meets, spoke at countless UIL conferences and workshops, recruited and motivated legends of coaches and students — elementary, junior high and high school alike — and, in general, served as one of the League’s most enthusiastic cheerleaders, occasionally from a wheelchair, for more than 25 years. For her tireless efforts, she was one of the first recipients of the UIL Sponsor Excellence Award. Erminie lived and died on her own terms. She was an ardent Texas Longhorn and Dallas Cowboy fan. As her health deteriorated, she resisted going to the hospital for fear she’d miss the Super Bowl. She was an original, a grand old gal, and we’ll miss her.

*** January/February, 2004 ... Leaguer Article

**Agreeing on solutions to ‘bad problems’ different with wild card teams involved
by Larry White Math/Number Sense Director**

As we get closer to the district, regional, and state competitions, we need to revisit our thoughts on what should be done concerning bad problems and/or incorrect solutions. Before the inception of the “wild card” team, these issues could be handled at each of the contest sites without having to worry about the effects it would have on other contest sites. However, the “wild card” concept has changed all that. Don’t get me wrong, I love the concept and think it is great for our competitions. We must be careful about making any changes at the district and regional meets because of the effect it will have on the “wild card” team.

Hopefully, with the extra precautions I have taken while writing the tests and with the tests being proofed by our past test writer, Don Skow, we hope to have caught the bad problems and solution errors. Of course, we are not so naive as to think that we still won’t let a bad problem get by or a wrong solution occur. We work to make the test as clean as possible. One problem occurs because of individual interpretation of problems. Different folks tend to see things differently from others. We have tried to avoid any ambiguous problems, but they can still appear.

So, what do you do at your contests if you think a problem is bad or a solution is incorrect?

If you make a change and no other site does, then it affects the “wild card” situation. It is important that you not make a change without consulting UIL or myself. UIL is able to contact me 24 hours a day during the two-week district time slot via three different phone numbers.

Your district contest director can contact me by phone (325-483-5446) or by e-mail at texasmath@aol.com. Also, they can contact me during the Regional contest time slot. Most regional directors have their contest directors proof the test before the contest and some contact me if there appears to be a problem. If a problem should appear, then I will inform UIL of the action that should be taken and will e-mail all the regional contest directors about any changes.

It is important we stay consistent in how we handle problems and solutions. We must grade according to UIL rules as stated in the *C&CR* and not make changes or decision base upon our own sites. It is important we keep the playing field as fair as possible.

Feel free to contact me at any time concerning these contests. Your feedback will only help in making the contests the best they can be.

*** November/December, 2004 ... **2004-2005 Sponsor Excellence Awards**

The UIL Sponsor Excellence Award recipients for 2004 include (Number Sense recipients):

• **Eulin Cain, Avery High School**

Eulin has coached junior high athletics for 25 years and high school cross country for 15 years. In addition, he has coached UIL Science, Number Sense and Mathematics for 30 years, and Calculator Applications for 15 years. He's coached qualifiers to the State Meet every year between 1983 and 2004. He was named Texas Math/Science Coaches Association Science Coach of the Year in 2003 and 2004.

"The awards that his students have received are countless; and it is a statistic that he does not keep up with. The one statistic that he does count is the number of former students who have finished college and are actively pursuing a career of their own, many in the field of education."— Robert Kelsoe, Principal.

• **Cliff McCurdy, Argyle High School**

Cliff has coached Calculator Applications for 20 years, Mathematics for 10 years, Science for nine years and Number Sense for six years. In that time, McCurdy has coached 11 first place state team, 12 first place individual state awards, and three first place state teams for overall academics.

Though he coaches in a small, 1A school, his students score higher than their 4A and 5A counterparts.

"Cliff encourages all students to participate and find the event best for them. He does not limit recruitment to only those who are academic superstars. He sincerely tries to reach as many students as possible. He creates an atmosphere of camaraderie and teamwork.

"Students eagerly stay after school to experience the practice session for the teams that Cliff coaches. They go and recruit other students. It is considered very prestigious and desirable to be a member of the UIL teams. Cliff has been a primary force in creating this belief in the culture of the high school." – Jeff Henry, Principal, Argyle HS

• **Carolyn Whitmire, Moulton High School**

Carolyn has coached on the high school and elementary/junior high level: high school Number Sense for 18 years, and elementary/junior high number sense for 22 years. She's also coached high school Calculator Applications for 17 years, Computer Science for 14 years and Computer Applications for 11 years. In that time, she's coached 34 students to the State Meet, filling 65 State Meet slots.

"As members of my academic teams, students learn to respect the worth of others," she said.

"They must offer suggestions and solutions and be receptive to the ideas of others. Additionally, they encourage each other as they look beyond personal glory to try to promote the success of the team as a whole.

"As a UIL academic coach, I serve as a mentor not only by guiding academic investigation, but also conveying my enthusiasm for learning. Our level of knowledge keeps evolving, and we must be receptive to change. I must teach my students to be proficient problem-solvers and confident risk-takers. UIL competitive activities promote a stimulating venue that assures that my students will be prepared to meet the challenges that await them in the future."

• **Katy Stockstill, Poth High School**

In her 30 years as a teacher, Katy has directed the One-Act Play for 25 years as well as coaching Prose and Poetry Interpretation, Informative and Persuasive Speaking, CX Debate, Current Issues & Events, Literary Criticism, Number Sense, LD Debate and Social Studies. She also is

the UIL campus academic coordinator. Her OAP troupes have won 20 district titles, and she's taken numerous students to the State Meet.

"It is wonderful to see smiles and confidence that comes with a win, especially when it happens to a student who exceeds his or her own expectations," she said. "As a teacher, I also want to be there so students can learn from failure as well. I love competition, but I know it is a tool and not an end all. It is a tool to help us discover what all we can do. Competition motivates individuals and teams to strive for excellence."

• **Janet Melton, Lampasas High School**

Janet has coached all speech and debate contests and served as UIL campus academic coordinator for 27 years. She also directed the One-Act Play for 14 years and served as assistant director for nine, as well as coaching Current Issues & Events for 10 years and Number Sense for four. She's brought students to State virtually every year, even though she coaches at one of the smallest and poorest 4A schools in the state.

"My philosophy can best be stated, 'It's not the destination but the journey.' When you look at the number of students we touch each year, not many find themselves at the State Meet," she said.

"If it were the destination that was important, are those who make it to the State Meet the only successful students? No. I believe the student who goes through the season without a trophy but who keeps trying is successful."

*** November/December 2005 ... Leaguer Article

Academic contest directors share their philosophies, stories

by **Andrea Negri, UIL Staff**



*Larry White presents at the Student Activities Conference.
Photo by Bobby Hawthorne.*

Larry White, Number Sense/Mathematics State Director

How did you become involved with UIL?

I started coaching students in Number Sense and Slide Rule around 1978 in Eden. When Slide Rule was replaced by the Calculator Applications contest, I started coaching it. I coached Number Sense, Calculator Applications, Mathematics, Science and Computer Science at Sterling City. Eden and Sterling City are small class 1A schools. I worked mainly with the high school. However, I worked with the elementary and junior high kids as well. A good coach knows the importance of building a program from the lower grades, regardless of whether it is athletics or

academics. I coached the math teams at Sterling City from 1983 to 1999 when I retired from public schools.

I became the state Number Sense contest director and the Mathematics contest director in 2002. Filling the shoes of the past director, Don Skow, was not an easy chore. He did such a great job for many years with UIL. I am fortunate that he is still involved by proofing my tests and assisting me with possible questions and ideas.

After retirement, I taught part-time for seven years at Angelo State University in the mathematics department. I helped develop and taught mathematics classes for elementary and middle school pre-service teachers.

Currently, I am the Angelo State University MELL (Mathematics for English Language Learners) Initiative Director. ASU and the four other Texas State University Systems Institutions (Sam Houston, Lamar, Sul Ross, and Texas State) are involved in this initiative to try to find ways to improve teaching and learning mathematics for the limited English speaking students in Texas.

What do you do in your spare time?

I am retired and do enjoy it.

I run my own computer business, building new systems, repairing systems, maintaining systems and troubleshooting all computer needs. I have my work with Angelo State and the MELL Initiative. I write math software to improve students' number sense skills and assist in math learning. I golf, fish and hunt. I love to travel (especially to Las Vegas where I can test my theories on probability).

I enjoy spending time visiting my boys. I enjoy spending time working on my four-acre Pecan Plantation (not too hard or too long), and I love spending time with my wonderful wife of 39 years.

In my spare time, I enjoy sitting under one of my pecan trees watching the sun go down, the moon and stars go up and the liquid in my glass going away.

What sort of preparation do you do for the Spring Meets? How long does it take you to make the tests for each meet and from where do the questions come?

I don't do anything special for district and regional except write the tests for them. For the State Meet, I prepare seating arrangements, create lists of coaches for proofing and grading the contest. I plan what neat places I am going to eat while I'm in Austin. I do love Serrano's and the Brick Oven. Ummmm! Good!

A number sense test takes about 15 hours to complete. I write seven of them for UIL and three for TMSCA. A mathematics test takes about 72 hours to complete. I write seven of them for UIL and two for TMSCA.

Number sense questions come from numerous sources. I make up some, steal some from the old days and get others where ever I find them.

The main source for the mathematics questions is the high school math curriculum. The test questions come from general math, algebra, geometry, analysis, trigonometry, probability, calculus, and (my favorite) miscellaneous. I use the misc. section to introduce students to some concepts that they may not get to see in their classroom. I introduce these topics in the early practice tests. This way students can do research on the problems and prepare themselves for the Spring Meets. Tests for both contests are written in such a way that the students who work and practice should progress in scores and knowledge from early tests up to the final test at state. The state tests are an accumulation of the knowledge and skills achieved from the practice tests, the district tests and the regional test.

Speaking of the State Meet, are there any aspects of it that you enjoy?

I enjoy all aspects of the State Meet, the great food, the great accommodations, the normally beautiful weather, the ... oops, I guess you meant the actual meet itself.

Seriously, what is there not to enjoy? I get the chance to work with and visit with some of the finest young math minds in the country. I get to work with the great coaches, who are my stress relievers. They proof the tests and grade the tests and do it as the professionals they are. Of course, I've known most of them for a lot of years and we have a jolly good time together at the State Meet.

Heck, the coaches and kids are stressed. I'm just having a ball. I get to see and visit with all of the good UIL folks and the other contest directors.

The only negative I have is the traffic and parking in Austin. You have to understand, there aren't many more than 25 or 30 cars total in downtown Millersview where I live, and most of them are in the country. A traffic jam only occurs when a car has to stop for a group of turkeys crossing the street or mama cat taking her young-un's out for the daily hunt. We only have one stop sign, and when we collect enough money, we are going to paint it red.

What do you like the most about your involvement with UIL?

The thing I like most about my involvement with UIL is that I am able to contribute to the growth and knowledge of the students across the state of Texas. I have the opportunity to help their minds expand, give them the opportunity to compete in their areas of interest and help to provide an academic means of gaining scholarship money for their future studies.

Why do you think it's important for students to be involved with UIL?

When you think about the assets that students gain from UIL, it is easy to see why it is important: improve their knowledge and skills, experience new adventures and various cultures, experience teamwork, meet new people, gain lifelong learning and experiences, understand the amount of work it takes to be successful, learn the value of sacrifice, hard work, dedication, helping others, etc. A student does not have to become a state champion to gain these assets. They only have to be involved in some way, and they will gain these invaluable assets.

*** October, 2006 ... Leaguer Article

Get ready for the annual math term race

by Larry White, Number Sense and Mathematics Contest Director

It was a bright day, with the sun shining bright like a lemon PI. It was a PERFECT day for the race. An ABUNDANT amount of spectators filled the stands. A TAN GENT was COMPLEMENTing A CUTE ANGLE, as she fluttered by.

His SEC ANT was ADJACENT to him suffering from a SINEus infection. Security for the event was provided by the PENTAGON as ORDERED PAIRS PLOTted themselves down in the four QUADRANTS around the track.

One COPLANAR didn't seem to be to happy about his seat and was yelling so hard that he almost had a COROLLARY. Vendors walked through the stands yelling, "snow CONEs, get them before they melt."

Entrants in the race had to SINE in with their entrance fees, however, THETA had to have a COSINer because she didn't have the fee. The ELLIPTICLE track was SLOPED along the MAJOR straightaways and leveled off around the MINOR curves.

The infield SURFACE AREA had lost most of its grass and flowers when a swarm of LOCUS came through the past summer. Snares had been set on the outer fence line to TRAP E ZOID that was always digging up the track. It was time for the race.

Bang! POLY GON went off.

The race had begun. CIRCLE was off and rolling smoothly along. RAY shot straight out. The fans could hear EQUILATERAL TRIANGLE go plop, plop, plop in a nice even tone. RIGHT TRIANGLE was having trouble staying up on its smaller LEGS.

The SQUARE started off fast, but a RECT ANGLE caused it to leave the track. Suddenly, A POTHEM carrying her brood on her back streaked across the track and disappeared into SPACE. At the first curve, CIRCLE had the perfect ROTATION. But, RAY only knew one direction and ran off the track into INFINITY.

And the crowd could still hear plop, plop, plop as EQUI rounded the curve. The remaining racers could see the CHORD stretched across the finish LINE.

It was going to be a close finish. The racers were at MAXIMUM speeds, reaching their LIMITs trying to MINIMIZE the distance to the finish. Suddenly, out of nowhere the PLANE BISECTED the CHORD and won. Whew! That PLANE sure could fly.

MORAL: Mathematics may seem awful serious, but it can be a lot of fun when looked at and treated with the right perspective. One should teach and/or learn MATH IN LIVING COLOR!!!

>>> Note: ... Andy Zapata, one of the originators of TMSCA, started writing Elementary Number Sense, Middle School Number Sense and Middle School Mathematics tests for the UIL in 2007. He wrote Middle School Calculator tests starting in 2008. UIL considers him as a extremely important consultant and test writer.

*** November/December, 2007 ... **2005-2006 Sponsor Excellence Awards**

The UIL Sponsor Excellence Award winners for 2006 include (Number Sense recipients):

• **Tammy Guidry, Silsbee High School**

Tammy Guidry has sponsored number sense, mathematics and calculator applications teams for 19 years, 14 of which were at the junior high level. Guidry has had 18 students compete in the Academic State Meet, including a second place finish for both the calculator applications and number sense teams. Under her guidance, Silsbee High School won the academic district meet for the first time in 2006.

“Many students find that UIL academics provide them with challenges not otherwise available,” she said. “To compete successfully, they must stretch themselves intellectually, facing challenges from their peers and beyond.”

• **Scotty Johnson, Katy Seven Lakes High School**

For 25 years, Scotty Johnson has been involved with UIL coaching 13 different events. Among his accomplishments, Johnson has coached six state championship teams in computer science at three different schools. His teams have won district and regional competitions in spelling, number sense, calculator applications, current issues and events, mathematics, social studies and journalism.

“I want the kids to be excited about learning,” Johnson said. “There is no better way of accomplishing this in my eyes than getting them involved in academic extra-curricular activities.”

*** January/February, 2008 ... **2007 Sponsor Excellence Award Winners announced**

14 UIL coaches and directors selected for this year's award. The UIL Sponsor Excellence Award recipients for 2007 include (Number Sense recipients):

• **Debbie Cook, Tuscola Jim Ned High School**

For the last 15 years, Debbie Cook has coached students in Mathematics, Calculator Applications, Number Sense, Computer Science and Ready Writing. She has advanced students and teams to regional competition each year of her tenure and state competition eight of the last 10 years in four different events. Her calculator Application's team placed first at the 2007 Academic State Meet.

"My desire is to help students realize what they can accomplish through hard work, discipline, dedication, commitment and time management," Cook said. "It has been my greatest pleasure to witness my students challenge themselves in a competitive team environment and have pride in their performances knowing that they have done their best to prepare and to have performed to the best of their abilities."

>>> Note: Number sense rule clarifications were stressed at the 2010 and 2011 Student Activity Conferences involving timing devices, start and stop signal, scoring problems, usage of symbols, dollars and cents answers, and altering problems on the test.

>>> Note: Beginning with the 2014-15 season there will be 6 conferences instead of 5 – 1A, 2A, 3A, 4A, 5A, 6A.

>>> Note: The number sense contest rules and information once found in the **UIL Constitution and Contest Rules** were placed in the 'new' **Number Sense Handbook 2016-17**.

>>> Note: The original high school **Problem Sequencing** chart and the elementary and middle school sequencing charts were revised in 2016 by Andy Zapata and Larry White in order to bridge the gap between the different grade levels. See Addendum for the current chart.

>>> Note: Beginning in 2017 only one district test was written and given.

>>> Note: Cliff McCurdy takes over as the Mathematics Contest director in the fall of 2021. Larry White stays on board as Mr. McCurdy's assistant director.

*** 2022 ... An amendment to the UIL C&CR increases the number of entries allowed in district competition for spring academic events with a team component. Each school could enter up to six contestants in each applicable event at the district meet, rather than the current limit of four, with the approval of the District Executive Committee. Points and advancement structures remain unchanged.

>>> 2022 ... A current list of number sense resources include, but not limited to:

BOOKS AND PRACTICE MATERIAL

No Sense in Mathematics -- Don Skow -- don31pi@outlook.com -- limited copies available
Mental Mathematics for Number Sense -- Frances Walzel -- no longer available
RAM Materials -- Leo Ramirez -- www.rammaterials.com
AMT Test Writing Service -- Andy Zapata -- adzapata74@gmail.com
Middle School and High School Packets -- Dr. John Hobbs (call 972-442-3168)
Hexco -- Linda Tarrant -- <http://www.hexco.com>

PRACTICE TESTS

University Interscholastic League (UIL) -- <http://www.uil.utexas.edu/>
Texas Math and Science Coaches Association (TMSCA) -- <http://www.tmsca.org>
RAM Materials -- Leo Ramirez -- www.rammaterials.com
AMT Test Writing Service -- Andy Zapata -- adzapata74@gmail.com
Hexco -- Linda Tarrant -- <http://www.hexco.com>

WEBSITES

UIL - www.uilutexas.org/academics
TMSCA - www.tmsca.org
Virtual Challenge Meet -- Chuck Thompson -- www.virtualchallengemeets.com
Number Sense Tricks -- Bryant Heath -- <http://bryanthearth.com/number-sense-tricks-manual/>
Number Dojo -- Jonathan Cluff -- <http://www.numberdojo.com/>

COMPUTER SOFTWARE

Number Sense Computerized -- Larry White -- texasmath@centex.net
UIL Number Sense Mental Math Mentor -- <http://www.hexco.com>

>>> Special note as of the 2022 state meet ... The highest number sense score previously mentioned was in 1969 and was 390. The next highest score was 386. It happened twice, once in 1991-92 or 1992-93 by Anthony Newberry from Wichita Falls and again in 2017 by Jonathan Zhang from Klein HS. In both cases the scoring was 5 points for correct and minus 4 points for incorrect or skipped. In both cases one problem had to be thrown out making the maximum score 395. Both, Anthony and Jonathan, missed only one of the 79 problems. Had the one problem not been thrown out, both could have scored 391.

>>> January, 2023 ... Larry White continues as the UIL Number Sense Contest director. Perhaps, a sequel to this chronology will be done in the future, as the number sense contest is still one of the top contests the University Interscholastic League has provided for the youth of Texas.

University of Texas Bulletin

No. 2638: October 8, 1926

DEVELOPING NUMBER SENSE

The Interscholastic League Bureau

Extension Division



PUBLISHED BY THE UNIVERSITY FOUR TIMES A MONTH, AND ENTERED AS
SECOND-CLASS MATTER AT THE POSTOFFICE AT AUSTIN, TEXAS,
UNDER THE ACT OF AUGUST 24, 1912

The benefits of education and of useful knowledge, generally diffused through a community, are essential to the preservation of a free government.

Sam Houston

Cultivated mind is the guardian genius of democracy. . . . It is the only dictator that freemen acknowledge and the only security that freemen desire.

Mirabeau B. Lamar

FOREWORD

This bulletin was prepared by John W. Calhoun, Professor of Applied Mathematics in the University of Texas. It is believed that it will be helpful especially for those teachers of arithmetic who are preparing students for Interscholastic League contests in arithmetic.

The purpose of the League's Arithmetic Contest may be stated as follows:

This contest is for the purpose of developing in those students who undertake it a "number sense" which will enable them to compute quickly and with a fair degree of accuracy simple arithmetic problems.

It is thought that conscientious attention to the suggestions made in this little bulletin and entry into the contest in the right spirit will be of service in relieving the teaching of arithmetic of some of the drudgery which we find charged against it by both pupils and teachers.

The rules for conducting the Arithmetic Contest in the County Meet are given on pages 41 to 42, inclusive, of the Interscholastic League Constitution and Rules, which is Bulletin No. 2622.

Each member-school is entitled to one free copy of this bulletin on request. Additional copies are sold for 10 cents apiece, 75 cents per dozen, or \$5 per 100.

ROY BEDICHEK,
Chief, Interscholastic League Bureau,
Extension Division.

I

THE STUDY OF ARITHMETIC

In these days when so many subjects are competing for favor of students and teachers, it becomes important to be able to give a convincing answer to the question, "Why should I study this?" or "What good will I get from that?" or "What is the use of the other?" Fortunately for arithmetic this question is easy to answer. But the fact that it is so easy has caused its teachers to be less alert in its defense and less clear and concise in their statements of its merits. Home economics, manual training, modern languages, and the like, have had to fight for a place on the program, and this has developed the resourcefulness of their advocates in calling attention to their merits. Arithmetic having been long intrenched in what seems to be a safe place in the curriculum, seems in danger of losing prestige by the apathy of its advocates.

Just what is the function of arithmetic in the schools? Why should it engage a considerable amount of the time of every student who enters the public schools? What good may the student expect to get from it? What inconvenience will he suffer on account of a lack of proficiency in it? The student is entitled to answers to those questions. And they should be somewhat more specific than the statement that "A study of arithmetic will improve the mind." The average boy or girl does not feel any great urge for mental improvement. He is likely to suspect that his mind is pretty good as it is. It is not surprising that the mere prospect of mental improvement does not excite any wild enthusiasm in the breast of children from ten to thirteen years of age.

The writer has not consulted a psychologist on this matter, but he strongly suspects that some perception of numbers is among the earliest mental developments of the individual and of the race. The disposition to count comes early in the life of a child. His fingers are still in the baby state of chubbiness when they are drafted to use for counting. So fundamental a thing, then, ought easily to obtain and to hold the interest of children. And it will if properly presented.

No boy asks why learn to read. No girl asks why learn to write. No child asks why learn to walk. The necessity for being able to do these things impresses itself on the child before he is old enough to formulate the question of why. Arithmetic is almost as obvious. One must be able to count the members of his family, to count his flocks and his cattle. Children in play must keep count of some sort of score. One must count up one's age, must estimate his wealth, must know distances—all expressed as numbers. Whichever way one turns he runs foul of numbers. "Even the hairs of one's head are *numbered*."

All people must learn to walk. People who cannot walk are helpless. They are objects of great pity. They are likely to be objects of charity, to be a burden to someone as long as they live. People who walk badly or with difficulty, whose steps are halting and uncertain, who move slowly, if at all, who are always in danger of falling, are called cripples. They are at a great disadvantage. They excite our pity and sympathy. They have a heavy handicap in their attempt to compete for a place in the world. It is only by being exceptionally talented in some other way that a cripple can compete on anything like an equality with others. Most people, cripples included, are not so gifted.

Since number is so fundamental in our lives, since so nearly all that we have to do makes some contact with numbers and computation with numbers, since the whole world of business, finance, and industry, is expressed in numbers, it is clear that an acquaintance with numbers is of prime importance. It is entitled to be compared to walking. Also, just as being able to walk competently, takes one out of the cripple class, so, being able to use numbers competently, which means accurately and with speed, takes one out of the class of number cripples.

The population of a country, its wealth, its extent, its expenditures for roads or schools, its taxes, its exports, its imports, its products, its rainfall, its temperature—in fact, almost all information is given in terms of numbers. Railroad building, canal digging, airplane navigation, baseball team rating, Ty Cobb's batting average, Charlie Chaplin's income tax, all are matters involving arithmetic. And arithmetic, to be of any use at all, *must* be accurate and *ought* to be speedy.

As arithmetic is now organized, the long difficult problems concerning the length of the head, the tail and the body of a fish, the problems that taxed the analytic ingenuity of the students of the eighties and the nineties, have been all taken over by algebra and are easily solved by means of an equation. This is as it should be. But the most important part of arithmetic remains, the art of rapid and accurate calculation. No problem in arithmetic ought to involve any serious analysis, certainly not before high school arithmetic. The method to be followed in the solution should be obvious. This enables teacher and student to concentrate on facility of calculation. A bill of goods cost \$1,865 and was sold at a profit of 19%, find the selling price. Any fairly intelligent student knows as soon as he reads this problem that he must add 19% of the cost to \$1,865. The analysis is so trivial that unless he notices that the profit is about one-fifth of \$1,865 or \$350 to \$400, and the selling price in the neighborhood of \$2,200, the pupil stands to get nothing at all from the problem. To multiply \$1,865 by 19 hundredths, getting \$345.35, and finding \$1,865 + \$345.35 equals \$2,210.35 is drudgery, but estimating it mentally in competition for speed with a fellow student is an adventure.

II

ESTIMATE ANSWER IN ADVANCE

If the average student of arithmetic should solve the problem: "A grocer bought nineteen boxes of apples at \$1.25 a box and sold them at a profit of 17 per cent, how much did he gain?" and should get for his answer 83 cents, and should look for the answer in the book (as he would be sure to do) and find that the book carried 83 cents as the answer he would experience a feeling of perfect satisfaction and tell himself that when it comes to arithmetic he was there with the goods.

But if, on the other hand, he should get \$3.95 and find that the book gave 83 cents as the answer, he would at once begin to back-track and try to find where he had gone wrong. It would, perhaps, never occur to him that he might be right and the answer in the book wrong.

Now before the boy put pencil to paper he should have made an analysis of the problem about as follows:

Nineteen times \$1.25 is about \$24; 17 per cent is about one-sixth, hence the profit was about one-sixth of \$24, or \$4. His subsequent written calculations are merely made to refine on the accuracy of this mental approximation. If he had made this rough solution mentally and had found 83 cents as the answer in a book he would have known the answer was wrong—if he had been trained in a way to give him confidence in his own mental processes.

There is a great deal more importance in having a student place confidence in his results than to get them in the first place. Understanding the problem, sensing its consequences, judging its results are of vastly more importance than rules and algorithms.

Any class in arithmetic that has passed the most elementary aspects ought to be able to give mentally and without hesitation good approximations to such problems as the following:

- (1) 9 per cent of \$356.87.
- (2) $8\frac{1}{2}$ per cent of \$5,643.90.
- (3) $\frac{5}{9}$ of 864.
- (4) $\frac{3}{8}$ of $\frac{1}{5}$ of 2,641.

In estimating the first the easiest way is to note that 9 per cent is about $\frac{1}{11}$ and that is slightly less than $\frac{1}{10}$; $\frac{1}{10}$ of the number is 35 or 36, so 9 per cent will be slightly less, say 32. Another way is to observe that 1 per cent is about $3\frac{1}{2}$ and 9 per cent is 9 times $3\frac{1}{2}$. Such an analysis will effectually prevent the very common and inexcusable error of misplacing the decimal point.

The second one of those would be solved by noticing that $8\frac{1}{2}$ per cent is close to $\frac{1}{12}$ and proceeding as in the first one. To find approximately $\frac{5}{9}$ of 864 it is sufficient to notice that $\frac{5}{9}$ is greater

than $\frac{1}{2}$ and less than $\frac{2}{3}$. This puts the answer between 432 and 570. In the last, note that $\frac{1}{5}$ of 2,641 is slightly more than 500 and $\frac{3}{8}$ of 500 is not far from 200.

Simple work like this to cultivate the sense of numbers and an instinct for the correct answer will prevent the student from accepting an absurd result simply because he thinks he has performed the requisite calculation.

In a recent college entrance examination in Advanced Arithmetic, students were asked to find at what price Liberty Bonds bearing $4\frac{1}{4}$ per cent interest should be bought in order to yield 6 per cent on the investment. The slightest thought and judgment applied to the problem beforehand would have told even a dull student that they must be bought below par—that $4\frac{1}{4}$ per cent of 100 will be 6 per cent of a smaller number than 100. Yet several students went through some "hocuspocus" and got 105 for the answer and turned it in apparently unaware of the absurdity on the face of the result.

EXERCISES

20% of 15,325
14% of 7,784.
 $\frac{3}{8}$ of 16,521.
 $\frac{5}{9}$ of 4,624.
 $\frac{1}{3}$ of $\frac{2}{5}$ of 3,186.

$\frac{5}{9}$ of $\frac{1}{4}$ of 864.
 $\frac{15}{7}$ of 8,421.
 $3\frac{1}{7} \times 85$.
 $3\frac{1}{7} \times 596$.

III

DEVICES FOR MAKING ESTIMATES

The importance of having some idea in advance as to what the answer to a given problem should be has just been pointed out. Here are some simple devices for estimating in advance about what a required result will be.

Let us consider multiplication. It is well known to most students that multiplication by 10, 100, 1,000, etc., merely results in giving as the product the multiplicand with one, two, three, etc., ciphers attached, e.g.

$$26 \times 10 = 260.$$

$$351 \times 100 = 35100.$$

$$39 \times 1000 = 39000.$$

Any student can give the results of such multiplications in his head at once without resorting to pencil or chalk.

Let us consider the result of multiplying by 5, 50, 500, etc. Since 5, 50, 500, are just half as much as 10, 100, 1000, the products, when these numbers are used, will be just half as great as in the preceding case, i.e.

$$26 \times 5 = \text{One-half of } 260 \text{ or } 130.$$

$$351 \times 50 = \text{One-half of } 35100 \text{ or } 17550.$$

$$39 \times 500 = \text{One-half of } 39000 \text{ or } 19500.$$

The fact to be noted is that multiplication by 5, 50, 500 can in reality be effected by dividing by 2. The method is as follows:

$$10 \times 26 \text{ is } 260, 5 \times 26 \text{ is one-half of } 260 \text{ or } 130.$$

It is readily seen that multiplication by 25 can be accomplished by dividing by four, multiplication by $33 \frac{1}{3}$ by dividing by 3, multiplication by 20 by dividing by 5, $16 \frac{2}{3}$ by 6, $12 \frac{1}{2}$ by 8, etc.

Find at once 138×25 . Let the student note that $138 \times 100 = 13800$; then $138 \times 25 = \text{one-fourth of } 13800$. Call attention to the fact that one-fourth of 13000 is about 3000, then on dividing by 4 the student will write at once 3450. With a little practice he will do the whole thing in his head, merely taking one-fourth of 13800. Take 15.641×500 . Call attention to the fact that 1000 times 15.641 is about 15000. One-half of 15000 is between 7000 and 8000. Dividing by two we get 78205 as the succession of figures. Since we have already noted that the result is 7000 or 8000, there is no difficulty, no question even, about placing the decimal point. The result is ob-

viously 7820.5. In like manner $31,648 \times 25 = 3164.8 \div 4 = 791.2$. The teacher can multiply such examples indefinitely.

But it may be urged that most problems do not give such handy multipliers as these. This is true, but we can easily calibrate most of those we have to these. And this is where the merits of this method are most conspicuous; e.g. $72 \times 47 = ?$ Notice that 47 is close to 50. If we had 72×50 the answer, from what we have had above, could be read off at once as 3600, but changing 47 to 50 increases it by about $1/16$ of itself. Hence we ought to pull off about that amount of 72; $1/16$ of 72 is about 4. Hence 72×47 is about equal to 68×50 , that is 3400. Actual multiplication gives 3384. No student trained to "size up" products by looking at the factors would accept 2384 for the above result if a mistake seemed to give this answer.

Examples:

To find 87×36 , use $94 \times 33 \frac{1}{3} = 3111$.

To find 142×63 , use $135 \times 66 \frac{2}{3} = 9000$.

To find 12.84×19 , use $12 \times 20 = 240$.

To find 645×17 , use $650 \times 16 \frac{2}{3} = 10900$.

Any clever teacher can adapt almost any case to some one of these, and, better still, can teach his students to do it.

EXERCISES

Give quickly approximate answers to the following problems:

$$126 \times 24.$$

$$82 \times 49.$$

$$237 \times 34.$$

$$815 \times 17.$$

$$256 \times 52.$$

$$841 \times 26.$$

$$463 \times 21.$$

$$519 \times 67.$$

$$844 \times 76.$$

$$1,256 \times 14.$$

$$4,928 \times 16.$$

IV

COMBINE DRILL WITH THOUGHT

Too much mechanical drill, instead of being educational may well become stupefying. Drill that combines practice with thought is both useful and delightful.

It requires little drill to secure ability on the part of students to add instantly two numbers each represented by a simple digit—*e.g.* $8+7$, $5+9$, $6+8$, etc. A little drill will enable any average student to give the answer to such exercises instantly and accurately.

When this has been accomplished attention should be called to the fact that adding numbers of two digits, the last being 0, is just as easy as adding one digit numbers—*e.g.* $8+7=15$, $80+70=150$, $5+9=14$, $50+90=140$, etc.

Children take some pride in the fact that they can add numbers of this size in their heads instead of having to write them down. And this leads me to remark that, in my judgment, most of the arithmetic sense with which children are born is siphoned out of them by the pencil route.

This brings us to the question of adding mentally numbers like 36 and 47. This can be done with perfect ease and accuracy if the teacher first learns to do it himself and gives a little thought to helping the students. To add 36 and 47, note that these things are involved, all simple, the addition of 30 and 40, and the addition of 6 and 7, and combining the results. Any child can be taught with little effort to add 30 and 40 getting 70, and 6 and 7 getting 13, and 70 and 13 getting 83. $55+38$ is $50+30$ and $5+8$, and $80+13$ gives 93.

Any teacher who has never tried this will be astonished to find after a little practice how quickly children will call out the answers to problems like $58+46$, $85+39$, $72+29$, $88+34$, etc.

When this has been mastered, advancing to numbers like $167+349$ is possible with students of a little more advancement.

EXERCISES

Add quickly the following:

$53+74$.
 $81+27$.
 $56+23$.
 $76+32$.
 $85+54$.
 $86+25$.
 $78+56$.
 $89+34$.
 $77+68$.

$41+32+24$.
 $42+25+61$.
 $53+25+34$.
 $62+48+25$.
 $44+55+66$.
 $39+24+32$.
 $65+35+42$.
 $53+25+74$.

(NOTE.—Teachers of arithmetic should watch the columns of the LEAGUER for suggestions concerning the preparation of students for this contest. Each student should have an individual copy of this bulletin.)

V

SKILL IN PERCENTAGE

At the very first mention of percentage, it should be made clear that 10 per cent means *tén* hundredths and, hence, i.e., one-tenth of something. This interpretation of percentage should never be lost sight of for a moment. The first drill on the subject should be devoted to translating various rates of percentage into simple and familiar fractions.

The pupil should use the expressions "50 per cent" and "one-half" interchangeably. They should mean the same thing without his having to stop and reflect at all. The teacher should set the example of reading problems and putting "one-fourth" instead of "25 per cent," "33 $\frac{1}{3}$ per cent" instead of one-third," etc.

A man invested \$2,000 in cattle and lost 25 per cent of his money, find his loss. The student should be taught to read this just as readily: "A man invested \$2,000 in cattle and lost one-fourth of his money, find his loss." If this is done, the problem can be answered mentally. But suppose the problem reads: "A man invested \$2,165 in cattle and lost 25 per cent, find his loss." The student trained to see that 25 per cent equals one-fourth can give a *good approximation* to the answer in a flash and can get it exactly in a few seconds without putting pencil to paper.

When the student has been thoroughly taught that 50 per cent equals one-half, 25 per cent equals one-fourth, 20 per cent equals one-fifth, 10 per cent equals one-tenth, etc., he can then be brought to see that such rates as 35 per cent, 65 per cent, 17 per cent, 14 per cent are almost equal to one-third, two-thirds, one-sixth, and one-seventh, respectively. Hence, 35 per cent of \$14,265.36 will be slightly more than one-third of it, or in the neighborhood of \$5,000. This information will keep him from accepting an answer as correct that is a gross error, though obtained by what he thinks a correct set of calculations.

Stocks with a face value of \$86,540 sold at 14 per cent below par. What did they bring? Fourteen per cent is about one-seventh. A glance at the face value shows that one-seventh of it is about \$12,000. This subtracted from the face value leaves about \$74,500. This fixes the approximate value of the answer.

Suppose the problem requires that the rate be found. The principle is the same. Goods bought for \$47 sold at \$56, find per cent of gain. The gain is \$9. This is slightly less than one-fifth of \$47. One-fifth equals 20 per cent. The gain is slightly less than 20 per cent. The pupil who thinks thus will never be in any danger of taking 1.9 per cent or 190 per cent for the answer.

It is not the intention of the writer to advocate the non-usage of the ordinary methods of solving problems in percentage. But he

strongly urges that all per cents be thought of as ordinary fractions and preliminary approximations to the result secured before the written calculation (when one is necessary) is undertaken at all. This will cause no loss of time, but, on the contrary, will result in a great saving of time, and what is vastly more important, in making the student eventually sure-footed.

EXERCISES

The student should give oral answers to problems like these very rapidly and with considerable accuracy:

9% of \$8,963.	$\frac{1}{2}$ of 1% of \$97,563.
2% of \$659.35.	$\frac{1}{10}$ of 1% of \$3,865,429.
11% of \$2,256.	$16\frac{2}{3}\%$ of \$19.50.
12% of \$1,856.	8% of \$3,258.95.

Approximately what simple fraction is equal to 17%, 35%, 41%, 83%, 65%, 19%, 8%, 7%, 14%?

What per cent, approximately, is each of these fractions: $\frac{1}{7}$, $\frac{1}{8}$, $\frac{1}{5}$, $\frac{1}{6}$, $\frac{2}{9}$, $\frac{3}{7}$, $\frac{4}{11}$, $\frac{1}{50}$, $\frac{1}{100}$, $\frac{1}{16}$, $\frac{1}{26}$, $\frac{4}{9}$, $\frac{5}{7}$?

DIRECTIONS FOR CONDUCTING THE CONTEST.

Read carefully the rules contained in Bulletin No. 2622, pp. 41-42.

The Director of Arithmetic should furnish each contestant with a copy of this Bulletin, No. 2638, after the contestants are assembled in the room and ready to begin the contest. They will be furnished free of charge from the State Office upon request. The Director of Arithmetic should, however, make a careful estimate of the number he will need. No contestant should be allowed to bring with him his individual copy of the Bulletin. After each contestant has been provided with a copy, the drawing should be made to determine the number of the problem with which the contest is to begin, see Rule 3, p. 41, Bulletin No. 2622. The contestant should be instructed *not* to copy down the problem, but simply to write down the number of the problem in parenthesis, with his answer after it in each case. For illustration, say that the contest begins with No. 832: The contestant should write the number thus: (832) and place his answer immediately after it, and (833) with the answer immediately after it, and so on. If he cannot solve a problem, he should write down the number of it in the same way, leaving space for the answer blank. This facilitates the grading.

Graders of the arithmetic papers shall be furnished with and shall observe the following instructions:

In the contest problems (except those involving merely simple addition and subtraction) answers within 5% of the correct answer will be graded 5; that is, such are considered a "solution" within the meaning of Rule 4, page 41 of the Constitution and Rules. Answers in error by more than 5% will be graded 0.

Example: Find 20% of 8625. The correct answer is 1725. Five per cent of this answer is 86. $1725 + 86 = 1811$. $1725 - 86 = 1639$. Any answer between 1639 and 1811 will be graded 5. Any answer less than 1639 or greater than 1811 will be graded zero.

In problems of simple addition or subtraction, the answer must be exact to be graded 5.* The method of computing the scores is fully covered in Rule 4, p. 41, Bulletin No. 2622.

CONTEST PROBLEMS

(1). A car which cost \$1,200 was sold for \$400. What was the per cent loss?

(2). Coal which cost \$8 a ton was sold for \$11 a ton. What was the per cent gain?

*By "simple addition or subtraction" is meant problems in which plus and minus signs are used and does not include any of the statement-problems.

- | | |
|---------------------------|----------------------|
| (3). $21+36$ | (9). $73+21+67$ |
| (4). $41+92$ | (10). $82+35+61$ |
| (5). 24×39 | (11). $97-38$ |
| (6). 49×57 | (12). $64-26$ |
| (7). $\frac{1}{5}$ of 653 | (13). $71-34$ |
| (8). $\frac{1}{3}$ of 891 | (14). 34×27 |

Approximately what per cent is each of these fractions:

- | | | |
|----------------------|---------------------|---------------------|
| (15). $\frac{3}{25}$ | (16). $\frac{1}{7}$ | (17). $\frac{5}{9}$ |
|----------------------|---------------------|---------------------|

Approximate what simple fraction is equal to:

- | | | |
|----------|-----------|-----------|
| (18). 2% | (19). 81% | (20). 12% |
|----------|-----------|-----------|

(21). A man bought goods for \$3.82, sold them, and lost 100%. What did he get for the goods?

(22). If a farmer feeds his stock $\frac{1}{4}$ bushel of corn daily, how long will $8\frac{1}{2}$ bushels last?

- | | |
|----------------------|----------------------------|
| (23). 9% of 2500 | (29). 8% of 640 |
| (24). 12% of \$480 | (30). 81% of \$250 |
| (25). $57-28$ | (31). 52×67 |
| (26). $87-29$ | (32). 69×26 |
| (27). $94-19$ | (33). 12×38 |
| (28). 17×49 | (34). $\frac{2}{5}$ of 643 |

(35). Sugar which cost 8 cents a pound was sold for 11 cents a pound. What was the per cent gain?

(36). If 7% of a farm is 25 acres, how many acres are there in the whole farm?

- | | |
|----------------------------|--------------------------------|
| (37). $47+36$ | (45). $29+42$ |
| (38). $26+44$ | (46). $17+29$ |
| (39). $14+18+16$ | (47). $23+7+27$ |
| (40). 13×93 | (48). 15×74 |
| (41). 21×92 | (49). 86×11 |
| (42). 97×25 | (50). 26×67 |
| (43). $\frac{1}{8}$ of 961 | (51). $\frac{1}{7}$ of 856 |
| (44). 39% of 325 | (52). $12\frac{1}{2}\%$ of 888 |

Approximately what simple fraction is equal to:

- | | | |
|----------|-----------|-----------|
| (53). 6% | (54). 20% | (55). 87% |
|----------|-----------|-----------|

Approximately what per cent is each of the following fractions:

- | | | |
|---------------------|----------------------|-----------------------|
| (56). $\frac{2}{5}$ | (57). $\frac{5}{18}$ | (58). $\frac{13}{40}$ |
|---------------------|----------------------|-----------------------|

- | | |
|----------------------------|----------------------------|
| (59). $62-28$ | (64). $74-38$ |
| (60). $87-51$ | (65). $102-91$ |
| (61). $64-27$ | (66). $61-49$ |
| (62). 6% of \$33.50 | (67). $\frac{3}{8}$ of 649 |
| (63). $\frac{2}{7}$ of 533 | (68). 9% of \$7488 |

(69). A car costing \$650 was sold at 10% gain. What was the amount of gain?

(70). A car costing \$650 was sold, and the amount of gain was \$18.50. What was the rate of gain?

- | | |
|----------------------|--------------------------------|
| (71). 14×64 | (84). $94-57$ |
| (72). 19×81 | (85). 67% of \$715 |
| (73). 20×59 | (86). 9% of \$7488 |
| (74). $47-23$ | (87). $\frac{3}{4}$ of \$85.70 |
| (75). $21+19$ | (88). $\frac{3}{8}$ of 649 |
| (76). $62+31$ | (89). 50×453 |
| (77). $47-23$ | (90). $15+17+12$ |
| (78). 46×16 | (91). 14% of \$490 |
| (79). 33×86 | (92). 17% of \$74.88 |
| (80). 66×65 | (93). $\frac{4}{11}$ of \$243 |
| (81). $94-57$ | (94). $\frac{1}{12}$ of 6546 |
| (82). $75+83$ | (95). 75×84 |
| (83). $48+26$ | (96). $16+14+28$ |

Approximately what per cent is each of these fractions:

- (97). $\frac{1}{8}$ (98). $\frac{1}{26}$ (99). $\frac{1}{16}$

Approximately what simple fraction is equal to:

- (100). 3% (101). 67% (102). 9%

- | | |
|-----------------------|-----------------------|
| (103). 50% of \$7.48 | (113). 11% of \$748 |
| (104). 10% of \$937 | (114). 25% of \$9370 |
| (105). 49% of \$8532 | (115). 74% of \$579 |
| (106). 24×21 | (116). 49×34 |
| (107). 17×83 | (117). 25×99 |
| (108). 26×55 | (118). 12×78 |
| (109). $27+35+16$ | (119). $25+37+91$ |
| (110). $18+24+55$ | (120). $24+18+26$ |
| (111). $74+16$ | (121). $23+48$ |
| (112). $47-23$ | (122). $94-57$ |

(123). A man's expenses are \$28 a week, which is 70% of his salary. How much does he earn in a week?

(124). In a certain school 96 students study arithmetic. Forty-eight per cent of the students study arithmetic. How many students are there in the school?

(125). A school enrolls 230 boys, which is 115% of the number of girls enrolled. How many students are there in the school?

- | | |
|-------------------------------|------------------------------|
| (126). $47-23$ | (138). $94-57$ |
| (127). $26-18$ | (139). $54-39$ |
| (128). $91-37$ | (140). $46-28$ |
| (129). 13×49 | (141). 15×58 |
| (130). 36×21 | (142). 43×67 |
| (131). 92×14 | (143). 16×80 |
| (132). $\frac{3}{10}$ of 8741 | (144). $\frac{5}{9}$ of 6439 |
| (133). $\frac{2}{11}$ of 3333 | (145). 33% of \$84 |
| (134). 8% of \$3460 | (146). 15% of \$585 |
| (135). $14+37+21$ | (147). $42+63+91$ |
| (136). $73+94$ | (148). $64+37$ |
| (137). $30+47$ | (149). $18+38$ |

What per cent, approximately, is each of these fractions:

- (150). $\frac{4}{11}$ (151). $\frac{3}{20}$ (152). $\frac{3}{5}$

What simple fraction is approximately equal to:

- (153). 7% (154). 41% (155). 11%

- | | |
|--|--------------------------------|
| (156). 75×77 | (164). 11×148 |
| (157). 19×987 | (165). 33×791 |
| (158). 11×19 | (166). 13×17 |
| (159). $71 + 62$ | (167). $43 + 17$ |
| (160). $64 + 24$ | (168). $53 + 27$ |
| (161). $76 - 57$ | (169). $61 - 42$ |
| (162). $\frac{1}{3}$ of $\frac{3}{8}$ of 675 | (170). $\frac{1}{5}$ of \$2491 |
| (163). 87% of 214 | (171). 65% of 84 |

Fill in the blank in each of the following with the right figures:

	Cost	Rate of gain	Amount of gain
(172).	-----	$16\frac{2}{3}\%$	\$ 12.60
(173).	-----	15%	\$185.00
(174).	\$2596	14%	-----

- | | |
|------------------------------|------------------------------|
| (175). $22 + 44 + 87$ | (189). $17 + 18 + 76$ |
| (176). $72 + 43$ | (190). $64 + 19$ |
| (177). $17 + 98$ | (191). $38 + 33$ |
| (178). $\frac{4}{9}$ of 8971 | (192). $\frac{2}{9}$ of 1863 |
| (179). $\frac{2}{7}$ of 1591 | (193). $\frac{2}{5}$ of 5630 |
| (180). 21% of 865 | (194). 24% of 725 |
| (181). 32% of 891 | (195). 17% of 536 |
| (182). $32 - 19$ | (196). $47 - 33$ |
| (183). $44 - 28$ | (197). $72 - 18$ |
| (184). $97 - 42$ | (198). $49 - 32$ |
| (185). 66×45 | (199). 11×21 |
| (186). 634×50 | (200). 13×21 |
| (187). 12×23 | (201). 30×184 |
| (188). 17×12 | (202). 11×15 |

What per cent, approximately, is each of these fractions:

- | | | |
|----------------------|-----------------------|----------------------|
| (203). $\frac{3}{7}$ | (204). $\frac{5}{12}$ | (205). $\frac{4}{5}$ |
|----------------------|-----------------------|----------------------|

Approximately what simple fraction is equal to:

- | | | |
|-----------|------------|-----------|
| (206). 4% | (207). 65% | (208). 8% |
|-----------|------------|-----------|

- | | |
|------------------------------|-------------------------------|
| (209). $24 + 96 + 48$ | (213). $21 + 47 + 26$ |
| (210). 17×25 | (214). 14×22 |
| (211). $70 - 43$ | (215). $49 - 35$ |
| (212). $\frac{2}{3}$ of 5164 | (216). $\frac{2}{11}$ of 3521 |

(217). A man is 60 years old, and his age is 110 per cent of his wife's age. How old is his wife?

(218). 40% of a certain ship's cargo is 250 barrels. How many barrels are there in the whole cargo?

(219). 80% of the population of a certain city is 64,000. What is the population?

- | | |
|-----------------------------------|---------------------------------|
| (220). 10×15 | (230). $36 + 15 + 29$ |
| (221). 11×25 | (231). 10×23 |
| (222). 13×15 | (232). $\frac{7}{8}$ of \$37.18 |
| (223). 18×19 | (233). 67% of 842 |
| (224). $\frac{4}{25}$ of \$371.80 | (234). $\frac{3}{50}$ of \$891 |
| (225). 67% of \$3.72 | (235). $93 - 84$ |
| (226). 17% of 960 | (236). $75 - 37$ |
| (227). $95 - 18$ | (237). $48 + 29$ |
| (228). $42 - 28$ | (238). $19 + 54 + 21$ |
| (229). $92 + 34$ | (239). 14×25 |

(240). Jack is 15 years old, and his age is 30% of his father's age. How old is his father?

- | | |
|-----------------------|--------------------------------|
| (241). 18×21 | (251). 12×14 |
| (242). 36×87 | (252). 21×94 |
| (243). $47 - 19$ | (253). $54 - 39$ |
| (244). $79 - 36$ | (254). $54 - 27$ |
| (245). $4/9$ of 1897 | (255). $4/7$ of 1584 |
| (246). $4/11$ of 3591 | (256). $4/5$ of 5521 |
| (247). 88% of 763 | (257). $62\frac{1}{2}\%$ of 80 |
| (248). 14% of 776 | (258). 23% of 659 |
| (249). $91 + 25 + 45$ | (259). $27 + 73 + 21$ |
| (250). $56 + 73$ | (260). $72 + 29$ |

What per cent, approximately, is each of these fractions:

- | | | |
|---------------------------------------|------------------------------------|---------------|
| (261). $1/5$ | (262). $4/9$ | (263). $5/16$ |
| (264). $\frac{1}{2}$ of 25% of \$3260 | (270). $\frac{1}{3}$ of 60% of 687 | |
| (265). 34% of \$9217 | (271). 5% of \$2589 | |
| (266). $24 + 72$ | (272). $63 + 92$ | |
| (267). 18×10 | (273). 13×22 | |
| (268). 39×81 | (274). 55×80 | |
| (269). $59 - 39$ | (275). $47 - 18$ | |

Approximately what simple fraction is equal to:

- | | | |
|------------|------------|------------|
| (276). 79% | (277). 35% | (278). 10% |
|------------|------------|------------|

(279). 15 is what per cent of 60?

(280). A man receives \$1650 a year, and his expenses are $87\frac{1}{2}\%$ of his income. How much has he left?

- | | |
|---------------------------------|-----------------------|
| (281). $62 + 17 + 27$ | (287). $43 + 52 + 55$ |
| (282). $95 + 81$ | (288). $57 + 59$ |
| (283). 12×13 | (289). 13×23 |
| (284). $98 - 84$ | (290). $89 - 33$ |
| (285). 34% of \$92.17 | (291). 5% of \$2580 |
| (286). $\frac{2}{3}$ of \$24.91 | (292). $1/9$ of \$249 |

What per cent, approximately, is each of these fractions:

- | | | |
|--------------|----------------|----------------|
| (293). $3/5$ | (294). $11/31$ | (295). $33/65$ |
|--------------|----------------|----------------|

(296). The number of pupils in daily attendance in a certain school is 420, which is 90% of the number enrolled. How many pupils are enrolled?

- | | |
|-------------------------------------|-----------------------------------|
| (297). 576×66 | (306). 319×83 |
| (298). 20×24 | (307). 26×15 |
| (299). $12\frac{1}{2}\%$ of \$51.25 | (308). $8\frac{1}{3}\%$ of \$6.25 |
| (300). $2/5$ of 3987 | (309). $\frac{1}{4}$ of 6402 |
| (301). $6/25$ of \$398 | (310). $\frac{2}{3}$ of \$640 |
| (302). $36 + 16 + 44$ | (311). $24 + 87 + 29$ |
| (303). $85 + 26$ | (312). $87 + 66$ |
| (304). $54 - 37$ | (313). $53 - 34$ |
| (305). $79 - 53$ | (314). $92 - 46$ |

(315). A horse was sold for \$12.60 profit, which was $16\frac{2}{3}\%$ of the cost of the horse. What did the horse cost?

Fill in the blank in each of the following problems with the right figures:

	Cost	Rate of gain	Amount of gain
(316).	15%	\$185
(317).	\$2596	14%
(318).	\$2596	\$350
(319).	% of \$4591		(328). 4/25 of 8762
(320).	$\frac{1}{2}$ of 1498		(329). 2/7 of \$1705
(321).	79% of 843		(330). 41% of 7782
(322).	$14+52+43$		(331). $71+53+31$
(323).	$58+94$		(332). $61+37$
(324).	86×125		(333). 74×251
(325).	15×22		(334). 17×19
(326).	$29-12$		(335). $65-21$
(327).	$62-14$		(336). $83-75$

Approximately what simple fraction is equal to:

(337). 83%	(338). 29%	(339). 5%
(340). $50+94$	(349). $85+42$	
(341). $17+36+20$	(350). $64+35+52$	
(342). $98+45$	(351). $71+28$	
(343). 76×335	(352). 48×375	
(344). 17×24	(353). 16×21	
(345). $72-49$	(354). $41-17$	
(346). $38-23$	(355). $74-36$	
(347). $\frac{6}{7}$ of \$9126	(356). $\frac{7}{8}$ of 8452	
(348). $\frac{5}{9}$ of 7681	(357). $\frac{3}{11}$ of 1376	

(358). Lumber which cost \$63 was sold for \$84. What was the per cent gain?

(359). A merchant made 11% profit on some goods which cost him \$536. How much did he get for the goods?

(360). $\frac{5}{16}$ of \$5528	(369). $\frac{1}{14}$ of \$795
(361). $\frac{1}{12}$ of 572	(370). 2% of \$37.24
(362). 12% of \$375	(371). 95% of \$792
(363). $36+24$	(372). $45+16$
(364). $15+87$	(373). $46+28$
(365). 52×73	(374). 26×81
(366). 18×24	(375). 15×17
(367). $91-27$	(376). $31-17$
(368). $92-67$	(377). $48-37$

Approximately what per cent is each of these fractions:

(378). $\frac{7}{8}$	(379). $\frac{4}{25}$	(380). $\frac{2}{3}$
(381). $71+21+19$	(389). $41+29+17$	
(382). $32+46$	(390). $76+94$	
(383). $\frac{1}{7}$ of \$8570	(391). 17% of \$188	
(384). 6% of 7920	(392). 49% of 3974	
(385). $91-23$	(393). $64-29$	
(386). $75-19$	(394). $49-27$	
(387). 15×12	(395). 28×17	
(388). 419×380	(396). $63 \times 16\%$	

(397). Find the cost of $\frac{1}{8}$ of a sack of flour, if a sack of flour costs \$6 24.

(398.) Mary is twice as old as John, who is $\frac{1}{4}$ as old as their father. If the father is 40 years old, how old is Mary?

- | | |
|----------------------------------|------------------------------|
| (399). 25×371 | (415). $52 + 36$ |
| (400). $85 \times 12\frac{1}{2}$ | (416). $31 + 47$ |
| (401). $88 - 23$ | (417). 10% of \$4895 |
| (402). 4% of \$1096 | (418). 52% of 869 |
| (403). $\frac{4}{11}$ of \$2190 | (419). $\frac{6}{25}$ of 936 |
| (404). $57 + 24$ | (420). $\frac{5}{7}$ of 261 |
| (405). 74×80 | (421). $92 - 45$ |
| (406). 88×41 | (422). $97 - 36$ |
| (407). $98 - 36$ | (423). 11×71 |
| (408). 8% of \$657 | (424). 18×22 |
| (409). $\frac{1}{50}$ of \$420 | (425). $35 + 27$ |
| (410). $26 + 43$ | (426). $55 + 30$ |
| (411). $72 - 13$ | (427). 20% of \$1208 |
| (412). $59 - 19$ | (428). 18% of 666 |
| (413). 26×30 | (429). $\frac{1}{26}$ of 782 |
| (414). 21×17 | (430). $\frac{3}{4}$ of 263 |

What per cent, approximately, is each of these fractions:

- (431). $\frac{1}{6}$ (432). $\frac{1}{9}$ (433). $\frac{7}{20}$

Approximately what simple fraction is equal to:

- (434). 25% (435). 74% (436). 49%

(437). 12 is what per cent of 36?

(438). A man travels two miles in 9 minutes. At that rate, how many miles would he travel in one hour?

- | | |
|---------------------------------|-------------------------------------|
| (439). 75% of \$432 | (449). 83% of \$961 |
| (440). 23% of \$43.20 | (450). $12\frac{1}{2}\%$ of \$96.10 |
| (441). $\frac{1}{7}$ of \$36.51 | (451). $\frac{2}{7}$ of \$365.10 |
| (442). $\frac{3}{7}$ of \$36.51 | (452). $\frac{5}{7}$ of \$36.51 |
| (443). $64 - 43$ | (453). $96 - 37$ |
| (444). $50 - 21$ | (454). $86 - 63$ |
| (445). 17×84 | (455). 26×11 |
| (446). 13×54 | (456). 15×94 |
| (447). $42 + 83 + 92$ | (457). $63 + 11 + 21$ |
| (448). $35 + 29$ | (458). $19 + 71$ |

Fill in the blank in each of the following with the right figures:

- | | Cost | Rate of gain | Amount of gain |
|--------|------------------------|--------------|-----------------------------|
| (459). | \$ 65.41 | 11% | ----- |
| (460). | ----- | 12% | \$ 63 |
| (461). | ----- | 35% | \$740 |
| (462). | $87 + 64$ | | (472). $29 + 17$ |
| (463). | $16 + 11$ | | (473). $84 + 42$ |
| (464). | 12×25 | | (474). 13×14 |
| (465). | 561×540 | | (475). 835×19 |
| (466). | $37 - 19$ | | (476). $88 - 32$ |
| (467). | $56 - 23$ | | (477). $59 - 24$ |
| (468). | $53 - 41$ | | (478). $56 - 25$ |
| (469). | 33% of \$5746 | | (479). 50% of \$9875 |
| (470). | $\frac{3}{5}$ of 5195 | | (480). $\frac{4}{5}$ of 176 |
| (471). | $\frac{3}{50}$ of 6420 | | (481). $\frac{5}{6}$ of 185 |

Express as percents:

(482). $1/10$

(483). $\frac{3}{8}$

(484). $1/14$

Express as simple fractions:

(485). 14%

(486). 33%

(487). 17%

(488). A house which cost \$5000 was sold for \$6250. What was the per cent gain?

(489). A farm which cost \$3000 was sold, and the profit was \$600. What was the per cent profit?

(490). 76×253

(496). $85 \times 33\frac{1}{3}$

(491). 26×12

(497). 16×55

(492). $37 + 23$

(498). $24 + 17$

(493). $62 + 31$

(499). $95 + 21$

(494). 29% of \$590

(500). 81% of \$895

(495). $\frac{2}{3}$ of 739

(501). $4/7$ of 625

(502). 12 is what per cent of 84?

(503). $84 - 45$

(511). $57 - 46$

(504). $59 - 38$

(512). $67 - 43$

(505). $66 - 24$

(513). $64 - 38$

(506). $\frac{5}{8}$ of 520

(514). $3/9$ of 7632

(507). $7/9$ of 3186

(515). $3/16$ of 273

(508). $22 + 76$

(516). $93 + 43$

(509). $65 + 15$

(517). $47 + 26$

(510). $46 + 92 + 25$

(518). $13 + 71 + 54$

(519). Cotton which cost 24 cents a pound was sold for 27 cents a pound. What was the per cent profit?

(520). A ship which cost \$13,500 was sold, and the loss was 17%. What was the amount of the loss?

(521). $92 + 38$

(530). $75 + 69$

(522). $29 + 48$

(531). $21 + 77$

(523). 98×125

(532). 60×193

(524). 12×16

(533). 11×24

(525). $57 - 45$

(534). $69 - 47$

(526). $56 - 48$

(535). $71 - 53$

(527). 85% of 845

(536). 75% of 6946

(528). 39% of 925

(537). 52% of 587

(529). $3/20$ of 648

(538). $1/33$ of 3527

(539). 13 is what per cent of 52?

What per cent, approximately, is each of these fractions?

(540). $3/50$

(541). $5/6$

(542). $\frac{1}{3}$

(543). How many square feet are there in the floor of a room 24 feet by 73 feet?

(544). What is the per cent of gain on potatoes which cost $3\frac{1}{2}$ cents a pound, and were sold for 5 cents a pound?

- | | |
|-----------------------------------|------------------------------|
| (545). 13×19 | (554). 12×24 |
| (546). 850×75 | (555). 16×19 |
| (547). $99-42$ | (556). $61-46$ |
| (548). $92-76$ | (557). $86-38$ |
| (549). $87\frac{1}{2}\%$ of \$278 | (558). 88% of \$139 |
| (550). $\frac{1}{7}$ of 416 | (559). $\frac{1}{5}$ of 4311 |
| (551). $\frac{1}{9}$ of 741 | (560). $\frac{3}{7}$ of 624 |
| (552). $45+46+32$ | (561). $23+91+75$ |
| (553). $86+82$ | (562). $19+46$ |

Approximately what simple fraction is equal to:

- (563). 87% (564). 49% (565). $\frac{1}{28}$

Fill in the blank in each of the following with the right figures:

- | | Cost | Rate of gain | Amount of gain |
|--------|-----------------------|--------------|-------------------------------|
| (566). | ----- | 42% | \$126.30 |
| (567). | \$846 | ----- | \$ 38.75 |
| (568). | $52+64$ | | (577). $42+27$ |
| (569). | $58+36$ | | (578). $24+67$ |
| (570). | 125% of \$95 | | (579). 120% of \$10.50. |
| (571). | $\frac{5}{12}$ of 464 | | (580). $\frac{3}{20}$ of 2915 |
| (572). | 3% of 576 | | (581). 67% of 925 |
| (573). | $92-78$ | | (582). $76-58$ |
| (574). | $77-63$ | | (583). $78-57$ |
| (575). | 14×18 | | (584). 17×20 |
| (576). | 24×59 | | (585). 49×64 |

Approximately what per cent is each of these fractions?

- (586). $\frac{5}{4}$ (587). $\frac{4}{3}$ (588). $\frac{4}{32}$

(589). A house was sold for \$7000, and the contractor made \$900 by the sale. How much did the house cost him?

- | | |
|----------------------------------|--------------------------------|
| (590). 50×17 | (600). 19×25 |
| (591). 16×82 | (601). 17×37 |
| (592). $93-61$ | (602). $98-79$ |
| (593). $89-62$ | (603). $64-27$ |
| (594). $16\frac{2}{3}\%$ of 1256 | (604). $8\frac{1}{2}\%$ of 954 |
| (595). 72% of 835 | (605). 85% of 936 |
| (596). $\frac{1}{5}$ of \$3.56 | (606). $\frac{2}{5}$ of \$35 |
| (597). $\frac{1}{9}$ of \$356 | (607). $\frac{1}{7}$ of 35c |
| (598). $92+32+29$ | (608). $16+58+64$ |
| (599). $53+45$ | (609). $99+69$ |

Approximately what simple fractions is equal to:

- (610). 11% (611). 14% (612). 74%

(613). A farmer plants 65% of his farm in cotton. If he has 325 acres of cotton, how many acres are there in his whole farm?

- | | |
|---------------------------------|------------------------------|
| (614). $23+47$ | (624). $76+49$ |
| (615). $29+71$ | (625). $22+84$ |
| (616). 133% of \$450 | (626). 167% of \$60 |
| (617). 72% of 270 | (627). 5% of 338 |
| (618). $\frac{7}{20}$ of \$2750 | (628). $\frac{3}{8}$ of 273 |
| (619). $\frac{4}{25}$ of 814 | (629). $\frac{1}{2}$ of 4811 |
| (620). 61—55 | (630). 82—66 |
| (621). 64—25 | (631). 96—55 |
| (622). 16×24 | (632). 15×19 |
| (623). 21×844 | (633). 67×85 |

(634). A stock of damaged goods sold for 15% less than the cost, and the merchant thereby lost \$200. How much did the goods cost the merchant?

- | | |
|-----------------------------------|---|
| (635). 96×17 | (645). 18×23 |
| (636). 14×19 | (646). 21×32 |
| (637). 83—68 | (647). 38—22 |
| (638). 69—47 | (648). 75—24 |
| (639). $\frac{4}{25}$ of \$371.80 | (649). $\frac{1}{16}$ of \$645 |
| (640). $\frac{7}{8}$ of \$37.18 | (650). $\frac{1}{3}$ of $\frac{3}{4}$ of \$80 |
| (641). 5% of \$3718 | (651). $\frac{5}{7}$ of \$247 |
| (642). 25% of \$3.72 | (652). $\frac{2}{9}$ of \$24.70 |
| (643). $64+42+83$ | (653). $48+31+62$ |
| (644). $92+45$ | (654). $65+76$ |

What per cent, approximately, is each of these fractions:

- | | | |
|----------------------|----------------------|----------------------|
| (655). $\frac{5}{8}$ | (656). $\frac{6}{7}$ | (657). $\frac{5}{6}$ |
|----------------------|----------------------|----------------------|

Fill in the blank in each of the following with the right figures:

- | | Cost | Rate of gain | Amount of gain |
|--------|----------------------|--------------|-----------------------------|
| (658). | \$ 931 | | \$ 37.50 |
| (659). | \$1875 | 21% | ----- |
| (660). | $29+45$ | | (670). $51+47$ |
| (661). | $54+82$ | | (671). $26+79$ |
| (662). | 79% of \$64.50 | | (672). 10% of 60c |
| (663). | 3% of \$24.63 | | (673). 41% of \$198 |
| (664). | $\frac{1}{7}$ of 476 | | (674). $\frac{1}{5}$ of 942 |
| (665). | $\frac{1}{9}$ of 846 | | (675). $\frac{3}{7}$ of 745 |
| (666). | 59—43 | | (676). 71—24 |
| (667). | 46—38 | | (677). 78—22 |
| (668). | 33×42 | | (678). 17×66 |
| (669). | 49×815 | | (679). 26×52 |

(680). A man with \$24 spent $\frac{1}{4}$ of what he had for a pair of shoes. How much money did he have left?

- | | |
|----------------------------------|-----------------------------------|
| (681). 125×43 | (691). 33×180 |
| (682). 120×84 | (692). 75×348 |
| (683). 51—23 | (693). 89—36 |
| (684). 78—14 | (694). 84—19 |
| (685). $66\frac{2}{3}\%$ of \$93 | (695). $87\frac{1}{2}\%$ of \$652 |
| (686). $6\frac{1}{4}\%$ of \$863 | (696). 11% of 594 |
| (687). $\frac{4}{11}$ of 592 | (697). $\frac{1}{50}$ of 345 |
| (688). $28+13$ | (698). $91+68$ |
| (689). $87+84+24$ | (699). $95+25+27$ |
| (690). $23+64$ | (700). $54+21$ |

Express as a simple fraction:

(701). 18% (702). 11% (703). 39%

(704). A merchant bought cloth at 80c a yard, and sold it at 25% profit. What was the selling price?

(705). $42+75$	(715). $25+47$
(706). $26+24$	(716). $27+91$
(707). $6/25$ of 678	(717). $1/26$ of 901
(708). $5/7$ of 104	(718). $3/4$ of 156
(709). 14% of \$87.60	(719). 35% of \$709
(710). 74% of \$8.76	(720). 83% of \$7.09
(711). $63-24$	(721). $98-57$
(712). $44-28$	(722). $87-39$
(713). 17×18	(723). 19×21
(714). 34×48	(724). 96×54

(725). Shoes, costing \$7 a pair, were sold at a loss of 21%. What was the selling price?

(726). 17×37	(736). 16×49
(727). 98×250	(737). 12×68
(728). $96-57$	(738). $94-39$
(729). $32-26$	(739). $75-18$
(730). 60% of \$500	(740). 70% of \$600
(731). 95% of 415	(741). 41% of 756
(732). $1/8$ of \$45.63	(742). $3/8$ of \$456.30
(733). $5/8$ of \$4.56	(743). $7/8$ of \$4563
(734). $28+56$	(744). $19+72$
(735). $82+65$	(745). $15+75$

What per cent. approximately, is each of these fractions:

(746). $5/17$ (747). $8/21$ (748). $45/83$

Fill in the blank in each of the following with the right figures:

	Cost	Rate of gain	Amount of gain
(749).	\$2563	66%	
(750).	\$8429	-----	\$1204
(751).	$19+28+39$		(761). $64+42+17$
(752).	$91+42$		(762). $48+52$
(753).	$1/9$ of \$86.51		(763). $2/9$ of \$865
(754).	$3/10$ of \$869		(764). $4/10$ of \$86.90
(755).	17% of \$15.34		(765). 51% of \$93.30
(756).	75% of \$36.18		(766). 72% of \$6.25
(757).	$93-68$		(767). $91-23$
(758).	$36-23$		(768). $34-19$
(759).	124×89		(769). 249×63
(760).	24×180		(770). 19×85

(771). At what price must goods costing \$6 be sold to gain $16\frac{2}{3}\%$

- | | |
|--------------------------|------------------------|
| (772). 865×67 | (782). 726×21 |
| (773). 32×73 | (783). 49×371 |
| (774). $93-39$ | (784). $68-24$ |
| (775). $87-75$ | (785). $71-36$ |
| (776). $3/16$ of \$48.70 | (786). $3/20$ of \$905 |
| (777). $1/33$ of \$34.80 | (787). $5/12$ of \$487 |
| (778). 7% of \$87.90 | (788). 9% of \$56.10 |
| (779). 11% of \$428 | (789). 25% of \$7628 |
| (780). $21+47+91$ | (790). $72+75+17$ |
| (781). $19+17$ | (791). $84+28$ |

Approximately what simple fraction is equal to:

- (792). 50% (793). 80% (794). 4%

(795). A merchant sold velvet at a profit of \$2 a yard and gained 20%. How much did the velvet cost?

- | | |
|-----------------------------------|---------------------------------|
| (796). $25+17$ | (806). $92+54$ |
| (797). $42+37$ | (807). $61+39$ |
| (798). 80% of \$300 | (808). 90% of \$800 |
| (799). 74% of \$836 | (809). 65% of \$767 |
| (800). $3/20$ of \$959 | (810). $7/20$ of \$371 |
| (801). $5/6$ of 287 | (811). $\frac{2}{3}$ of \$47.90 |
| (802). $79-42$ | (812). $79-62$ |
| (803). $81-26$ | (813). $86-65$ |
| (804). 375×14 | (814). 963×17 |
| (805). $12\frac{1}{2} \times 864$ | (815). 95×11 |

(816). A dealer sold a pair of boots for \$6, and thereby lost 25%. How much did the boots cost the dealer?

- | | |
|-------------------------|------------------------|
| (817). 39×61 | (827). 48×83 |
| (818). 76×145 | (828). 24×249 |
| (819). $72-13$ | (829). $67-45$ |
| (820). $75-28$ | (830). $84-52$ |
| (821). $1/10$ of 72,636 | (831). $3/10$ of 1535 |
| (822). $7/10$ of 1954 | (832). $3/25$ of 216 |
| (823). 66% of 586 | (833). 5% of 5679 |
| (824). 41% of 719 | (834). 83% of 490 |
| (825). $29+37+62$ | (835). $42+26+28$ |
| (826). $37+56$ | (836). $52+38$ |

What per cent, approximately, is each of these fractions:

- (837). $9/16$ (838). $15/47$ (839). $16/33$

Fill in the blank in each of the following with the right figures:

- | | Cost | Rate of gain | Amount of gain |
|--------|-------------------|-------------------|---------------------------|
| (840). | \$3625 | | \$310.40 |
| (841). | ----- | $12\frac{1}{2}\%$ | \$639 |
| (842). | $87+23$ | | (852). $17+16$ |
| (843). | $79+85$ | | (853). $37+21$ |
| (844). | $4/9$ of \$865.10 | | (854). $3/11$ of \$634.90 |
| (845). | $5/9$ of \$8651 | | (855). $7/10$ of \$8.69 |
| (846). | 82% of \$120.50 | | (856). 67% of \$9.30 |
| (847). | 90% of \$18.39 | | (857). 37% of \$12.86 |
| (848). | $90-67$ | | (858). $57-48$ |
| (849). | $53-36$ | | (859). $94-25$ |
| (850). | 69×32 | | (860). 841×663 |
| (851). | 216×24 | | (861). 189×33 |

(862). Wheat which cost \$1.25 a bushel was sold for \$1.20. What was the per cent loss?

- | | |
|-----------------------------|----------------------------------|
| (863). $82+48+31$ | (873). $17+23+48$ |
| (864). $45+21$ | (874). $67+23$ |
| (865). $\frac{1}{8}$ of 361 | (875). $\frac{1}{6}$ of 444 |
| (866). $\frac{2}{9}$ of 879 | (876). $\frac{1}{100}$ of 29,764 |
| (867). 7% of 658 | (877). 9% of 723 |
| (868). 14% of 260 | (878). 35% of 427 |
| (869). $81-64$ | (879). $51-39$ |
| (870). $24-17$ | (880). $79-62$ |
| (871). 21×78 | (881). 19×442 |
| (872). 51×351 | (882). 79×125 |

Approximately what simple fractions is equal to:

- (883). 74% (884). 83% (885). 79%

(886). A bale of cotton costing \$675 was sold at 15% profit. What was the amount of profit?

- | | |
|------------------------------|------------------------------|
| (887). $81+26$ | (897). $51+62$ |
| (888). $27+95$ | (898). $47+35$ |
| (889). 17% of 223 | (899). 25% of 817 |
| (890). 83% of 2323 | (900). 87% of 937 |
| (891). $\frac{1}{10}$ of 7.7 | (901). $\frac{3}{10}$ of 292 |
| (892). $\frac{4}{5}$ of 77 | (902). $\frac{2}{5}$ of 29 |
| (893). $74-18$ | (903). $56-34$ |
| (894). $62-17$ | (904). $74-38$ |
| (895). 87×93 | (905). 88×127 |
| (896). 376×253 | (906). 289×125 |

(907). A grocer sold butter at 40c a pound and gained 25%. How much did the butter cost him?

- | | |
|-------------------------------|-----------------------------------|
| (908). $75+24+56$ | (918). $65+52+28$ |
| (909). $23+17$ | (919). $52+73$ |
| (910). $\frac{7}{10}$ of 2855 | (920). $\frac{3}{25}$ of 269 |
| (911). $\frac{1}{8}$ of 5488 | (921). $\frac{1}{6}$ of 2635 |
| (912). 6% of 394 | (922). 8% of 792 |
| (913). 12% of 6904 | (923). 20% of 9094 |
| (914). $55-43$ | (924). $58-39$ |
| (915). $42-36$ | (925). $72-17$ |
| (916). 436×49 | (926). $249 \times 16\frac{2}{3}$ |
| (917). 21×72 | (927). 25×340 |

What per cent, approximately, is each of these fractions:

- (928). $\frac{19}{24}$ (929). $\frac{3}{26}$ (930). $\frac{5}{7}$

Fill in the blank in each of the following with the right figures:

- | | Cost | Rate of gain | Amount of gain |
|--------|--------|--------------|----------------|
| (931). | \$3000 | | \$ 30 |
| (932). | \$3000 | 14% | ----- |

- | | |
|--------------------------------|--------------------------------|
| (933). $18+92$ | (943). $21+36$ |
| (934). $82+49+29$ | (944). $87+43+45$ |
| (935). 4% of \$645 | (945). 10% of \$34,576 |
| (936). 33% of \$5717 | (946). 50% of \$369 |
| (937). $\frac{4}{7}$ of \$8.20 | (947). $\frac{5}{8}$ of \$9908 |
| (938). $\frac{3}{9}$ of \$267 | (948). $\frac{7}{9}$ of \$593 |
| (939). $57-53$ | (949). $64-42$ |
| (940). $95-72$ | (950). $82-68$ |
| (941). 125×76 | (951). 17×356 |
| (942). 24×314 | (952). 567×67 |

(953). A baseball glove cost \$1.80, and was sold for \$2.10. What was the per cent gain?

- | | |
|----------------------------------|-------------------------------|
| (954). $54+17+36$ | (964). $76+54+90$ |
| (955). $17+25$ | (965). $17+16$ |
| (956). $\frac{5}{11}$ of \$63.49 | (966). $\frac{9}{11}$ of 6349 |
| (957). $\frac{7}{11}$ of \$6.35 | (967). $\frac{3}{7}$ of 826 |
| (958). 120% of \$2.68 | (968). 110% of \$34.10 |
| (959). 8% of 248 | (969). 87% of 6.7 |
| (960). $77-48$ | (970). $84-19$ |
| (961). $56-24$ | (971). $46-39$ |
| (962). 12.5×81 | (972). 576×33 |
| (963). 99×53 | (973). 84×91 |

What simple fraction is approximately equal to:

- (974). 3% (975). 17% (976). 74%

(977). \$85,000 worth of bonds were sold at $12\frac{1}{2}\%$ loss. What was the selling price?

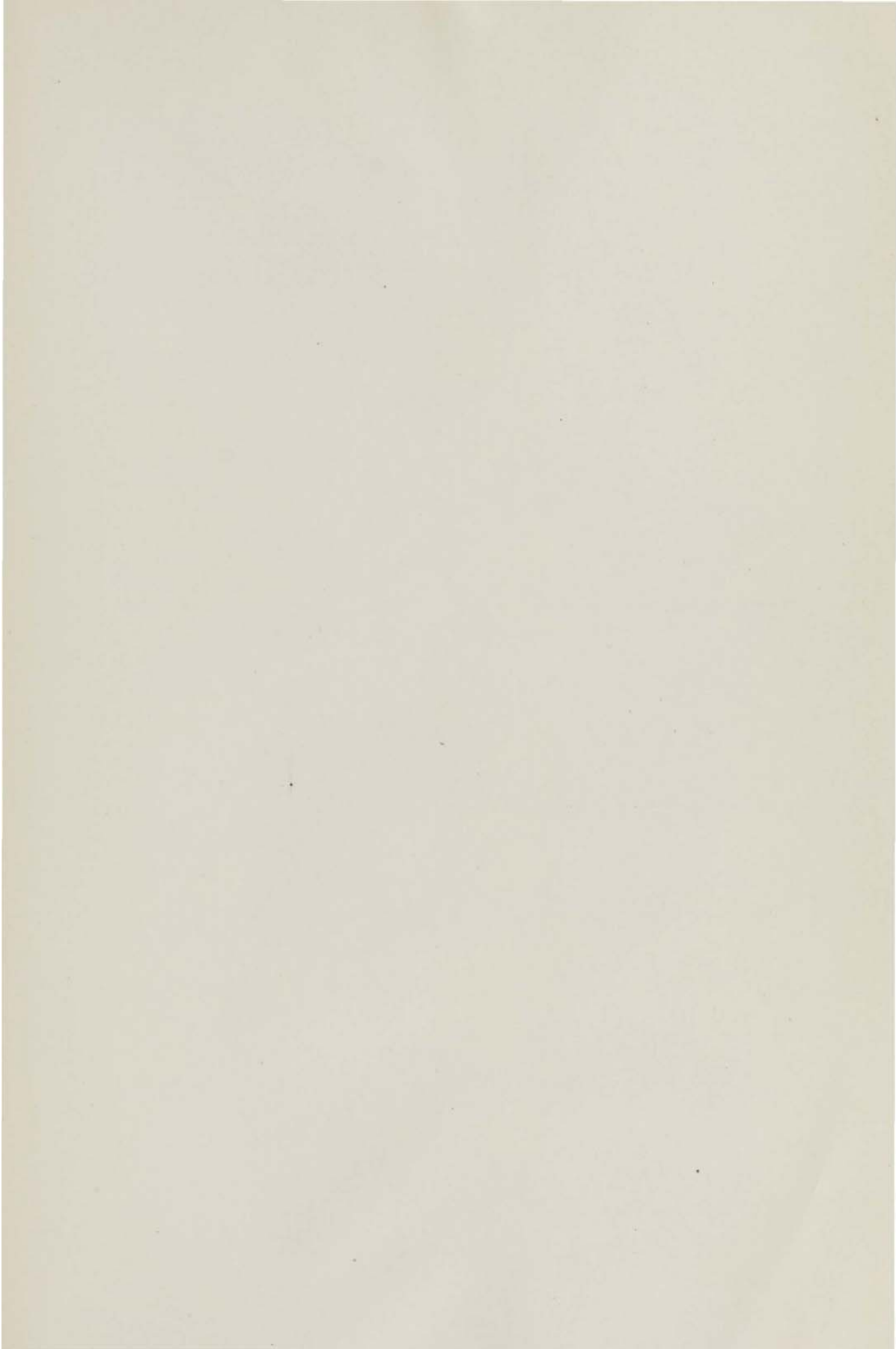
- | | |
|------------------------------|-----------------------------|
| (978). $42+87+31$ | (988). $48+52+67$ |
| (979). $92+11$ | (989). $13+42$ |
| (980). $\frac{2}{7}$ of 184 | (990). $\frac{6}{7}$ of 394 |
| (981). $\frac{7}{8}$ of 2786 | (991). $\frac{5}{9}$ of 596 |
| (982). 41% of \$27.86 | (992). 81% of 725 |
| (983). 79% of 629 | (993). 49% of 1943 |
| (984). $89-72$ | (994). $94-47$ |
| (985). $72-46$ | (995). $74-32$ |
| (986). 51×413 | (996). 83×120 |
| (987). 36×17 | (997). 250×89 |

(998). A watch costing \$80 was sold at a loss of 17%. What was the selling price?

- | | |
|--------------------------------|----------------------------------|
| (999). $51+47+52$ | (1009). $31+23+24$ |
| (1000). $13+91$ | (1010). $27+14$ |
| (1001). $\frac{3}{11}$ of 2786 | (1011). $\frac{5}{16}$ of 595 |
| (1002). $\frac{1}{14}$ of 1560 | (1012). $\frac{1}{2}$ of 4530 |
| (1003). 29% of 563 | (1013). $87\frac{1}{2}\%$ of 862 |
| (1004). 88% of 144 | (1014). 95% of 247 |
| (1005). $46-29$ | (1015). $69-47$ |
| (1006). $23-14$ | (1016). $62-49$ |
| (1007). 25×577 | (1017). 692×20 |
| (1008). 38×85 | (1018). 101×86 |

What per cent. approximately, is equal to:

- (1019). $\frac{3}{7}$ (1020). $\frac{16}{25}$ (1021). $\frac{4}{19}$



COUNTY CONTEST IN ARITHMETIC

This contest is for the purpose of developing in those students who undertake it speed and accuracy in the four fundamental operations, and a "number sense" which will enable them to compute quickly and with a fair degree of accuracy simple arithmetic problems. Teachers of arithmetic are fast getting away from puzzle problems. Guy M. Wilson, of Boston, head of the committee reporting on arithmetic to the last meeting of the National Education Association said in the oral presentation of the report that arithmetic is giving time to useless and traditional subjects which should be allotted to "the more vital citizenship aims of education," and named the following as subjects to be discarded:

Apothecaries weights, partial payments, proportion, troy weight, greatest common divisor and least common multiple, long and confusing problems in common fractions, complex and compound fractions, reductions in denominate numbers, table of folding paper, surveyor's table and tables of foreign money, compound numbers including their addition, subtraction, multiplication, and division; longitude and time, cases 2 and 3 in percentage; compound interest, annual interest; exchange, both domestic and foreign; true discount, partnership with time; ratio, beyond the ability of fractions to satisfy; most of mensuration—the trapezoid, trapezium, polygons, frustum, sphere, cube root; and the metric system.*

Stripped down to the four fundamental operations, arithmetic lends itself admirably to the contest method. The results may be quickly and objectively scored, and a spectacular element may be added which gives much zest to any contest.

RULES

1. *Eligibility*.—In addition to the general eligibility rules set forth in Article VIII of the Constitution and Rules, the following are eligible in this particular event:

(a) In independent districts, and in "high schools" wherever located (see Definition 3, Page 9), only those students in the fifth to the seventh grades, inclusive.

(b) All students in rural schools.

*This is given as an extreme illustration of the tendency towards the reduction of the subject matter of arithmetic. It would seem that the omission of the metric system would be a serious mistake.

2. *Divisions.*—There is but one division in this contest, all students eligible under Rule 1 entering and competing with each other in the same division. There shall be both a preliminary and a final contest, if there are more than six contestants entered, that is, if the teams entered comprise more than six individuals.

3: *Representation.*—The same method of selecting an arithmetic team shall be used as prescribed for selecting a Music Memory Team. See Rule 3, Page 55.

4. *Contest Problems.*—The Director of the Arithmetic Contest, who shall be appointed early in the school year by the Director General of the county, shall provide the contest problems. In case the Director of Arithmetic has contestants in the contest, or there are contestants from his school, he shall select a competent person to provide the problems. The first ten problems given shall be such as to test the number sense of the contestants, and shall be of the same general character as the sample problems given at the close of this chapter, but no one given shall be identical with any of the sample problems. These ten problems shall be followed by problems in this order: One in addition, one in subtraction, one in multiplication, and one in division, in a series of four, repeating the series until twelve problems in the four fundamental operations are given. In addition, the problems shall consist of ten numbers of not more than six figures each. In subtraction the minuend shall have seven figures and the subtrahend five figures; in multiplication a number of five digits shall be multiplied by a number of three; in division a number of seven figures shall be divided by a number of three.

All of the problems shall be written on the board before the contestants are admitted to the room. In the final contest the above directions shall be followed, using of course, different problems from those used in the preliminary.

5. *Conducting the Preliminary Contest.*—The preliminary contest shall be so placed on the program that the results may be determined before the meet is over, in order that individual contestants making or tying for first, second, third, or fourth place may engage in a final contest on a blackboard before an audience.

Before admitting the contestant to the room in which the preliminary contest is to be held, each contestant shall be given a number with instructions to place the number so given upon his contest paper, the Director listing each of the contestants and his school by his number, so that when the papers are graded, the graders will not know to which of the contestants a given paper belongs. Each contestant should be provided with pencil, and paper of uniform size. After the contestants are assembled in the room, and located as sparsely as the seating capacity will permit, the contest shall begin at a given signal, lasting twenty minutes. Contestants shall be instructed to answer the first ten problems by number, without

copying the problems, and they shall be instructed to take each problem in its regular order. They shall be instructed, also, to take the remainder of the problems in their regular order after finishing the first ten. The Director may appoint as many monitors for this contest as he deems necessary in order to assure absolutely original work.

No contestant can possibly finish all of the problems in the twenty minutes allotted, and the papers must all be collected after the twenty-minute period has passed.

6. *Scoring the Papers.*—Five points shall be awarded to each contestant for each problem that he solves correctly, and contestants shall be awarded first, second, third, and fourth place on the basis of the total points made. For illustration, first place goes to the individual making the highest number of points, second place to next highest, and so on. Tying for any one of these places entitles the individual to participate in the final. An illegible figure shall be considered an error. The same test as the one prescribed for determining legibility in the Spelling Contest shall apply in both the preliminary and final Arithmetic Contest, see p. 53, Rule 4, note.

The *team* grade is determined by dividing the total number of points made by the team by the number of individuals composing the team. The team scoring highest wins the team event, the second highest second place, and so on. For counting points in this contest on all-around championship, see Article XI of the Constitution and Rules.

It will be noted that the *final* contest is not a team—but an individual event.

7. *Final Contest.*—If the final debate and declamation program is not already too long, it will be found that the final Arithmetic Contest may be made an attractive feature of that program. Otherwise a separate auditorium with plenty of blackboard space should be provided and the public invited. The Director of Arithmetic shall have the problems of the same character and number as prescribed in the preliminary contest written on the blackboard, one set for each contestant who qualified for the final, leaving each contestant plenty of blackboard space for performing the operations. The problems shall be placed on the blackboard before the contestants are admitted to the room, so that there may be no delay in the contest. The numbers winning in the preliminary shall be called, and each contestant answering to one of the numbers shall take his place at the space reserved for him at the blackboard. If any contestant called is not present, then the next highest to the four who have qualified shall be called, so that there shall be at least four in the final contest. If there are ties in the preliminary there will be one additional contestant in the final for each tie, as provided above. At a given signal, the contestants shall begin, and continue for a

period of fifteen minutes. At the end of the period, all contestants shall immediately stop, and the graders shall proceed to grade the work. The scoring shall be done on the same basis as is prescribed in the preliminary contest, and first, second, and third places determined and announced.

8. *Awards.*—Great interest will be added to this event if the Director will secure a suitable cup for the winning team, and appropriate medals for first, second, and third place winners in the final. The State Office of the League will award a certificate to the winning team, attractively printed and suitable for framing.

9. *Assistance.*—Each issue of the *Interscholastic Leaguer* beginning in October and lasting until March will contain an article of information and advice for teachers who are training pupils for the arithmetic contest. Many sample problems will be given calculated to develop number sense and directions suggested for teaching them. John W. Calhoun, professor of Applied Mathematics in the University of Texas, will conduct this department in the *Leaguer*.

10. *Sample Contest Problems.*—The following problems are given as illustrating the character of problems which shall be given as a test of number-sense, which constitutes the first part of the examination:

One. State within one unit the products and quotients of the following:

(a) 5.23×6.81	(b) 10.256×35.8	(c) 38.4
(d) 3.14159	(e) $7 \frac{2}{9} \times 14 \frac{1}{7}$	$\frac{\quad}{2.9}$
$\frac{\quad}{.51}$		

Two. Which is nearer 7 per cent of \$2,569.37, \$17.56 or \$201.00?

Three. The correct answer to a problem is 5.3. One boy got 53, another 4.9. By how many per cent was each wrong. An answer within 2 per cent of the exact answer will be graded perfect.

Four. When is the daylight longer, when the sun rises at 7 and sets at 5, or when it rises at 5 and sets at 7?

Five. The city of Austin has 36,582 people and assesses about \$37,000,000 for taxation. State within \$100 the per capita assessment. The tax rate is $2\frac{1}{2}$ per cent. What is the average per capita tax? What is the whole tax?

(Further illustrative problems will be given in Prof. Calhoun's articles in the *Interscholastic Leaguer*.)

Number Sense Contest Directors			
Year	Test Name	State Director	Assistant State Director
1943-44	A ?	?	First year for number sense
1944-45	B ?	?	
1945-46	C ?	?	
1946-47	D ?	Dr. R. H. Bing	Dr. W.E.S. Dickerson (prepared tests)
1947-48	E ?	Dr. R. H. Bing	Dr. W.E.S. Dickerson (prepared tests)
1948-49	F ?	Dr. R. H. Bing	Dr. W.E.S. Dickerson (prepared tests)
1949-50	G ?	Dr. W. E. S. Dickerson	Dr. W.E.S. Dickerson (manager)
1950-51	H ?	Dr. W. E. S. Dickerson	Dr. W.E.S. Dickerson (manager)
1951-52	J	Dr. W. E. S. Dickerson	Dr. W.E.S. Dickerson (director)
1952-53	K	Prof. James M. Hurt	
1953-54	M	Prof. James M. Hurt	
1954-55	N	Prof. James M. Hurt	
1955-56	O	Prof. James M. Hurt	Dr. Roger Osborn
1956-57	P	Prof. James M. Hurt	
1957-58	Q	Prof. James M. Hurt	
1958-59	R	Prof. James M. Hurt	
1959-60	S	Prof. James M. Hurt	
1960-61	T	Prof. James M. Hurt	
1961-62	U	Prof. James M. Hurt	
1962-63	V	Prof. James M. Hurt	
1963-64	W	Prof. James M. Hurt	
1964-65	X	Prof. James M. Hurt	
1965-66	Y	Dr. Milo W. Weaver	Prof. James M. Hurt
1966-67	Z	Dr. Milo W. Weaver	Dr. Dale E. Walston (Elementary Director)
1967-68	AA	Dr. Milo W. Weaver	
1968-69	BB	Dr. Dale E. Walston	
1969-70	CC	Dr. Dale E. Walston	
1970-71	DD	Dr. Milo W. Weaver	Mrs. GeNelle Beck
1971-72	EE	Dr. Milo W. Weaver	
1972-73	FF	Dr. Milo W. Weaver	
1973-74	GG	Dr. Milo W. Weaver	
1974-75	HH	Mrs. GeNelle Beck	Dr. Milo W. Weaver
1975-76	II	Mrs. GeNelle Beck	Dr. Milo W. Weaver
1976-77	JJ	Mrs. GeNelle Beck	Dr. Milo W. Weaver
1977-78	KK	Mrs. GeNelle Beck	Dr. Milo W. Weaver
1978-79	LL	Mrs. GeNelle Beck	Dr. Milo W. Weaver
1979-80	MM	Mrs. GeNelle Beck	
1980-81	NN	Dr. Charles Lamb	
1981-82	OO	Dr. Charles Lamb	
1982-83	PP	Dr. Charles Lamb	
1983-84	QQ	Dr. Charles Lamb	
1984-85	RR	Dr. Charles Lamb	
1985-86	SS	Mrs. GeNelle Beck	Mr. Don Skow
1986-87	TT	Mrs. GeNelle Beck	Mr. Don Skow
1987-88	UU	Mr. Don Skow	
1988-89	VV	Mr. Don Skow	

1989-90	WW	Mr. Don Skow	
1990-91	XX	Mr. Don Skow	
1991-92	YY	Mr. Don Skow	
1992-93	ZZ	Mr. Don Skow	
1993-94	1993-94	Mr. Don Skow	
1994-95	1994-95	Mr. Don Skow	
1995-96	1995-96	Mr. Don Skow	
1996-97	1996-97	Mr. Don Skow	
1997-98	1997-98	Mr. Don Skow	
1998-99	1998-99	Mr. Don Skow	
1999-00	1999-00	Mr. Don Skow	
2000-01	2000-01	Mr. Don Skow	
2001-02	2001-02	Mr. Don Skow	
2002-03	2002-03	Mr. Larry White	Mr. Don Skow
2003-04	2003-04	Mr. Larry White	Mr. Don Skow
2004-05	2004-05	Mr. Larry White	Mr. Don Skow
2005-06	2005-06	Mr. Larry White	Mr. Don Skow
2006-07	2006-07	Mr. Larry White	Mr. Don Skow
2007-08	2007-08	Mr. Larry White	Mr. Don Skow
2008-09	2008-09	Mr. Larry White	Mr. Don Skow
2009-10	2009-10	Mr. Larry White	Mr. Don Skow
2010-11	2010-11	Mr. Larry White	Mr. Don Skow
2011-12	2011-12	Mr. Larry White	Mr. Don Skow
2012-13	2012-13	Mr. Larry White	Mr. Don Skow
2013-14	2013-14	Mr. Larry White	Mr. Don Skow
2014-15	2014-15	Mr. Larry White	Mr. Don Skow
2015-16	2015-16	Mr. Larry White	Mr. Don Skow
2016-17	2016-17	Mr. Larry White	Mr. Don Skow
2017-18	2017-18	Mr. Larry White	Mr. Don Skow
2018-19	2018-19	Mr. Larry White	Mr. Don Skow
2019-20	2019-20	Mr. Larry White	Mr. Don Skow
2020-21	2020-21	Mr. Larry White	Mr. Cliff McCurdy
2021-22	2021-22	Mr. Larry White	Mr. Cliff McCurdy
2022-23	2022-23	Mr. Larry White	Mr. Cliff McCurdy



Number Sense State Champions

Year	Conf	Type	School	Student Names
1943- 1944		Individual	Forney	Carrol Trail
1944- 1945		Individual	Amarillo	Joe Perry
1945- 1946		Individual	Rio Hondo	David Gavenda
1946- 1947		Individual	Rio Hondo	David Gavenda
1947- 1948	1A	Individual	Marble Falls	Paula Kae Leforge
1947- 1948	2A	Individual	Lubbock	Jack Alderson
1947- 1948	B	Individual	Claude	Donald Bagwell
1947- 1948	B	Individual	Moulton	Francis Fisbeck
1948- 1949	1A	Individual	Marble Falls	Alvin Ray idell
1948- 1949	2A	Individual	Lubbock	Coleen Baldwin
1948- 1949	2A	Individual	Sweetwater	Jack Scott
1948- 1949	B	Individual	Woodsboro	Bob Carpenter
1948- 1949	B	Individual	Alpine	Ronald Klein
1949- 1950	1A	Individual	Marble Falls	Jerry Michel
1949- 1950	2A	Individual	El Paso	Nancy Wilbanks
1949- 1950	B	Individual	Miami	Gene Hodges
1950-	1A	Individual	Pharr-San Juan-Alamo	Morrie McCharen

Year	Conf	Type	School	Student Names
1951				
1950- 1951	2A	Individual	El Paso	Jimmy Webb
1950- 1951	B	Individual	Alpine	Bob Duncan
1951- 1952	1A	Individual	Hereford	Richard Tucker
1951- 1952	2A	Individual	El Paso	Maurice Bryson
1951- 1952	B	Individual	Woodson	Craig Boyd
1952- 1953	1A	Individual	Taylor	Marvin Kuehner
1952- 1953	2A	Individual	El Paso	Betty McAfee
1952- 1953	B	Individual	Schulenburg	Lester Ray Koether
1953- 1954	1A	Individual	Llano	James Gray
1953- 1954	2A	Individual	El Paso	Phillip Seeger
1953- 1954	B	Individual	Giddings	Allan Marburger
1954- 1955	1A	Individual	Floydada	Leon Wiley
1954- 1955	2A	Individual	Pharr-San Juan-Alamo	Sandy Crabner
1954- 1955	B	Individual	Dayton	Mike Merritt
1955- 1956	1A	Individual	Bowie	Wade Dyer
1955- 1956	2A	Individual	Kerrville	Roe Davenport Jr.
1955- 1956	B	Individual	Sugar Land	Kenneth Albers
1956- 1957	1A	Individual	Granbury	Winfred Blanton
1956- 1957	2A	Individual	Lubbock Monterey	Don Cannon
1956- 1957	B	Individual	Van Horn	Charles McLure

Year	Conf	Type	School	Student Names
1957-1958	1A	Individual	Liberty	Milton Sisk
1957-1958	2A	Individual	Tom S. Lubbock	Neal Parker
1957-1958	B	Individual	Anton	Charles Richards
1958-1959	1A	Individual	Canadian	Johnny Glenn
1958-1959	2A	Individual	Lampasas	Ann Scofield
1958-1959	3A	Individual	Cleburne	Brooks Taylor
1958-1959	4A	Individual	Austin McCallum	Gentry Lee
1958-1959	B	Individual	Mont Belvieu Barbers Hill	W.C. Underwood Jr.
1959-1960	1A	Individual	Groesbeck	Preston Geren
1959-1960	2A	Individual	Granbury	Paul Forman
1959-1960	3A	Individual	Pharr-San Juan-Alamo	Charles Davis
1959-1960	4A	Individual	Lubbock Monterey	Carl Clark
1959-1960	B	Individual	Sulphur Bluff	Michael Bassham
1960-1961	1A	Individual	White Oak	Donnie Ealy
1960-1961	2A	Individual	A&M Consolidated	Aleen Laverty
1960-1961	3A	Individual	Andrews	Norman Rogers
1960-1961	4A	Individual	Port Neches	William Glassmire
1960-1961	B	Individual	Anton	Alvin Mitchell
1961-1962	1A	Individual	Mont Belvieu Barbers Hill	W.C. Underwood, Jr.
1961-1962	2A	Individual	A&M Consolidated	Allen Laverty
1961-	3A	Individual	Cleburne	Larry Jordan

Year	Conf	Type	School	Student Names
1962				
1961- 1962	4A	Individual	Lubbock	Bill Robert
1961- 1962	B	Individual	Rochelle	Kirby Huffman
1962- 1963	1A	Individual	Schulenburg	Larry Meyer
1962- 1963	2A	Individual	A&M Consolidated	Alan Laverty
1962- 1963	3A	Individual	Deer Park	John Rawlings
1962- 1963	4A	Individual	Lubbock Monterey	Johnny Boley
1962- 1963	B	Individual	Sulphur Bluff	Michael Bassham
1963- 1964	1A	Individual	Schulenburg	Larry Meyer
1963- 1964	2A	Individual	San Saba	George Booker
1963- 1964	3A	Individual	Wichita Falls Rider	Coy Lewis May
1963- 1964	4A	Individual	Lubbock Monterey	Johnny Boley
1963- 1964	B	Individual	Adrian	Richard Gruhlkey
1964- 1965	1A	Individual	Alto	Rayford Smith
1964- 1965	2A	Individual	San Saba	George Booker
1964- 1965	3A	Individual	Andrews	Tommy Tonkin
1964- 1965	4A	Individual	San Antonio MacArthur	Sam Reed
1964- 1965	B	Individual	Rocksprings	Mickey Wann
1965- 1966	1A	Individual	Stockdale	im Wehmeyer
1965- 1966	2A	Individual	Pittsburg	Phil Garrett
1965- 1966	3A	Individual	Andrews	Louie Ramirez

Year	Conf	Type	School	Student Names
1965- 1966	4A	Individual	Freeport Brazosport	Alan R. Beale
1965- 1966	B	Individual	Rocksprings	Mickey Wann
1966- 1967	1A	Individual	Silverton	Crockett Grabbe
1966- 1967	2A	Individual	Quanah	Benjamin Jones
1966- 1967	3A	Individual	Andrews	Louie Ramirez
1966- 1967	4A	Individual	Freeport Brazosport	Alan R. Beale
1966- 1967	B	Individual	Rocksprings	Darrell Scott
1967- 1968	1A	Individual	Silverton	Crockette Grabbe
1967- 1968	2A	Individual	Quanah	Benjamin Jones
1967- 1968	3A	Individual	Andrews	Louis Ramirez
1967- 1968	4A	Individual	Wichita Falls Rider	David Jones
1967- 1968	B	Individual	Whiteface	Mike Teer
1968- 1969	1A	Individual	Wink	Danny Glover
1968- 1969	2A	Individual	Quanah	William Curtis Phillips, Jr.
1968- 1969	3A	Individual	Levelland	Jerry Anderson
1968- 1969	4A	Individual	Odessa Permian	Jimmy Black
1968- 1969	B	Individual	Imperial Buena Vista	Carl Dale
1969- 1970	1A	Individual	Wink	Linda Austin
1969- 1970	2A	Individual	Winnie East Chambers	Kyle White
1969- 1970	3A	Individual	Bishop	Dwain Thiele
1969-	4A	Individual	Midland Lee	Randy Prude

Year	Conf	Type	School	Student Names
1970				
1969- 1970	B	Individual	Rocksprings	Fred Speck
1970- 1971	1A	Individual	Cedar Hill	Cindy Stark
1970- 1971	2A	Individual	Quanah	Samuel Castro
1970- 1971	3A	Individual	Andrews	Stanley Mark Joyce
1970- 1971	4A	Individual	Austin McCallum	Howard Ludwig
1970- 1971	B	Individual	Wall	Russ Gully
1971- 1972	1A	Individual	Granger	Robert Rister
1971- 1972	2A	Individual	Waco Robinson	Kenny Wollitz
1971- 1972	3A	Individual	Andrews	Mark Joyce
1971- 1972	4A	Individual	Fort Worth Paschal	Dale Napier
1971- 1972	B	Individual	Wall	Rusell Gully
1972- 1973	1A	Individual	Wall	Russel Gulley
1972- 1973	2A	Individual	Waco Robinson	Kenny Wollitz
1972- 1973	3A	Individual	Andrews	Angela Reece
1972- 1973	4A	Individual	McAllen	Billy Fitzgerald
1972- 1973	B	Individual	Jayton	Bill Wallace
1973- 1974	1A	Individual	Wink	Jack Elliott
1973- 1974	2A	Individual	Zapata	Jose Eloy Cuellar
1973- 1974	3A	Individual	Andrews	Angela Reece
1973- 1974	4A	Individual	Pasadena South Houston	Larry Briggs

Year	Conf	Type	School	Student Names
1973- 1974	B	Individual	Brookesmith	Terry Youngblood
1974- 1975	1A	Individual	Poth	Louis Christa
1974- 1975	2A	Individual	Zapata	Jose Eloy Cuellar
1974- 1975	3A	Individual	Andrews	Charles Neeley
1974- 1975	4A	Individual	Stafford Dulles	Gene Lewis
1974- 1975	B	Individual	Matador Motley County	Charles Giesecke
1975- 1976	1A	Individual	Poth	Louis Christa
1975- 1976	2A	Individual	Zapata	Jose Eloy Cuellar
1975- 1976	3A	Individual	Andrews	Charles Neeley
1975- 1976	4A	Individual	Austin Anderson	Chris Delevoryas
1975- 1976	B	Individual	Sadler S & S Cons.	Frankie Williams
1976- 1977	1A	Individual	Tatum	Trung Pham
1976- 1977	2A	Individual	Crane	David Bizzak
1976- 1977	3A	Individual	Edcouch-Elsa	Kelly McKinnis
1976- 1977	4A	Individual	North Mesquite	Denise Tatsch
1976- 1977	B	Individual	Bronte	Bobby Hamilton
1977- 1978	1A	Individual	Lorenzo	Danny McCallister
1977- 1978	2A	Individual	Boerne	Mike Wallace
1977- 1978	3A	Individual	Andrews	Mark Munsell
1977- 1978	4A	Individual	Edinburg	Gilbert Garcia
1977- 1978	B	Individual	Sadler S & S Cons.	Darlene Dolezalek

Year	Conf	Type	School	Student Names
1978				
1978- 1979	1A	Individual	Lorenzo	Danny McCallister
1978- 1979	2A	Individual	Powderly North Lamar	Charles Draper
1978- 1979	3A	Individual	Silsbee	Paul Skinner
1978- 1979	4A	Individual	San Antonio Marshall	Joe Warren
1978- 1979	B	Individual	Moulton	Ed Braeus
1979- 1980	1A	Individual	Shamrock	David Bryant
1979- 1980	2A	Individual	Powderly North Lamar	Jeff Draper
1979- 1980	3A	Individual	Hallsville	Allen Pliler
1979- 1980	4A	Individual	Edinburg	Gilbert Garcia
1979- 1980	B	Individual	Graford	Jeff Alling
1980- 1981	1A	Individual	Pottsville	John Burnett
1980- 1981	2A	Individual	Shamrock	David Bryant
1980- 1981	3A	Individual	Powderly North Lamar	Jeff Draper
1980- 1981	4A	Individual	Andrews	Richard Nimz
1980- 1981	5A	Individual	San Antonio Marshall	Jerome De La Cruz
1981- 1982	1A	Individual	Granger	John White
1981- 1982	1A	Individual	Midland Greenwood	Kyle Longley
1981- 1982	2A	Individual	Shamrock	David Bryant
1981- 1982	3A	Individual	Powderly North Lamar	Jeff Draper
1981- 1982	4A	Individual	Andrews	Tobin Ross

Year	Conf	Type	School	Student Names
1981-1982	5A	Individual	McAllen Memorial	Joey Vitello
1982-1983	1A	Individual	Phillips	Jack Thompson
1982-1983	2A	Individual	Anson	Kenin Ansley
1982-1983	3A	Individual	Powderly North Lamar	Jeff Draper
1982-1983	4A	Individual	Azle	Michele Waelti
1982-1983	5A	Individual	Houston Waltrip	Tommy Huie
1983-1984	1A	Individual	Lenorah Grady	Greg McKaskle
1983-1984	2A	Individual	Anson	Kevin Ansley
1983-1984	3A	Individual	Powderly North Lamar	Robert Smith
1983-1984	4A	Individual	San Antonio Edgewood	Raul Arias
1983-1984	5A	Individual	Alvin	Steven Woo
1984-1985	1A	Individual	Barksdale Nueces Canyon	Wayne Herndon
1984-1985	2A	Individual	Shamrock	Heath Hoffman
1984-1985	3A	Individual	Mission Sharyland	Ricardo Ochoa
1984-1985	4A	Individual	Azle	Jim Cummings
1984-1985	5A	Individual	Freeport Brazoswood	Nhue Ho
1985-1986	1A	Individual	Lenorah Grady	Greg McKaskle
1985-1986	1A	Individual	San Isidro	Onel Garza
1985-1986	1A	Individual	San Isidro	Sandra Farias
1985-1986	2A	Individual	Quitman	Jim Davis
1985-	2A	Individual	Earth Springlake	Steven Cantrell

Year	Conf	Type	School	Student Names
1986				
1985- 1986	3A	Individual	Gladewater	Joseph Bishop
1985- 1986	4A	Individual	Azle	Phillip Murphree
1985- 1986	5A	Individual	Lubbock	Richard Spoons
1986- 1987	1A	Individual	Plains	Shane McMinn
1986- 1987	2A	Individual	Springlake-Earth	Steven Cantrell
1986- 1987	3A	Individual	Quitman	Jim Davis
1986- 1987	4A	Individual	Azle	David Wilmott
1986- 1987	5A	Individual	Klein Oak	Greg Martin
1987- 1988	1A	Individual	Meridian	B.J. Fielden
1987- 1988	2A	Individual	Rosebud-Lott	Roger Hoelscher
1987- 1988	3A	Individual	Orangefield	Marcus Wernig
1987- 1988	4A	Individual	Wichita Falls Hirschi	Chad Gamble
1987- 1988	5A	Individual	Klein Oak	Greg Martin
1988- 1989	1A	Individual	Moulton	Jay Whitmire
1988- 1989	1A	Team	Plains	Chad Guetersloh, Lance Morrow, Layne Morrow
1988- 1989	2A	Individual	Shallowater	Kevin Gravett
1988- 1989	2A	Team	Shallowater	Karrie Alewine, Kevin Gravett, Heather Jordan
1988- 1989	3A	Individual	Quitman	Jim Davis
1988- 1989	3A	Team	Quitman	Jim Davis, Sam Hartin, Evan Wilson
1988- 1989	4A	Individual	Wichita Falls Hirschi	Chad Gamble

Year	Conf	Type	School	Student Names
1988-1989	4A	Team	Wichita Falls Hirschi	Chad Gamble, Stephen Stringer, Phi Tran
1988-1989	5A	Individual	Longview	Todd Biesel
1988-1989	5A	Team	McAllen	Homera Gutierrez, Javier Nino, Robert Vargas
1989-1990	1A	Individual	Plains	Lance Morrow
1989-1990	1A	Team	Plains	Lance Morrow, Nieves Garcia, Layne Morrow
1989-1990	2A	Individual	Shallowater	Heather Hordan
1989-1990	2A	Team	Shallowater	Karrie Alewine, Heather Jordan, Jon Jackson
1989-1990	3A	Individual	Bishop	John Dorsey
1989-1990	3A	Team	Orangefield	Robert Byerly, Bryan Oswalt, Douglas Wilson
1989-1990	4A	Individual	Wichita Falls Hirschi	Chad Gamble
1989-1990	4A	Team	Wichita Falls Hirschi	Chad Gamble, Stephen Stringer, Phi Tran
1989-1990	5A	Individual	Lubbock	Linda Barker
1989-1990	5A	Team	Mission	Fernando Rivero, Fafael Gonzales, Rene Reyes
1990-1991	1A	Individual	San Isidro	Hilario Alvarado
1990-1991	1A	Team	San Isidro	Hilario Alvarado, Nathan Tallent, David Garcia
1990-1991	2A	Individual	Ingram Moore	Kevin Lange
1990-1991	2A	Team	Quanah	Clif Cover, Babu Makkena, Robert Baumle
1990-1991	3A	Individual	Bandera	Lee Jenkins
1990-1991	3A	Team	Austin Travis	Jason Decker, Doug Clayton, Pete Herrera
1990-1991	4A	Individual	Azle	Jason Gayman
1990-	4A	Team	Azle	Mary Vanagas, Jason Gayman, Joseph Davis

Year	Conf	Type	School	Student Names
1991				
1990-1991	5A	Individual	Mission	Fernando Rivera
1990-1991	5A	Individual	Longview	Todd Biesel
1990-1991	5A	Team	Lubbock	Tom Zavisca, Jun Sridhara, Jonathan Cluff
1991-1992	1A	Individual	San Isidro	Hilario Alvarado
1991-1992	1A	Team	Sterling City	L.D. White, Amy Schrader, Zane Arp
1991-1992	2A	Individual	Shallowater	Jon Jackson
1991-1992	2A	Team	Shallowater	Jon Jackson, Courtney Jordan, Mike Jackson
1991-1992	3A	Individual	Devine	Larry Eshleman
1991-1992	3A	Team	Devine	Larry Eshleman, Don Beck, Sagar Bhakta
1991-1992	4A	Individual	Wichita Falls	Anthony Newberry
1991-1992	4A	Team	Wichita Falls	Anthony Newberry, Kevin Bills, Hui Yi
1991-1992	5A	Individual	Mission	Fernando Rivera
1991-1992	5A	Individual	Mission	Fernando Rivera
1991-1992	5A	Team	McAllen	Ray Salloom, George Lopez, Javier Nino
1992-1993	1A	Individual	San Isidro	Hilario Alvarado
1992-1993	1A	Team	Sterling City	L.D. White, Amy Schrader, Howard Arp
1992-1993	2A	Individual	Stamford	Jonathan Lammert
1992-1993	2A	Team	Little Elm	Shawn Fielder, Billy Phillips, Eric Flewelling
1992-1993	3A	Individual	Mont Belvieu Barbers Hill	Jeff Puckett
1992-1993	3A	Team	Crane	Ricky Solis, Scott Huddleston, Peter Leupold Rule

Year	Conf	Type	School	Student Names
1992-1993	4A	Individual	Wichita Falls	Anthony Newberry
1992-1993	4A	Team	Wichita Falls	Anthony Newberry, Kevin Bills, Nikhih Mankodi
1992-1993	5A	Individual	Wichita Falls Rider	Terrence Kim
1992-1993	5A	Team	Lubbock	Jeremy Martin, Jesse Martin, Eric Vugrin
1993-1994	1A	Individual	Sterling City	Amy Schrader
1993-1994	1A	Team	Plains	Lenny Morrow, Jay Rushing, Brad McMinn
1993-1994	2A	Individual	Salado	Brent Cabaniss
1993-1994	2A	Team	Little Elm	Shawn Fielder, Eric Flewelling, Billy Phillips
1993-1994	3A	Individual	Mont Belvieu Barbers Hill	Jeff Puckett
1993-1994	3A	Team	Rule	Allison Pike
1993-1994	4A	Individual	Buda Hays	Nate Laughlin
1993-1994	4A	Team	Buda Hays	Tommy Pyles, Nate Laughlin, Michael Swaney
1993-1994	5A	Individual	Wichita Falls Rider	Terrence Kim
1993-1994	5A	Team	Alvin	David Miller, James Kwon, Rene Fassbender
1994-1995	1A	Individual	Wink	Jeffrey Watts
1994-1995	1A	Team	Henrietta Midway	Sam Keen, Cheryl Boettcher, Mandy Brown
1994-1995	2A	Individual	Salado	Brent Cabaniss
1994-1995	2A	Team	Salado	Brent Cabaniss, Vinny Michna, Kyle Anderson
1994-1995	3A	Individual	Bridgeport	Joy Kennedy
1994-1995	3A	Team	Bridgeport	Joy Kennedy, Brad Garrison, Joe Newton
1994-	4A	Individual	Wichita Falls	Kevin Bills

Year	Conf	Type	School	Student Names
1995				
1994-1995	4A	Team	Azle	Brian Barone, Keith Voss, William LaFon
1994-1995	5A	Individual	Wichita Falls Rider	Terrence Kim
1994-1995	5A	Team	Sugar Land Elkins	Damian Burch, Steven Robertson, Jyeh Gan
1995-1996	1A	Individual	Henrietta Midway	Sam Keen
1995-1996	1A	Team	Rule	Justin Xuster, Cory Robinson, Denise Wilson
1995-1996	2A	Individual	Salado	Vinny Michna
1995-1996	2A	Team	Salado	Vinny Michna, Kyle Anderson, Michelle Lenis
1995-1996	3A	Individual	Bridgeport	Joy Kennedy
1995-1996	3A	Team	Shallowater	Rachel Dunn, Joe Orozco, Scott Crosthwait
1995-1996	4A	Individual	Corpus Christi Flour Bluff	Juan Sotelo
1995-1996	4A	Team	Longview Pine Tree	Chris Harrison, Scott Harrison, Jeff Slade
1995-1996	5A	Individual	Sugar Land Elkins	Damian Burch
1995-1996	5A	Team	Mission	Sam Rodriguez, Joey Bazan, Victor Garza
1996-1997	1A	Individual	Henrietta Midway	Sam Keen
1996-1997	1A	Team	Henrietta Midway	Sam Keen, Eric Peden, Carrie Pennington
1996-1997	2A	Individual	Lockney	Dewayne Jones
1996-1997	2A	Team	Shallowater	Scott Crosthwait, Rachel Dunn, Stephanie Rackler
1996-1997	3A	Individual	Port Isabel	Francisco Castillo
1996-1997	3A	Team	Bridgeport	Somkit Boutchantharaj, Brad Garrison, Joy Kennedy
1996-1997	4A	Individual	Sweeny	Jeffrey Sims

Year	Conf	Type	School	Student Names
1996-1997	4A	Team	Longview Pine Tree	Chris Harrison, Scott Harrison, Jeff Slade
1996-1997	5A	Individual	Spring Westfield	Brian Murphy
1996-1997	5A	Team	Spring Westfield	Brian Murphy, Vishal Patel, Derek Wood
1997-1998	1A	Individual	Henrietta Midway	Samuel Keen
1997-1998	1A	Team	Henrietta Midway	Laurie Brock, Samuel Keen, Eric Peden
1997-1998	2A	Individual	Wellington	Jeremy Sain
1997-1998	2A	Team	Plains	Shawna Box, Richmond Cullins, Kristen Gray
1997-1998	3A	Individual	Bridgeport	Joy Kennedy
1997-1998	3A	Team	Santa Rosa	Javier Aranda, Michael Lopez, Fidencio Zamorano
1997-1998	4A	Individual	Sweeny	Jeff Sims
1997-1998	4A	Team	Longview Pine Tree	Ed Lee, Jeff Slade, Kenny Younger
1997-1998	5A	Individual	Mission	Joey Bazan
1997-1998	5A	Team	Mission	Joey Bazan, Samuel Rodriguez, Lisa Sparrgrove
1998-1999	1A	Individual	Valley View	Jeff Schrantz
1998-1999	1A	Team	Henrietta Midway	Laurie Brock, Katye McClendon, Eric Peden
1998-1999	2A	Individual	De Leon	Robby Morgan
1998-1999	2A	Team	Salado	Adrienne Akins, Chris Ray, Shane Rigsby
1998-1999	3A	Individual	Sweeny	Jeff Sims
1998-1999	3A	Team	Santa Rosa	Javier Aranda, Michael Lopez, Andrew Olivarez
1998-1999	4A	Individual	Edcouch-Elsa	Devin Smither
1998-1999	4A	Team	Sulphur Springs	Cliff Cambell, Brad Cutrell, Dustin Ragan

Year	Conf	Type	School	Student Names
1999				
1998-1999	5A	Individual	Mission	Joey Bazan
1998-1999	5A	Team	Klein	Francis Ho, Robert Mallery, James Tong
1999-2000	1A	Individual	Muenster	Chris Jackson
1999-2000	1A	Team	Valley View	Jeff Schrantz, Dusty Bush, Jered Brookshear
1999-2000	2A	Individual	Elkhart	Cody Mitchell
1999-2000	2A	Team	Salado	Chris Ray, Greg Dachs, Adrienne Akins
1999-2000	3A	Individual	Bridgeport	Allen Brown
1999-2000	3A	Team	Bridgeport	Allen Brown, Mara Ooten, Jacy Kennedy
1999-2000	4A	Individual	Pharr-San Juan-Alamo Memorial	Oscar Santos
1999-2000	4A	Team	Azle	Reed Hamm, Tamara Shepherd, Scott Timms
1999-2000	5A	Individual	Spring Westfield	Derek Wood
1999-2000	5A	Team	Klein Oak	Robery Mallery, Kelley Riviore, Amaan Mazhar
2000-2001	1A	Individual	Muenster	Chris Jackson
2000-2001	1A	Team	Muenster	Chris Jackson, Brett owell, Bronya Vogel
2000-2001	2A	Individual	Elkhart	David Mendiola
2000-2001	2A	Team	Salado	Chris Ray, Greg Dachs, Miles Wallace
2000-2001	3A	Individual	Seminole	Steven Houston
2000-2001	3A	Team	Bridgeport	Jacy Kennedy, Devin Millis, Mara Ooten
2000-2001	4A	Individual	Pharr-San Juan-Alamo Memorial	Oscar Santos
2000-2001	4A	Team	Corpus Christi Flour Bluff	Andrew Biddle, Allen Parish, Carla Coltharp

Year	Conf	Type	School	Student Names
2000-2001	5A	Individual	Edinburg North	Victor Alcala
2000-2001	5A	Team	Edinburg North	Victor Alcala, David Rodriguez, Chris Perez
2001-2002	1A	Individual	Muenster	Chris Jackson
2001-2002	1A	Team	Muenster	Chris Jackson, Derek Felderhoff, Whitney Watson
2001-2002	2A	Individual	Salado	Devon Rex
2001-2002	2A	Team	Salado	Miles Wallace, Devon Rex, Joseph Shumate
2001-2002	3A	Individual	Falfurrias	Juan Cisneros
2001-2002	3A	Team	Bridgeport	Kevin McBride, Devin Millis, Craig Bailey
2001-2002	4A	Individual	Corpus Christi Flour Bluff	Andrew Biddle
2001-2002	4A	Team	Corpus Christi Flour Bluff	Andrew Biddle, Carla Coltharp, Jaime Alexander
2001-2002	5A	Individual	Klein	Kelley Rivoire
2001-2002	5A	Team	Edinburg North	Daniel Davila, Chris Perez, Rafael Maldonado
2002-2003	1A	Individual	Tenaha	Jason Farmer
2002-2003	1A	Team	Muenster	Michael Eckart, Derek Felderhoff, Brady Howell, Whitney Watson
2002-2003	2A	Individual	Salado	Devon Rex
2002-2003	2A	Team	Salado	Matt Caskey, Jenny Goode, Devon Rex, Joseph Shumate
2002-2003	3A	Individual	Bridgeport	Alan Thetford
2002-2003	3A	Team	Bridgeport	Kevin McBride, Jason Musser, Paige Scarpinato, Alan Thetford
2002-2003	4A	Individual	Pharr-San Juan-Alamo Memorial	Oscar Santos
2002-2003	4A	Team	Azle	Aaron Goldsmith, Drew Slinger, Jeff Tschoep, Amanda White
2002-	5A	Individual	Edinburg North	Daniel Davila

Year	Conf	Type	School	Student Names
2003				
2002- 2003	5A	Team	Edinburg North	Daniel Davila, Ivan Eloy, Rafael Maldonado, Carlos Quiroz
2003- 2004	1A	Individual	San Isidro	Mike Garcia
2003- 2004	1A	Team	Lindsay	Rameez Anwar, Michael Eckart, Malcom Martin, Travis Reiter
2003- 2004	2A	Individual	Salado	Joseph Shumate
2003- 2004	2A	Team	Salado	Matt Caskey, Jenny Goode, Ines Min, Joseph Shumate
2003- 2004	3A	Individual	Bridgeport	Kevin McBride
2003- 2004	3A	Team	Bridgeport	Kevin McBride, Jason Musser, Paige Scarpinato, Alan Thetford
2003- 2004	4A	Individual	Wichita Falls Hirschi	Matt McCabe
2003- 2004	4A	Team	Castroville Medina Valley	Sarah Aelvoet, Landon Coleman, Chris Compean, Tony Zerr
2003- 2004	5A	Individual	Pearland	Stephen Wolff
2003- 2004	5A	Team	Pearland	James Kofi, Yuhong Liu, Stephen Wolff, Jack Xie
2004- 2005	1A	Individual	Lindsay	Malcom Martin
2004- 2005	1A	Team	Lindsay	Rameez Anwar, Michael Eckart, Malcom Martin, Travis Reiter
2004- 2005	2A	Individual	Argyle	Kevin Burnett
2004- 2005	2A	Team	Argyle	Josh Albritton, Kevin Burnett, Justin Johnson, Brock Spratlen
2004- 2005	3A	Individual	Bridgeport	Alan Thetford
2004- 2005	3A	Team	Bridgeport	Caleb Joiner, Paige Scarpinato, Alan Thetford, Charlene Vela
2004- 2005	4A	Individual	Castroville Medina Valley	Chris Compean
2004- 2005	4A	Team	Castroville Medina Valley	Sarah Aelvoet, Chris Compean, Darcy Melton, Tony Zerr
2004- 2005	5A	Individual	Pearland	Yuhong Liu

Year	Conf	Type	School	Student Names
2004-2005	5A	Team	La Joya	Roel Cantu, Cesar Garza, Ana Parada, Omar Torres
2005-2006	1A	Individual	Utopia	Grant Potter
2005-2006	1A	Team	Garden City	Katie Gully, Wade Jansa, Taylor Niehues, Colton Schwartz
2005-2006	2A	Individual	Argyle	Kevin Burnett
2005-2006	2A	Team	Argyle	Kevin Burnett, Justin Johnson, Thomas Quintana, Kirstie Wade
2005-2006	3A	Individual	Longview Spring Hill	Brian Bass
2005-2006	3A	Team	Bridgeport	Caleb Joiner, Joey Reyes, Paige Scarpinato, Charlene Vela
2005-2006	4A	Individual	Nacogdoches	Sam Stripling
2005-2006	4A	Team	Castroville Medina Valley	Sarah Aelvoet, Christopher Compean, Melton Darcy, Tony Zerr
2005-2006	5A	Individual	Pearland	Yuhong Liu
2005-2006	5A	Team	Klein	William Li, Cynthia Nguyen, Akash Shah, Stephen Worlow
2006-2007	1A	Individual	Plains	Seong Jae Kim
2006-2007	1A	Team	Lindsay	Nick Bezner, Christina Eckart, Dillon Hanson, Colton Hermes
2006-2007	2A	Individual	Wichita Falls City View	Brandon Tiedeman
2006-2007	2A	Team	Wichita Falls City View	Thanh Hoang, Kyle Kleckner, Ravi Patel, Brandon Tiedeman
2006-2007	3A	Individual	Longview Spring Hill	Zach Barnhart
2006-2007	3A	Team	Longview Spring Hill	Zach Barnhart, Brian Bass, Michael Bass, Joey Blakeley
2006-2007	4A	Individual	Port Lavaca Calhoun	Sam Fang
2006-2007	4A	Team	Corpus Christi Flour Bluff	Andrew Acker, Dylan Keyes, Anthony Pabillano, Austin Smith
2006-2007	5A	Individual	Fort Bend Clements	Mark Zhang
2006-	5A	Team	San Antonio O'Connor	Oliver Peng, BinBin Wu, Lingyi Zhang, Susan Zhang

Year	Conf	Type	School	Student Names
2007				
2007-2008	1A	Individual	Lindsay	Dillon Hanson
2007-2008	1A	Team	Lindsay	Nick Bezner, Christina Eckart, Dillon Hanson, Colton Hermes
2007-2008	2A	Individual	Caddo Mills	Jeremy Smith
2007-2008	2A	Team	Caddo Mills	Israel Chavarri, Trey Craig, Jeremy Smith, Taylor Westmoreland
2007-2008	3A	Individual	Argyle	Thomas Quintana
2007-2008	3A	Team	Argyle	Phillip Fullingim, Erik Katzen, Thomas Quintana, Nick Strelke
2007-2008	4A	Individual	Nederland	Nick Duplan
2007-2008	4A	Team	Katy Seven Lakes	Olaoluwatoni Alimi, Yang Liu, Jessica Weng, Binbin Wu
2007-2008	5A	Individual	Klein	Stephen Worlow
2007-2008	5A	Team	Klein	William Li, Pulak Mittal, Akash Shah, Stephen Worlow
2008-2009	1A	Individual	Lindsay	Dillon Hanson
2008-2009	1A	Team	Lindsay	Nick Bezner, Dillon Hanson, Colton Hermes, Christopher Klement
2008-2009	2A	Individual	Caddo Mills	Jeremy Smith
2008-2009	2A	Team	Caddo Mills	Israel Chavarri, Trey Craig, Jeremy Smith, Taylor Westmoreland
2008-2009	3A	Individual	Wichita Falls Hirschi	Nathan Shih
2008-2009	3A	Team	Wichita Falls Hirschi	Andrew Darling, Shri Ganeshram, Brian Gregg, Nathan Shih
2008-2009	4A	Individual	Big Spring	Kade Parker
2008-2009	4A	Team	Longview Pine Tree	Amy Pearson, Todd Schrader, Kyle Unruh, Greg Wallace
2008-2009	5A	Individual	Fort Bend Clements	Mark Zhang

Year	Conf	Type	School	Student Names
2008-2009	5A	Team	Fort Bend Clements	Jeffrey Chan, Kevin Chen, Kevin Lin, Dennis Mou, Mark Zhang
2009-2010	1A	Individual	Lindsay	Dillon Hanson
2009-2010	1A	Team	Lindsay	Chisam Reiter, Christopher Klement, Dillon Hanson, Colton Hermes
2009-2010	2A	Individual	Salado	Jansen Oyler
2009-2010	2A	Team	Salado	Jansen Oyler, Jacob Heiner, Ryan Suresh, Bubba Luna
2009-2010	3A	Individual	Wichita Falls Hirschi	Nathan Shih
2009-2010	3A	Team	Wichita Falls Hirschi	Nathan Shih, Shri Ganeshram, Clayton Poteat, Andrew Darling
2009-2010	4A	Individual	Pearland Dawson	Steven Xu
2009-2010	4A	Team	Mount Pleasant	Feiran Chen, Greg Segura, Eduardo Landeros, Lucas Quarry
2009-2010	5A	Individual	Sugar Land Clements	Kevin Chen
2009-2010	5A	Team	Sugar Land Clements	Kevin Chen, Aaron Chen, Jeffrey Chan, Chris Lin
2010-2011	1A	Individual	Lovelady	Lucas Mauldin
2010-2011	1A	Team	Lindsay	Chisam Reiter, Christopher Klement, Megan Schumacher
2010-2011	2A	Individual	Daingerfield	Matthew Moore
2010-2011	2A	Team	Daingerfield	Matthew Moore, Samuel Fowler, Michael McRae, Cassidy Shaver
2010-2011	3A	Individual	Wichita Falls Hirschi	Shri Ganeshram
2010-2011	3A	Team	Wichita Falls Hirschi	Shri Ganeshram, Clayton Poteat, Brian Gregg, Nick Smith
2010-2011	4A	Individual	Pearland Dawson	Steven Xu
2010-2011	4A	Team	Pearland Dawson	Steven Xu, Jason Liu, Annie Zhang, Daniel Wu
2010-2011	5A	Individual	Sugar Land Clements	Kevin Chen

Year	Conf	Type	School	Student Names
2010-2011	5A	Team	Sugar Land Clements	Kevin Chen, Jamar Brooks, Aditya Jain, Chris Lin
2011-2012	1A	Individual	Ackerly Sands	Hayden Ware
2011-2012	1A	Team	Lindsay	Chisam Reiter, Lucinda Krahlt, Megan Schumacher, Taylor Krebs
2011-2012	2A	Individual	Daingerfield	Matthew Moore
2011-2012	2A	Team	Daingerfield	Matthew Moore, Samuel Fowler, Cedarion Hopkins, Cassidy Shaver
2011-2012	3A	Individual	Argyle	Ross Coker
2011-2012	3A	Team	Argyle	Ross Coker, Ben Woolums, Jon Clark, Matthew Hayden
2011-2012	4A	Individual	Whitehouse	Jack Terrell
2011-2012	4A	Team	MissionVeterans Memorial	Gabriel Siegel, Victor De Leon, Michelle Guajardo, Darius Davis
2011-2012	5A	Individual	Sugar Land Dulles	Robert (Bobby) Shen
2011-2012	5A	Team	Sugar Land Dulles	Bobby Shen, Mitchell Hwang, Rishiprotim Nag, Daniel Fan
2012-2013	1A	Individual	Lindsay	Chisam Reiter
2012-2013	1A	Team	Lindsay	Chisam Reiter, Karsen Gum, Megan Schumacher, Matthew Block
2012-2013	2A	Individual	Abernathy	Alex Priest
2012-2013	2A	Team	Salado	Sammy Nguyen, Ellis Van Sickle, Dane Hankamer, Robert Cortes
2012-2013	3A	Individual	Argyle	Ross Coker
2012-2013	3A	Team	Argyle	Ross Coker, Jared Cole, Colton Katzen, Matthew Hayden
2012-2013	4A	Individual	Whitehouse	Jack Terrell
2012-2013	4A	Team	Pearland Dawson	Steven Xu, Jason Liu, Angel Feng, Daniel Wu
2012-2013	5A	Individual	Dallas Science-Eng Magnet	Wesley Runnels
2012-	5A	Team	Sugar Land Dulles	Bobby Shen, Mitchell Hwang, Rishiprotim Nag,

Year	Conf	Type	School	Student Names
2013				Keerthana Kumar
2013-2014	1A	Individual	Lovelady	Lucas Mauldin
2013-2014	1A	Team	Lindsay	Chisam Reiter, Karsen Gum, Cayden Maydew, John Michael Fuhrman
2013-2014	2A	Individual	Abernathy	Alex Priest
2013-2014	2A	Team	Salado	Sammy Nguyen, Ellis Van Sickle, Dane Hankamer, Robert Cortes
2013-2014	3A	Individual	Argyle	Ross Coker
2013-2014	3A	Team	Argyle	Ross Coker, Colton Katzen, Justin Clark, Matthew Hayden
2013-2014	4A	Individual	MissionVeterans Memorial	Darius Davis
2013-2014	4A	Team	Dallas Highland Park	Nathan Kong, Sandra Kong, Eric Murphy, William Lake
2013-2014	5A	Individual	Sugar Land Clements	Aditya Jain
2013-2014	5A	Team	Sugar Land Clements	Aditya Jain, Steven Jiang, Rao Angie, Eric Li
2014-2015	1A	Individual	Garden City	Kadden Kothmann
2014-2015	1A	Team	Garden City	Kadden Kothmann, Scott Miller, Brazos Hirt, Seth Miller
2014-2015	2A	Individual	Lindsay	Karsen Gum
2014-2015	2A	Team	Lindsay	Matthew Block, Karsen Gum, Cayden Maydew, John Michael Fuhrman
2014-2015	3A	Individual	Wichita Falls City View	Steven Ngo
2014-2015	3A	Team	Paris Chisum	Jacob Duren, Brandon Gillen, Zak Moore, Becca Hurst
2014-2015	4A	Individual	Argyle	Justin Clark
2014-2015	4A	Team	Argyle	Will Blake, Nicholas Mohar, Justin Clark, Matthew Castle
2014-2015	5A	Individual	MissionVeterans Memorial	Darius Davis
2014-2015	5A	Team	Frisco Liberty	Vik Shirvaikar, Rohit Kopparthy, Bill Zhao, Katherine Xiong

Year	Conf	Type	School	Student Names
2014-2015	6A	Individual	Klein	Jonathan Zhang
2014-2015	6A	Team	Edinburg North	Javier Garcia, Marco Rivera, Juan Garcia, Christopher Rios
2015-2016	1A	Individual	Knippa	Dane Stocks
2015-2016	1A	Team	Knippa	Dane Stocks, Gage Brown, Jessica Dong, Mason Adams
2015-2016	2A	Individual	Lindsay	John Michael Fuhrman
2015-2016	2A	Team	Lindsay	Cameron Worth, Brandon Craigie, Luke Meece, John Michael Fuhrman
2015-2016	3A	Individual	Queen City	Jay Patel
2015-2016	3A	Team	Wichita Falls City View	Matthew Lancaster, Steven Ngo, Nathaniel Shawver, Isaiah Bonner
2015-2016	4A	Individual	Argyle	Justin Clark
2015-2016	4A	Team	Argyle	Nicholas Mohar, Gentry Cole, Justin Clark, Matthew Castle
2015-2016	5A	Individual	Hallsville	Hulon Sherard
2015-2016	5A	Team	Mission Sharyland	Josh Jones, JinHo Yoon, Hyuk Jun Choi, Yujin Seo
2015-2016	6A	Individual	Klein	Jonathan Zhang
2015-2016	6A	Team	Edinburg North	Javier Garcia, Marco Rivera, Juan Garcia, Christopher Rios
2016-2017	1A	Individual	Bellevue	Jon Walker
2016-2017	1A	Team	Garden City	Karli Tubb, Scott Miller, Parker Koenning, Cade Braden
2016-2017	2A	Individual	Lindsay	Cameron Worth
2016-2017	2A	Team	Lindsay	Cameron Worth, Brandon Craigie, Luke Meece, John Michael Fuhrman
2016-2017	3A	Individual	Queen City	Jay Patel
2016-2017	3A	Team	Queen City	Jay Patel, Colton Henry, Dylan Garrison, Tyler Moore

Year	Conf	Type	School	Student Names
2016-2017	4A	Individual	Argyle	Justin Clark
2016-2017	4A	Team	Argyle	Nicholas Mohar, Gentry Cole, Justin Clark, Matthew Castle
2016-2017	5A	Individual	Mission Sharyland	Josh Jones
2016-2017	5A	Team	Dallas Highland Park	Richard Luo, Sandra Kong, Michael Zhan, Amy Li
2016-2017	6A	Individual	Klein	Jonathan Zhang
2016-2017	6A	Team	Klein	Jonathan Zhang, Akash Kumashi, Pranav Mehta, Thomas Ye
2017-2018	1A	Individual	Bellevue	Jon Walker
2017-2018	1A	Team	Bellevue	Jon Walker, Trey Terry, Rebecca Maddin, Trista Lawson
2017-2018	2A	Individual	Lindsay	Cameron Worth
2017-2018	2A	Team	Lindsay	Cameron Worth, Brandon Craigie, Luke Meece, Gage Bezner
2017-2018	3A	Individual	Wichita Falls City View	Matthew Lancaster
2017-2018	3A	Team	Gladewater Sabine	Scottie Taylor, Michael Taylor, Armando Borrego, Makenzie Williams
2017-2018	4A	Individual	Argyle	Nicholas Mohar
2017-2018	4A	Team	Argyle	Nicholas Mohar, Ryan Ross, Kunal Gahlawat, Shivani Gandhi
2017-2018	5A	Individual	Dallas Highland Park	Richard Luo
2017-2018	5A	Team	Dallas Highland Park	Richard Luo, Stacy Wang, Parth Nandekar, Amy Li
2017-2018	6A	Individual	Sugar Land Clements	Eric Wu
2017-2018	6A	Team	Sugar Land Dulles	Andrew Liu, Ethan Zahid, Shreya Thipireddy, Naveen Mukkat
2018-2019	1A	Individual	Bellevue	Jon Walker
2018-2019	1A	Team	Bellevue	Jon Walker, Trey Terry, Rebecca Maddin, First Chawallapat

Year	Conf	Type	School	Student Names
2018-2019	2A	Individual	Poolville	Dalton Sprague
2018-2019	2A	Team	Poolville	Dalton Sprague, Wyatt Thomas, Eduardo Lopez, Evan Lang
2018-2019	3A	Individual	Gladewater Sabine	Scottie Taylor
2018-2019	3A	Team	Gladewater Sabine	Scottie Taylor, Amy Smith, Carter Horton, Makenzie Williams
2018-2019	4A	Individual	Wichita Falls Hirschi	Alexis Nicolas
2018-2019	4A	Team	Wichita Falls Hirschi	Alexis Nicolas, Krishna Reddy, Anthony Shuey, Rohan Tanjavur
2018-2019	5A	Individual	Dallas Highland Park	Richard Luo
2018-2019	5A	Team	Dallas Highland Park	Richard Luo, Stacy Wang, Parth Nandekar, Amy Li
2018-2019	6A	Individual	Sugar Land Clements	Andrew Cai
2018-2019	6A	Team	Sugar Land Clements	Andrew Cai, Akash Karanam, Eric Wu, Siddarhart Muppalla
2020			No State Meet due toCovid	
2020-2021	1A	Individual	Jonesboro	Luke Maxwell
2020-2021	1A	Team	Knippa	Michael Williams, John Dong, Claire Dean, Luke Alejandro
2020-2021	2A	Individual	Woodsboro	Nikolas Ellison
2020-2021	2A	Team	Woodsboro	Nikolas Ellison, Rogelio Gonzalez III, Coy Burns, Cassandra Mead
2020-2021	3A	Individual	Gladewater Sabine	Addison Langley
2020-2021	3A	Team	Gladewater Sabine	Addison Langley, Kaylee Coon, Rodolfo Fierros, Rosa Gaona
2020-2021	4A	Individual	Salado	Cooper Chambliss
2020-	4A	Team	Argyle	Vidit Tripathi, Evan Harbach, Eli Valentino, Mark Castle

Year	Conf	Type	School	Student Names
2021				
2020- 2021	5A	Individual	Dallas Highland Park	Justin Li
2020- 2021	5A	Team	Dallas Highland Park	Justin Li, Joyce Jiang, Parth Nandekar, Michelle Xing
2020- 2021	6A	Individual	Sugar Land Clements	Andrew Cai
2020- 2021	6A	Team	Sugar Land Clements	Andrew Cai, Justin Lai, Dhilan Patel, Anne Christiono
2021- 2022	1A	Individual	Jonesboro	Christopher Maxwell
2021- 2022	1A	Team	Garden City	Blake Stewart, Mason Walker, Skyler Garcia, Brock Braden
2021- 2022	2A	Individual	Woodsboro	Nikolas Ellison
2021- 2022	2A	Team	Lindsay	Colton Popp, Corey Metzler, Ryan Hellman, Jase Keith
2021- 2022	3A	Individual	Idalou	Logan Sanders
2021- 2022	3A	Team	Wichita Falls City View	Christian Griffin, Keagan Hollemans, Rylen Pereira, Jordan Cornelison
2021- 2022	4A	Individual	Salado	Cooper Chambliss
2021- 2022	4A	Team	Argyle	Vidit Tripathi, Caroline Deffenbaugh, Eli Valentino, Mark Castle
2021- 2022	5A	Individual	Dallas Highland Park	Justin Li
2021- 2022	5A	Team	Corpus Christi Flour Bluff	Kyle Xu, Nathaniel Puumala, Samuel Zhang, Conner Murphy
2021- 2022	6A	Individual	Sugar Land Clements	Dhilan Patel
2021- 2022	6A	Team	Sugar Land Clements	Rich Wang, Justin Lai, Dhilan Patel, Aryan Arora

Problem Sequencing UIL High School Number Sense Test
Updated as of 2016-2017

Problem 1 - 20 *

- 1) Addition, subtraction, multiplication, & division of Integers, Mixed Numbers, Fractions, and Decimals
- 2) Order of Operations
- 3) Use of the Distributive Property
- 4) Comparison of Fractions and Decimals
- 5) Multiplication Short-Cuts
- 6) Squaring Numbers
- 7) Conversion Problems (either way):
Percent/Fractions, English/Metric,
Roman Numerals/Arabic Numerals,
Measurement units
(length, weight, capacity, time)
- 8) Greatest Common Divisor (GCD) and
Least Common Multiple (LCM)
- 9) Percent Problems
- 10) Mean, Median, & Mode
- 11) Sums of Integers
- 12) Remainder Problems
- 13) Consumer Type Problems
- 14) Number Theory Problems Involving:
Prime Numbers, Divisors, Sums of Divisors, etc.

Problems 21 - 40 *

- 1) Powers of Numbers
- 2) Substitution
- 3) Word Problems
- 4) Inverses
- 5) Absolute Value
- 6) Ratio/Proportion
- 7) Square Roots/Cube Roots
- 8) Sets
- 9) Base System Conversion Problems
- 10) Solving Simple Equations
- 11) Systems of Equations
- 12) Repeating Decimals to Fractions
- 13) More Remainder Type Problems
- 14) Perimeter & Area of Polygons and Circles
- 15) Sequences
- 16) Quadratic & Cubic Equation Problems

Problems 41 - 60 *

- 1) Laws of Exponents
- 2) Right Triangle Problems
- 3) Coordinate Geometry Problems
- 4) Regular Polygon Problems
- 5) Inequalities
- 6) Applications of Theorems from Geometry
- 7) Direct and Inverse Variation
- 8) Sequences & Series (Finite & Infinite)
- 9) Complex Numbers
- 10) Logarithms & Logarithmic Equations
- 11) Factorials, Permutations, & Combinations
- 12) Probability/Odds
- 13) Conics

- 14) Binomial Theorem (Expansion)
- 15) Base System Problems Using Operations
- 16) Roots of equations
- 17) Polygonal numbers

Problems 61 - 70 *

- 1) Volume & Surface Area
- 2) Greatest Integer
- 3) Application of Remainder Theorem
- 4) Trigonometry
- 5) Determinants
- 6) Matrices
- 7) Vectors
- 8) Composite Functions
- 9) Bases Involving Decimals or Fractions
- 10) Polar/Rectangular Coordinates

Problems 71 -80 *

- 1) Function domains and ranges
- 2) Modular Arithmetic
- 3) Limits
- 4) Derivatives
- 5) Slopes of Tangent Lines
- 6) Horizontal & Vertical Asymptotes
- 7) Determining Critical Values
- 8) Maximum & Minimum Problems
- 9) Definite Integration
- 10) Inverse functions

* A type of problem from a particular section could appear later in the test.
Example: A base problem could appear as problem #55, but should not appear Earlier than problem #21.

Problem Sequencing Junior High Number Sense Test
Updated as of 2016-2017

Problems 1 - 20

1. Addition, subtraction, multiplication & division of whole numbers, fractions, and decimals
2. Order of operations
3. Use of the distributive property
4. Comparison of fractions & decimals
5. Multiplication short-cuts
6. Squaring numbers
7. Roman numerals/Arabic numbers
8. Mean, median, mode
9. Sums of whole numbers of multiple terms of a finite series

Problems 21 - 40

1. Addition, subtraction, multiplication & division of mixed numbers and integers
2. More multiplication short-cuts
3. Percent problems
4. Conversion problems (either way): English/metric, length, area, capacity, time
5. Consumer type problems
6. Substitution problems
7. Solving simple equations
8. Square roots/cube roots
9. Greatest common divisor (gcd) & least common multiple (lcm)
10. Number theory - prime numbers and divisors
11. Perimeter/area of: square, rectangle, circle
12. Ratio/proportion
13. Inverses
14. Multiplication of 101, 111

Problems 41 - 60

1. Sets
2. Word problems
3. Pythagorean theorem
4. Sequences
5. Volume/surface area of rectangular solid/cube
6. Base systems: conversions and basic operations
7. Area of: parallelogram, rhombus, trapezoid, circle
8. Solving inequalities
9. Basic geometry facts
10. Remainder problems

Problems 61 - 80

1. Repeating decimals
2. More number theory
3. Powers of numbers
4. Volume of: circular cylinder, cone, sphere
5. Sequences & series
6. Factorial
7. Coordinate geometry
8. Probability/odds
9. More percent type problems: Advanced
10. More remainder type problems
11. More multiplication short-cuts

Problem Sequencing Elementary Number Sense Test
Updated as of 2016-2017

Problem 1 - 20

1. Addition, subtraction, multiplication, & division of whole numbers
2. Recognizing place value
3. Rounding off whole numbers
4. Multiplication short-cuts
5. Remainder type problems
6. Even & odd number type problems
7. Expanded notation
8. Sums of whole numbers with regrouping
9. Differences of whole numbers with regrouping
10. Roman numerals/Arabic numbers conversion

Problems 21 - 40

1. Addition/subtraction of fractions with common denominators
2. Addition, subtraction, multiplication, & division of decimal fractions
3. Comparing decimal & fractions
4. Conversion problems (either way): fraction/decimal, percent/fraction, percent/decimal
5. Order of operations
6. More multiplication short-cuts
7. Ratio/proportion
8. Consumer type problems
9. Problems about prime numbers
10. Greatest common divisor (gcd) & least common multiple (lcm)
11. Conversion problems (either way): length, measurements, time

Problems 41 - 60

1. Addition, subtraction, multiplication & division of fractions and mixed numbers
2. Substitution problems
3. Perimeter/area of: square, rectangle, triangle
4. Radius/diameter of a circle
5. Powers & roots of numbers
6. Solving simple equations
7. Sequences
8. Sets
9. Word problems
10. Volume of cube/rectangular box
11. Right triangle problems
12. More multiplication short-cuts
13. Base systems conversions

Problems 61 - 80

1. Addition, subtraction, multiplication & division of integers
2. Inverses
3. Basic geometry facts
4. More area problems
5. Squaring two-digit numbers
6. More multiplication short-cuts
7. More powers and roots of numbers
8. More consumer type problems
9. Inequalities
10. Probability
11. More area problems: parallelogram, rhombus, trapezoid
12. Coordinate geometry - number line
13. More percent type problems

The University of Texas Interscholastic League

Number-Sense Test, Series R-8

Contestant's Number.....

Contestant's Score.....

Contestants Read Directions

Don't Unfold This Sheet Until

Carefully Before Beginning Test

You Are Told to Begin

Directions: Do not turn this page until the person conducting the test gives the signal to begin. This is a ten-minute test. There are 80 problems. Solve accurately and quickly as many as you can in the order in which they appear. *All problems are to be solved mentally.* Make no calculations with paper and pencil. Write only the answer in the space provided at the end of each problem. Problems marked with a star (*) require only approximate answers; any answer to a starred problem that is within five per cent of the exact answer will be scored correct; all other problems require exact answers.

Person conducting contest should explain these directions carefully to the contestants.

Stop—Wait for Signal

- | | |
|---|---|
| <p>(1) $76 + 48 + 88 =$</p> <p>(2) $76 + 48 - 89 =$</p> <p>(3) $18 \times 14 =$</p> <p>(4) $48 \div \frac{3}{4} =$</p> <p>(5) $49 \div 1\frac{3}{4} =$</p> <p>(6) $15\frac{1}{2} \times 5 =$</p> <p>(7) $155 \times 5 =$</p> <p>(8) $650 \div 16\frac{2}{3} =$</p> <p>(9) $24\frac{1}{2} \div 7 =$</p> <p>* (10) An expenditure of a billion dollars a year is equivalent to what expenditure per day? \$.....</p> <p>(11) 89% of \$5000 = \$.....</p> <p>(12) $50 \times 63 =$</p> <p>(13) $152 \times 25 =$</p> <p>(14) $152 \times 75 =$</p> <p>(15) Find the altitude of a triangle of area $283\frac{1}{2}$ sq. in. and base 21 in. in.</p> <p>(16) Find the area of a square of perimeter 46 ft. sq ft.</p> <p>(17) Find the cost of a 17 pound turkey at 42¢ a pound. \$</p> <p>(18) Find the cost per pound of an 18 pound ham costing \$10.62..... \$</p> <p>(19) $283\frac{1}{2} \div 10\frac{1}{2} =$</p> <p>* (20) A rocket travels 12,000 miles an hour. How many feet does it move in a second?</p> <p>(21) 77 is 5% of what number?</p> <p>(22) $283\frac{1}{2} \div 21 =$</p> <p>(23) Find the average of 28, 138, 41 and 93.</p> <p>(24) $550 \div 12\frac{1}{2} =$</p> <p>(25) Convert 15,000 Italian lire into U.S. dollars by using the fact that 100 lire equal 16¢. \$.....</p> | <p>(26) Find the greatest common divisor of 105, 385, and 273.</p> <p>(27) Convert \$9.60 into lire, using the data of problem number 25. lire.</p> <p>(28) $8\frac{3}{4} + 13\frac{7}{8} - 16\frac{1}{2} =$</p> <p>(29) $16\frac{1}{2} - 13\frac{7}{8} + 8\frac{3}{4} =$</p> <p>* (30) Estimate the area of a circle of circumference 75 feet. sq. ft.</p> <p>(31) $5\% \times 54 =$</p> <p>(32) $7\% \times 54 =$</p> <p>(33) $4\% \times 54 =$</p> <p>(34) $5\frac{1}{2} \times 54 =$</p> <p>(35) $\\$4.60 + \\$7.29 - \\$9.88 =$ \$</p> <p>(36) $\\$4.44 + \\$7.27 - \\$9.88 =$ \$</p> <p>(37) $\\$4.53 + \\$7.22 - \\$9.74 =$ \$</p> <p>(38) $\\$4.61 + \\$7.34 - \\$9.94 =$ \$</p> <p>(39) $5\frac{1}{2} \times 54\frac{1}{2} =$</p> <p>* (40) Estimate the length of the diagonal of a rectangle of base 4 feet and area 32 square feet. ft.</p> <p>(41) Find the fifth term of the sequence, $3\frac{1}{2}, 3\frac{3}{2}, 3\frac{5}{2}, 3\frac{7}{2}, \dots$</p> <p>(42) $5\frac{1}{2} \times 84 =$</p> <p>(43) $5\frac{1}{2} \times 84 =$</p> <p>(44) $(2\frac{1}{2} \times 84) + (3\frac{1}{2} \times 84) =$</p> <p>(45) $(84 \times 1\frac{1}{2}) + (84 \times 4\%) =$</p> <p>(46) What per cent of $\frac{1}{8}$ is $\frac{3}{8}$? %.</p> <p>(47) $12^3 =$</p> <p>(48) $16^2 - 14^2 =$</p> <p>(49) $8^3 - 7^3 =$</p> <p>* (50) Estimate the hypotenuse of a right triangle if the sides adjacent to the right angle are 8 inches and 12 inches. in.</p> |
|---|---|

- (51) $87 \times 87 =$
- (52) $87\frac{1}{2}\%$ of \$5200 = \$
- (53) How many feet in 3 miles?
- (54) $88^2 =$
- (55) Which of the following is largest: $11/16$, $.66$, $13/18$?
- (56) $62\frac{1}{2}\%$ of 24% of a number is 135. What is the number?
- (57) Find the sum of \$8.36, \$11.76 and \$7.68. \$
- (58) $114 - 17\frac{1}{2} - 22\frac{7}{8} =$
- (59) $114 + 17\frac{1}{2} - 22\frac{7}{8} =$
- * (60) Estimate the area of a right triangle of base 8 in. and hypotenuse 14 in.sq. in.
- (61) If one mile is equal to 1609 meters, how many miles in 6436 meters?
- (62) $161 \div 11\frac{1}{2} =$
- (63) $1610 \div 115 =$
- (64) 98% of 320 =
- (65) 97% of 320 =
- (66) $97\frac{1}{2}\%$ of 320 =
- (67) $48\frac{3}{4}\%$ of 320 =
- (68) 49% of 320 =
- (69) $21\frac{1}{2}\%$ of 320 =
- * (70) The distance between two cities is 955 kilometers. If one kilometer equals 3281 feet, find the distance in miles.miles.
- (71) $841 - 268 - 473 + 137 =$
- (72) $841 - 268 + 473 - 137 =$
- (73) $375 \div 8\frac{1}{3} =$
- (74) $37\frac{1}{2} \div 8\frac{1}{8} =$
- (75) $13 \times 15\frac{1}{2} =$
- (76) $13\frac{1}{2} \times 15\frac{1}{2} =$
- (77) $13\frac{1}{2} \times 15\frac{1}{4} =$
- (78) $13\frac{1}{2} \times 1525 =$
- (79) $13\frac{1}{2} \times 15\frac{3}{4} =$
- * (80) Estimate the circumference of a circle of area 84 sq. ft. ft.

The University of Texas Interscholastic League

Number Sense Test, Series X-8

Contestant's Number.....

Contestant's Score.....

**Read Directions Carefully
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Stop—Wait for Signal

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| <p>(1) $1422 - 788 =$</p> <p>(2) $676 + 746 - 787 =$</p> <p>(3) $17 \times 24 =$</p> <p>(4) $16\% \times 24 =$</p> <p>(5) 12% of $833\frac{1}{3}$ is</p> <p>(6) $(38 \times 91) - (45 \times 76) =$</p> <p>(7) $66 \div 4 \frac{5}{7} =$</p> <p>(8) $3\frac{3}{8}$ is what per cent less than $4\frac{1}{2}$? %.</p> <p>(9) $21\frac{1}{4} - 13\frac{3}{8} + 9\frac{1}{8} - 14\frac{7}{8} =$</p> <p>* (10) Estimate the revenue obtainable by taxing 4,167,500 cartons of cigarettes at 43.15¢ a carton. \$</p> <p>(11) $833\frac{1}{3} \div 1\frac{1}{2} =$</p> <p>(12) If sausage sticks weighing $\frac{1}{4}$ oz. each sell four for a quarter, what is the equivalent selling price per pound? \$</p> <p>(13) If 10 liters are equivalent to 2.64 gallons, then $32\frac{1}{2}$ liters are equivalent to gallons.</p> <p>(14) 25 liters are equivalent to gallons.</p> <p>(15) $13\frac{1}{2}$ gallons are equivalent to liters.</p> <p>(16) Find the cost of 26% gallons of gasoline at $8\frac{1}{4}$¢ a liter. \$</p> <p>(17) Find the cost in dollars of $8\frac{3}{4}$ gallons of gasoline at one peso per liter, assuming that $12\frac{1}{2}$ pesos are equivalent to one dollar. \$</p> <p>(18) Find the cost in pesos of 30 gallons of gasoline that sells for 28¢ a gallon. pesos.</p> <p>(19) Seven-millionths of seven billion is</p> <p>* (20) If one mile is equivalent to 1.61 kilometers, estimate the cost in dollars of fuel for a trip of 579.6 kilometers in a car getting 16 miles to the gallon, assuming that fuel costs $4\frac{1}{4}$ pesos per gallon. \$</p> <p>(21) How far can you drive in 23 hours 20 minutes at 54 miles an hour? miles.</p> | <p>(22) How long does it take to cover 536 miles at 67 miles an hour? hours.</p> <p>(23) How fast must you drive in order to cover 550 miles in 8 hours 20 minutes? miles an hour.</p> <p>(24) Find the cost of fuel at 28¢ a gallon for a trip of 11 hours 25 minutes at $55\frac{1}{2}$ miles an hour in a car that gets $18\frac{1}{2}$ miles to the gallon. \$</p> <p>(25) How far can you drive in 32 minutes at $22\frac{1}{2}$ miles an hour? miles.</p> <p>(26) $1260 \div 23\frac{1}{2} =$</p> <p>(27) At what speed must you drive in order to cover 715 miles in 10 hours 50 minutes? miles an hour.</p> <p>(28) How long can you drive at 54 miles an hour in a car getting $13\frac{1}{2}$ miles to the gallon on an expenditure of \$8.58 for fuel costing 33¢ a gallon? hours.</p> <p>(29) How many liters of gasoline can be bought for \$12.98 at 9¢ a liter? liters.</p> <p>* (30) Estimate the area of an equilateral triangle of altitude 16 in. sq. in.</p> <p>(31) Write in figures: twelve and three-sixteenths billion.</p> <p>(32) $1298 \div 19\% =$</p> <p>(33) $27 \frac{1}{9} - 18\frac{1}{8} + 9 \frac{5}{9} - 7 \frac{2}{9} + 11 \frac{7}{9} =$</p> <p>(34) $6\% \times 8\frac{1}{2} =$</p> <p>(35) $(6\% \times 14\%) - (3 \frac{3}{10} \times 12\frac{1}{4}) =$</p> <p>(36) $8\frac{1}{8} \times 3 \frac{3}{5} \times 6 \frac{3}{5} =$</p> <p>(37) Find the tax on 8,750,000 gallons of gasoline at 8.4¢ a gallon. \$</p> <p>(38) If the tax on 8,750,000 gallons of gasoline is \$700,000, find the tax on one gallon.¢.</p> <p>(39) How many gallons of gasoline must be taxed at 6½¢ a gallon to yield \$327,600 in revenue? gallons.</p> |
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- * (40) Estimate the time required for a rocket traveling 15,500 feet a second to cover 2500 miles. minutes.
- (41) If 660 pegs cost \$99, find the cost per thousand. \$.....
- (42) If pegs cost \$68 a thousand, how many can be bought for \$238?
- (43) Truck B hauls 40% more than truck A; truck C hauls 68% more than truck A. What per cent more does C haul than B? %.
- (44) $1\frac{1}{2}$ is what per cent of $6\frac{1}{4}$? %.
- (45) 10% is what per cent less than $14\frac{2}{9}$? %.
- (46) $4\frac{1}{2}$ is what per cent more than $3\frac{1}{2}$? %.
- (47) Of 612 girls in a school, 356 take English, 178 take History, and 157 take neither. How many take both?
- (48) How many take only one of the two subjects?
- (49) How many do not take history?
- * (50) If one mile is equivalent to 1.61 kilometers, and one square mile is equivalent to 640 acres, estimate the number of square kilometers contained in 8000 acres. square kilometers.
- (51) Subtract \$25.65 from \$42.22. \$.....
- (52) Subtract the sum of \$18.96 and \$6.77 from \$42.31. \$.....
- (53) Subtract \$24.87 from the sum of \$28.51 and \$12.93. \$.....
- (54) Subtract the sum of \$18.37 and \$6.56 from the sum of \$12.56 and \$28.98. \$.....
- (55) If \$1750 earns \$52.50 in interest in a year, how much should \$8750 earn? \$.....
- (56) The square root of (98×450) is
- (57) The square root of $(16 \times 64 + 9 \times 64)$ is
- (58) The cube root of $(21 \times 12 \times 6 \times 49)$ is
- (59) $\frac{3}{8}$ is to 1 as $2\frac{1}{4}$ is to
- * (60) If a trip which is usually made in 5 hours 54 minutes is made at a speed 42% slower than usual, how long will the trip take? hours.
- (61) If a trip which is usually made in 21 hours is made at a speed 40% faster than usual, how long will the trip take? hours.
- (62) If a trip which is usually made in 21 hours is made at a speed 30% slower than usual, how long will the trip take? hours.
- (63) Find the sixth term of the sequence 1.35, 1.62, 1.89, 2.16, —
- (64) A car traveling 50 miles an hour is moving how many feet a second?
- (65) How long will it take a car traveling 52.5 miles an hour to cover 2310 feet? seconds.
- (66) How long will it take a car traveling 55 feet a second to cover $7\frac{1}{2}$ miles? minutes.
- (67) How far can a car travel in 7 minutes at 45 miles an hour? feet.
- (68) Find the area of a trapezoid of altitude 23 in. and bases 19 in. and 27 in. sq. in.
- (69) Find the altitude of a trapezoid of bases 29 in. and 23 in. and area 416 sq. in. in.
- * (70) Estimate the altitude of an equilateral triangle of side 23 in. in.
- (71) A box contains 8 red balls and 8 white balls. Three balls are taken at random from the box. Find the probability that one is red and two are white.
- (72) What is the probability that all three are white?
- (73) What is the probability that at least one of the three balls is red?
- (74) Two cards are taken at random from an ordinary deck of 52 playing cards. Find the probability that the two cards belong to the same suit.
- (75) The sides of a triangle are 27 in., 36., and 45 in. Find the area sq. in.
- (76) The area of a square is decreased from $132\frac{1}{4}$ sq. in. to $72\frac{1}{4}$ sq. in. Find the corresponding decrease in the perimeter. in.
- (77) An increase of $33\frac{1}{3}\%$ in speed is accompanied by a decrease of % in time.
- (78) A decrease of 40% in speed is accompanied by an increase of % in time.
- (79) A decrease of 36% in time is accompanied by an increase of % in speed.
- * (80) The diagonal of a square is increased from $23\frac{1}{2}$ in. to $31\frac{1}{4}$ in. Estimate the corresponding increase in the side. in.

The University of Texas Interscholastic League

Number Sense Test, Series Z-8

Contestant's Number.....

Contestant's Score.....

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Stop—Wait for Signal

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| <p>(1) $14 \times 15 =$</p> <p>(2) $32 \times 7/24 =$</p> <p>(3) $165 \div 15 =$</p> <p>(4) $63 + 75 =$</p> <p>(5) 28.5 is what percent of 1140?%</p> <p>(6) $2\frac{1}{8} \times 3\frac{1}{2} =$</p> <p>(7) $7/8 - 5/12 =$</p> <p>(8) $12.62 + 8.21 =$</p> <p>(9) $35 \times 11 =$</p> <p>* (10) $37 \times 526 =$</p> <p>(11) 62 doz. =eggs.</p> <p>(12) 196 in. =yd.</p> <p>(13) 5 mi. =rd.</p> <p>(14) $22\frac{1}{2}\%$ =(fraction).</p> <p>(15) $714 = 87\frac{1}{2}\%$ of</p> <p>(16) $7/12 =$%.</p> <p>(17) 70% of 623 =</p> <p>(18) $16 + 18 - 12 =$</p> <p>(19) $75 \times 75 =$</p> <p>* (20) $5 \times 7 \times 11 \times 13 =$</p> <p>(21) Find the interest on \$526 for 2 yr. at 6%. \$.....</p> <p>(22) How much should be invested for $1\frac{1}{2}$ yr. at 8% in order to yield \$2400? \$.....</p> <p>(23) Find the tax on 7,327,622 gal. gas at 8¢ per gal. \$.....</p> <p>(24) At 25¢ on the \$100 what is the tax on a farm valued at \$12000? \$.....</p> <p>(25) If the government pays \$8 per acre to Mr. Jones for allowing 120 acres to lie fallow, how much did it pay him? \$.....</p> <p>(26) $133\frac{1}{3} \times 1515 =$</p> <p>(27) $28 \times 32 =$</p> | <p>(28) $27\frac{3}{7} \div 3 =$</p> <p>(29) If the sides of a triangle are 5", 12", and 13", what is the length of the projection of the short leg on the hypotenuse? in.</p> <p>* (30) What percent larger is 622 than 500?%.</p> <p>(31) If a rectangular trough has its length and width doubled with the depth remaining the same, its volume is multiplied by</p> <p>(32) A trapezoid has x as one base and $2x$ as its altitude. If both bases are doubled while the altitude remains fixed, the area is multiplied by</p> <p>(33) How many degrees are in each exterior angle of a regular pentagon?°.</p> <p>(34) Find the next term of 1, 2, 4, 6, 10, 12, 16,</p> <p>(35) What is the sum of two numbers which satisfy $2x^2 - 3x + 7 = 0$?</p> <p>(36) What is the largest prime less than 100?</p> <p>(37) Which is the larger, 19/17 or 21/19?</p> <p>(38) What is the least common denominator: 1/33, 1/35, 1/6?</p> <p>(39) Find the number of divisors of $2^2 \times 4 \times 5$.</p> <p>* (40) $7 \times 11 \times 13 \times 17 =$</p> <p>(41) Find the sum of the divisors of $2^2 \times 3 \times 5$.</p> <p>(42) How many positive integers less than or equal $2^2 \times 3 \times 5$ are relatively prime to it?</p> <p>(43) How many elements are in the power set for the set of primes between 10 and 20?</p> <p>(44) If $A \times B$ is the Cartesian product of A and B, then $A \cap (A \times B)$ has how many elements in it?</p> <p>(45) The altitude of a triangle of area 721 sq. in. is 30 in. Find the base.</p> <p>(46) $\{0, 1, 2\} \cup (\{1, 2, 3\} \cap \{1, 2, 3, 4\}) = \{.....\}$.</p> <p>(47) $(\{0, 1, 2\} \cup \{1, 2, 3\}) \cap (\{0, 1, 2\} \cup \{1, 2, 3, 4\}) = \{.....\}$.</p> <p>(48) A rectangular parallelepiped has two edges multiplied by 3/2. The</p> |
|---|--|

- other remains fixed, and the figure is still a parallelepiped. What is the volume multiplied by?
- (49) $33\frac{1}{4}\%$ of $37\frac{1}{2}\%$ of 896 =
- * (50) The largest possible right circular cylinder is cut from a cube of volume 1000 cu. in. The volume of the cylinder is cu. in.
- (51) A circular floor is divided into three sectors by radii. How many ways can it be painted so as to use all three of three colors of paint?
- (52) If $6 + 2x = x + 10$, then $x =$
- (53) What is the exact number of days from January 1, 1964 to June 1, 1964? days.
- (54) At $12\frac{1}{2}$ pesos to the dollar, how many pesos are in \$188? pesos.
- (55) What is the difference of the areas of two circles of radii 5" and 2". pi sq. in.
- (56) $12\frac{1}{2}\% \times 37\frac{1}{2}\% \times 192 =$
- (57) The short side of a 30° right triangle is $5\frac{1}{2}$ ". The hypotenuse is "
- (58) $62 \times 58 =$
- (59) John is twice as old as Tom. Five years ago he was three times as old as Tom. How old is Tom? yr.
- * (60) The largest possible sphere is cut from a cube. what is the percent cut away? %.
- (61) $2\% - 1\% =$
- (62) $\$175 \times 21 = \$$
- (63) If the edge of a regular tetrahedron is $\sqrt{6}$ ", the altitude is in.
- (64) $2\frac{1}{2} \times 3\% =$
- (65) If 120 acres are enough to graze 75 cows, at the same rate how many acres will it take to graze 125 cows? A.
- (66) $175 \times 27 =$
- (67) A recipe calls for $3\frac{1}{2}$ cups of flour. If the recipe is tripled, how many cups of flour will it take? cups.
- (68) What is the total surface area of a cylindrical can 8" high and 5" in diameter? pi sq. in.
- (69) At \$2.50 an oz., how much will 1 lb. blue bonnet seeds cost? \$
- * (70) At 8 lb. per gal. and $7\frac{1}{2}$ gal. per cu. ft., what is the weight of water in a full cylindrical tank 5 ft. high and 6 ft. in diameter, lb.
- (71) A sail boat traveling at the rate of $6\frac{1}{2}$ miles per hour went 132 miles. How long did it take? hr.
- (72) $1.9 \times 1.9 =$
- (73) $28 \times 28 =$
- (74) $32^2 - 28^2 =$
- (75) $9^3 - 7^3 =$
- (76) $28^2 - (5 \times 28) + 6 =$
- (77) If $28^x = 1$, then $x =$
- (78) How many solutions does $\sqrt{5 - x^2} = -3$ have?
- (79) A line from P intersects a circle in A and B so that PB = 8'. A tangent from P is 4' long. The length of PA = ft.
- * (80) $59^3 =$

The University of Texas Interscholastic League

Number Sense Test, Series BB-6

Contestant's Number.....

Contestant's Score.....

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Stop—Wait for Signal

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|--|---|
| (1) $326 + 109 + 445 =$ | (26) $1/3 + 1/6 + 1/9 =$ |
| (2) $109 - 326 + 445 =$ | (27) Change 27 in base eight to base ten. |
| (3) $10 + 9 + 32 + 64 + 45 =$ | (28) $7^3 =$ |
| (4) $84 \times 96 =$ | (29) What is the length of the tangent from a point 6 inches from the center of a circle of radius 5 inches?in. |
| (5) $33 \times 47 =$ | (30) Find the greatest common divisor of 60, 36, 84. |
| (6) $\sqrt{529} =$ | (31) Change 23 in base four to base three. |
| (7) $84 \div 19 =$ | (32) What is the area of a square whose diagonal is 12? |
| (8) What is the area of a triangle whose base is 7 and whose altitude is 5? | (33) Find the least common multiple of 60, 36, 72. |
| (9) If 80 kph is equivalent to 50 mph then 25 kph is equivalent to how many mph?mph. | * (34) $\frac{5267}{26} =$ |
| (10) Write $6/5$ as a percentage. | (35) What is the hypotenuse of a right triangle whose sides are 4 and 7? |
| (11) $2\% - 4\% =$ | (36) How many dollars is 500 pesos at $12\frac{1}{2}$ pesos per dollar? \$..... |
| (12) What is the sum of the positive integral divisors of 42? | (37) Add 54 in base six to 35 in base six and give the answer in base six. |
| (13) $2\% \div 3\% =$ | (38) $103 \times 896 =$ |
| (14) What is the largest prime divisor of 136? | (39) If 80 kilometers per hour equals 50 miles per hour, then 70 mph equals how many kph?kph. |
| (15) What is the area of a square whose perimeter is 3? | (40) At $12\frac{1}{2}$ pesos per dollar, how many pesos is 26 dollars?pesos. |
| (16) If 3 cokes cost 19¢, how much will 15 cost?¢. | (41) $2/8 \div 4/9 =$ |
| (17) $288 \div 24 =$ | * (42) $537 \times 13 =$ |
| (18) $57 \times 8 =$ | (43) How many seconds in $1\frac{1}{2}$ hours?sec. |
| (19) What is the perimeter of a square whose area is $\frac{1}{4}$? | (44) $2\frac{1}{2} \div 5\frac{1}{2} =$ |
| (20) Solve for X: $125^X = 1/25$ | (45) The number of positive prime factors of 87 is |
| (21) The interest on \$200 for 90 days at 4% is how many dollars? \$..... | (46) $.0205 \div .005 =$ |
| (22) Multiply 45 in base six by 4 in base six and give the answer in base six. | (47) A car travels at 63 miles per hour for 3 hours and 20 minutes. How far does it travel?miles. |
| * (23) Find the average score if 17 test scores add up to 1042. | (48) $98 \times 82 =$ |
| (24) $78 \times 2\% =$ | (49) What is the largest root of $X^2 - 13X + 42 = 0$? |
| (25) What common fraction is $28\frac{4}{7}\%$? | |

- (50) Change $44\frac{4}{9}\%$ to a fraction.
- (51) What is the 16th term in this progression: 3, 7, 11, 15, ...?
- (52) An automobile travels 195 miles in 3 hours. How fast does it travel? mph.
- (53) How many hours between 1:45 p.m. and 6:15 p.m.? hrs.
- (54) What is the simple interest rate if \$200 earns \$6 interest in 6 months? %.
- (55) 120% of 17 =
- (56) What is the sum of the roots of $X^2 - 9X + 33 = 0$?
- (57) % of 36 = 84
- (58) Solve for X: $3X - 2Y = 2$
 $X + Y = 4$

- (59) What is the coefficient of a^4b in the binomial expansion of $(a + b)^8$?
- (60) $(-\frac{1}{2})^{-4} =$
- (61) If the ratio of 3 to 5 is the same as the ratio of 9 to X, what is X?
- (62) What is the product of the roots of $X^2 + 3X + 14 = 0$?
- (63) If $f(X) = 3X^2 - X + 3$, what is $f(-3)$?
- (64) $(256)^{1/4} =$
- (65) What is the diameter of a circle whose area is 44π ?
- (66) If $X = -13$, what is $|X|$?
- (67) $21 + 58 + 44 + 32 + 98 =$
- (68) $215 + 844 + 329 + 821 =$
- (69) $2158 + 4432 + 9821 =$
- (70) In how many ways can 4 different books be arranged in a bookcase?
- (71) How many ways can 3 people be seated in 6 chairs?
- *(72) How many gallons of water in a tank 20 feet in diameter and 10 feet deep if there are $7\frac{1}{2}$ gallons to the cubic foot? gal.
- (73) How many committees of 5 can be formed from a group of 6 people?
- (74) If 3 coins are tossed simultaneously, what is the probability that 2 or more tails will come up?
- (75) $(\frac{1}{81})^{-3/4} =$
- (76) What is the slope of the line whose equation is $X + 4Y - 3 = 0$?
- (77) What is the slope of a line perpendicular to the line whose equation is $X + 4Y - 3 = 0$?
- (78) What is the slope of the line through the points (1, 4) and (3, 9) in the plane?
- (79) What is the distance between the points (1, 4) and (3, 9) in the plane?
- (80) What is the radius of the circle whose equation is $X^2 + Y^2 - 121 = 0$?

The University of Texas Interscholastic League

Number Sense Test, Series CC-6

Contestant's Number.....

Contestant's Score.....

**Read Directions Carefully
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Stop—Wait for Signal

- | | |
|---|---|
| <p>(1) $397 + 801 + 159 =$</p> <p>(2) $4396 + 3987 + 1533 =$</p> <p>(3) $3987 - 4396 =$</p> <p>(4) How many days does it take for \$300 to accumulate to \$312 if the interest rate is 8%?</p> <p>(5) $\sqrt{1024} =$</p> <p>(6) What is the least common multiple of 33, 30?</p> <p>(7) If x% of 115 is 184, what is x?</p> <p>(8) If $30 - 3^x = x$, then x =</p> <p>(9) $4.201 + 3.9\% + 7/25 =$</p> <p>(10) $201 \times 39 =$</p> <p>(11) How much money did I borrow if I must repay \$130 on a 180-day note at 8%? \$.....</p> <p>(12) $413 \div 59 =$</p> <p>(13) What is the sum of the positive integral divisors of 48?</p> <p>(14) What is the radius of a circle whose equation is $x^2 + y^2 - 8x - 6y = -14$?</p> <p>(15) 225% of 464 =</p> <p>(16) Write as a common fraction: .011111...</p> <p>(17) Multiply 45 in base seven by 5 in base seven and give the answer in base seven.</p> <p>(18) What is the altitude of a triangle whose base is 7 and whose area is 13?</p> <p>(19) If the ratio of 2 to x is the same as the ratio of x to 8, what is x?</p> <p>(20) What is the coefficient of a^3b^4 in the binomial expansion of $(-2 + b)^7$?</p> <p>(21) $(2i) - (3 - i) + (5 + 2i) =$</p> <p>(22) Add 37 in base eight to 65 in base eight and give the answer in base eight.</p> <p>(23) $104.16 \div 8.4 =$</p> | <p>(24) If 80 kph is equivalent to 50 mph, how many kph is 187.5 mph?</p> <p>(25) Find the average: 63, 74, 50, 87, 96.</p> <p>* (26) $784 \times 421 =$</p> <p>(27) Find a root of $x^2 - 4x - 4 = 0$</p> <p>(28) $(3 - i)(2i + 5) =$</p> <p>(29) An exterminator examines 314 houses with bugs and finds 295 have roaches, and 43 have termites. How many have only roaches?</p> <p>(30) If 7 books cost \$4.83, how much should 12 cost? \$.....</p> <p>(31) $7\frac{1}{2} - 9\frac{1}{2} =$</p> <p>(32) The sales tax in Austin is 4%. If I pay \$2.60 for a belt, what is the cost before the tax? \$.....</p> <p>(33) $7\frac{1}{2} \times 4\frac{1}{2} =$</p> <p>(34) If $\log 2 = .3$, $\log 3 = .5$, and $\log 5 = .7$, what is $\log 7.5$?</p> <p>(35) $26 \times 42 =$</p> <p>(36) Change 46 in base seven to base two.</p> <p>(37) What is the sum of the roots of $13x^2 - 24 = 0$</p> <p>(38) What is the product of the roots of $13x^2 - 24 = 0$</p> <p>(39) Solve for B: $A + 2B + C = 2$
 $A + B - C = -4$
 $A + 2B - C = -6$</p> <p>(40) $2^{13} =$</p> <p>(41) What is the greatest common divisor of 60, 260, 180?</p> <p>(42) If $\log_{10} 7 = .8$, $\log_{10} 5 = .7$, $\log_{10} 3 = .5$, and $\log_{10} 2 = .3$, what is $\log_{10} 27$?</p> <p>(43) What is the length of a tangent to a circle with diameter 12 from a point 8 from the center?</p> <p>(44) How many positive integral divisors does 357 have?</p> <p>(45) Add 328 in base nine to 187 in base nine and give the answer in base nine.</p> |
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- (46) $357 + 445 + 467 + 208 =$
- (47) Calculate z if $z = \frac{2x + b}{x^2 - c}$ and $x = 4$, $b = 5$, $c = 3$.
- *(48) $208,980 \div 645 =$
- (49) $.0057 \times 11.1 =$
- (50) If the ratio of x to y is the same as the ratio of y to z , and $x = 9$, $z = 8$, what is y ?
- (51) $(2i + 5) \div (3 - i) =$
- (52) Write as a common fraction: $46\frac{2}{3}\%$
- (53) $1562 - 4623 + 3130 =$
- (54) $5 + 2 \div 7 - 8 =$
- (55) $.13130 \div .026 =$
- (56) $\sqrt{725} =$
- (57) One acute angle of a right triangle is 39° . What is the other angle?
- (58) Change 101101110010111 in base two to base eight.
- (59) 13 pints is how many quarts?
- (60) How many seconds in 4 hours and 12 minutes?
- (61) $\sum_{K=2}^4 (K^2 + 1) =$
- (62) If $f(x) = 1/x$ and $g(x) = x^2$, then $g(f(2)) =$
- (63) How far does a point move in traveling counterclockwise from the point $(1,0)$ to the point $(1/2, \sqrt{3}/2)$ along a circle with radius 1 and center at the origin?
- (64) Find the smallest positive value of x such that $1 + 2 \cos x = 3 - 2 \cos x$
- (65) Suppose $\sin 2 = .6$. What is $\sin 4$?
- (66) 3 coins are tossed simultaneously. What is the probability that exactly two heads appear?
- (67) Two cards are drawn, one after the other, from an ordinary deck of 52 cards. The first card is replaced before the second card is drawn. What is the probability that neither is a spade?
- (68) Two dice are thrown. What is the probability that the sum is greater than or equal to 2 and less than or equal to 4?
- (69) How many ways may seating be arranged at a 4 place circular table if 5 people are available?
- (70) How many subsets of a set of 8 objects are there?
- (71) What is the length of a line segment whose end points are $(1,4)$ and $(3,7)$
- (72) What is the slope of a line perpendicular to the line $3y + 2x = 17$
- (73) What is the slope of $f(x) = \frac{1}{2x+1}$ at $x = 3$?
- (74) Suppose $f(x) = \sqrt{1-x^2}$ and $h(x) = f(x/2)$. What is $h(1/2)$?
- (75) $[x]$ is defined to be the greatest integer less than or equal to x . What is $[-3\frac{1}{2}]$?
- (76) If a central angle of 2.5 radius intercepts an arc of 12 inches on the circumference, what is the radius of the circle?
- (77) Find the value of $\sqrt{\frac{1-\cos \theta}{1+\cos \theta}}$, if $\sin \theta = 24/25$ and $\sec \theta$ is positive.
- (78) $\tan 210^\circ =$
- (79) $(\cos 22\frac{1}{2}^\circ)^2 - (\sin 22\frac{1}{2}^\circ)^2 =$
- (80) Find the value of $\frac{\sin \theta - \cos \theta}{\sin \theta + \cos \theta}$, if $\cot \theta = -\frac{1}{2}$ and $\sec \theta$ is negative.

The University of Texas Interscholastic League

Number Sense Test, Series FF-6

Contestant's Number.....

Contestant's Score.....

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Stop—Wait for Signal

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|---|---|
| <p>(1) $3^6 =$</p> <p>(2) $87 - 23 - 56 =$</p> <p>(3) $127 - 146 =$</p> <p>(4) $49 \times 2 - 49 \times 9 =$</p> <p>(5) $(-18)^2 =$</p> <p>(6) $46 + 47 + \dots + 54 =$</p> <p>(7) $125^2 =$</p> <p>(8) $77 \times 83 =$</p> <p>(9) $9^3 - 6^3 =$</p> <p>* (10) $27^3 + 17 =$</p> <p>(11) $3\frac{1}{2} \times 5/7 =$</p> <p>(12) $5 \div 7\frac{1}{2} =$</p> <p>(13) $3/7 \div 1\frac{1}{14} =$</p> <p>(14) $1\frac{3}{7} \times 91 =$</p> <p>(15) The least common denominator for $5/6, 1/10, 3/22$ is</p> <p>(16) Reduce $28/98$ to the lowest terms.</p> <p>(17) $1\frac{1}{5} + 2\frac{1}{10} - 3\frac{1}{4} =$</p> <p>(18) $12\frac{1}{2} \div (1\frac{1}{4} \times 3) =$</p> <p>(19) Write the larger of $5/8, 14/24, 20/31$.</p> <p>* (20) $19 \times 8700 =$</p> <p>(21) $44\frac{4}{9}\% =$ (fraction)</p> <p>(22) $14/200 =$ %.</p> <p>(23) $18\frac{3}{4}\%$ of $64 =$</p> <p>(24) $35 \div 87\frac{1}{2}\% =$</p> <p>(25) 18 is what percent of 25? %.</p> <p>(26) $87\frac{1}{2}\%$ of what number is 63?</p> <p>(27) $66\frac{2}{3}\%$ of $87\frac{1}{2}\%$ of $24/14 =$</p> <p>(28) $2/11 \times 3/2 =$ %.</p> <p>(29) If, after a $16\frac{2}{3}\%$ discount, a car sold for \$500, the original price was \$.....</p> | <p>* (30) 126% of \$18000 = \$.....</p> <p>(31) If a chicken keeps his same shape and wt. per cu. in. while growing to triple all his dimensions, his wt. is multiplied by</p> <p>(32) If $x^2 + 6x + 9 = 0$, then $x =$</p> <p>(33) The area of a square whose diagonal is $17\sqrt{2}$ in. is sq. in.</p> <p>(34) If $x^2 + 1 = 0$, then $x^4 =$</p> <p>(35) The area of a rhombus with diagonals 6" and 8" is sq. in.</p> <p>(36) If $x = 5$, find $(x - 1)(x + 1)(x^2 + 1)$.</p> <p>(37) The next term of $\frac{1}{2}, 2/-1, 3/-4, 4/-7, 5/-10, \dots$ is</p> <p>(38) The area of an isosceles triangle with sides of 5", 5", and 6" is sq. in.</p> <p>(39) If $x = 5$, then $(x^4 - 1) \div (x^3 + x^2 + x + 1) =$</p> <p>* (40) $190 + 1966 + 5672 + 8932 =$</p> <p>(41) If one neglects friction, a pipe with rectangular 5" \times 6" cross section will carry how many times as much water per hour as one with rectangular 2" \times 3" cross section?</p> <p>(42) Tom does a job in 1 hr. which takes Joe 2 hr. to do. How long does it take them working together at the same rates?.....hr.</p> <p>(43) $(36)^{-3/2} =$</p> <p>(44) The coefficient of the xy term of $(x^4 + x^2y^2 + y^4) \div (x^2 + xy + y^2)$ is</p> <p>(45) If $x^2 + 1 \geq 50$ and $x < 0$, what is the largest possible value of x? $x =$</p> <p>(46) The sum of the roots of $2x^2 - 5x + 7 = 0$ is</p> <p>(47) The product of the roots of $2x^2 - 5x + 7 = 0$ is</p> <p>(48) Find k so that the roots of $x^2 - 6x + 5k = 0$ are equal.</p> <p>(49) The slope of the line through $(-1, -2)$ and $(-5, -6)$ is</p> |
|---|---|

- (44) In #42, the y-intercept is (0,y). y = _____.
- (45) A line perpendicular to the line in #42 would have slope _____.
- (46) $5 - i$ is a complex number in the form $a + bi$. a = _____.
- (47) In #46, b = _____.
- (48) $i^{123} =$ _____.
- (49) A decagon has _____ sides.
- *(50) $973236 \div 1111 =$ _____.
- (51) $(289)^{1/2} + 4^3 + 7^2 =$ _____.
- (52) $(144)^{1/2} - 8^2 + 9^2 =$ _____.
- (53) Two dice are rolled, what is the probability that their sum is 2? _____.
- (54) (x,y) is the midpoint of the line segments with endpoints (3,4) and (6,7). x = _____.
- (55) In #54, y = _____.
- (56) $6! + 3! =$ _____.
- (57) $\sum_1^2 (x-1)^2 =$ _____.
- (58) $\sum_1^2 \pi (x+1) =$ _____.
- (59) The volume of a box with edges 7", 11", and 12" is _____ cu. in.
- *(60) $\sqrt{308025} =$ _____.
- (61) $\cos (135^\circ) =$ _____.
- (62) $\sin (270^\circ) =$ _____.
- (63) $\lim_{x \rightarrow 0} \frac{3x^3 + x}{x} =$ _____.
- (64) $\int_0^2 x dx =$ _____.
- (65) Evaluate $f(x) = 4x^3 - 4$ at $x = 3$. _____.
- (66) Let $f(x) = 4x^3 - 4$. $f(x) =$ _____.
- (67) $\sin (11\pi/6) =$ _____.
- (68) $\cos (5\pi/4) =$ _____.
- (69) $\tan (\pi/4) =$ _____.
- *(70) $\left(\det \begin{bmatrix} 4 & 7 \\ -1 & -3 \end{bmatrix} \right)^3 =$ _____.
- (71) $(4, \pi/3)$ are polar coordinates for the point (x, y) is rectangular coordinates. x = _____.
- (72) In #71, y = _____.
- (73) $4\pi/3$ radians = _____ degrees.
- (74) 330 degrees = _____ radians.
- (75) Change 80°C to Fahrenheit. _____ $^\circ\text{F}$.
- (76) $C_4^8 =$ _____.
- (77) $P_3^5 =$ _____.
- (78) Let $f(x) = x-2$. Then $f^{-1}(x) =$ _____.
- (79) $f(x) = 2x + 1$ and $g(x) = x-1$. Find $f(g(3))$. _____.
- *(80) $2^{10} - 2^4 =$ _____.

**The University Interscholastic League
Number Sense Test • HS State • 2003**

Contestant's Number _____

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Final		
2nd		
1st		
Score		Initials

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STOP – WAIT FOR SIGNAL

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|--|--|
| <p>(1) $2003 - 1776 =$ _____</p> <p>(2) $18 \times 18 =$ _____</p> <p>(3) $25 \times 2003 =$ _____</p> <p>(4) $9 \times (5 + 3) - 7 \div 2 =$ _____</p> <p>(5) $6\frac{3}{4}\% =$ _____ (decimal)</p> <p>(6) $2\frac{3}{8} - 3\frac{1}{4} =$ _____</p> <p>(7) $1.2 \times 1.25 =$ _____ (decimal)</p> <p>(8) MCDLIX = _____ (Arabic Numeral)</p> <p>(9) $\frac{5}{16} =$ _____ % (decimal)</p> <p>*(10) $1 - 11 + 111 - 1111 + 11111 =$ _____</p> <p>(11) $\frac{1}{3} - \frac{5}{6} + \frac{2}{9} =$ _____ (fraction)</p> <p>(12) The LCM of 28, 42, and 56 is _____</p> <p>(13) The mean of 2, 3, 5, 7, 5, 3, 2, 5 is = _____</p> <p>(14) $13 \times 245 =$ _____</p> <p>(15) $4\frac{1}{4}\%$ of 1200 = _____</p> <p>(16) $94 - 12 + 70 + 82 - 24 =$ _____</p> <p>(17) $37 \times 24 =$ _____</p> | <p>(18) Which is larger, $\frac{9}{11}$ or 81%? _____</p> <p>(19) $\frac{21}{40} =$ _____ %</p> <p>*(20) $\sqrt[3]{1730} \times 145 =$ _____</p> <p>(21) If 8 slats cost \$1.20 then 14 slats cost \$ _____</p> <p>(22) $65 \times 45 =$ _____</p> <p>(23) 2122 in base 3 = _____ in base 9</p> <p>(24) 108 is what % more than 81? _____</p> <p>(25) The sum of the proper positive integral divisors of 36 is _____</p> <p>(26) $164 \times 161 =$ _____</p> <p>(27) $\frac{2}{3}$ of a mile = _____ feet</p> <p>(28) .3050505... = _____ (fraction)</p> <p>(29) $(24 \times 34 - 44) \div 7$ has a remainder of _____</p> <p>*(30) $27 \times 29 \times 31 \times 33 =$ _____</p> <p>(31) The equation $2x^3 - bx^2 + cx = d$ has roots r, s, and t. If $rst = 3.5$ then $d =$ _____</p> <p>(32) If $x = -4$ and $y = -5$ then $(x + y)(x^2 - xy + y^2) =$ _____</p> <p>(33) $222_9 - 66_9 =$ _____ ₉</p> |
|--|--|

- (34) $1.2^2 + 3.6^2 =$ _____
- (35) $65 \times 625 =$ _____
- (36) $12\frac{1}{4} \times 8\frac{1}{4} =$ _____ (mixed number)
- (37) If x and y are positive integers and $x^2 - y^2 = -67$ then x is _____
- (38) $89 \times 84 =$ _____
- (39) $(2197)^{\frac{1}{3}} =$ _____
- *(40) $\sqrt{6123457} =$ _____
- (41) $991 \times 989 =$ _____
- (42) An obtuse triangle has integer side lengths of x , 7, and 11. The smallest value of x is _____
- (43) The next term of 2, 9, 28, 65, 126, ... is _____
- (44) $105 \times 715 =$ _____
- (45) $133 \times 311 =$ _____
- (46) If $8^{x+1} = -24$ then $2^{3x} =$ _____
- (47) The slope of the line perpendicular to the line containing the points (3, -1) and (-3, 1) is _____
- (48) $214 \times 314 =$ _____
- (49) For $3x^2 - 2x + 1 - k = 0$ to have equal roots, k has to have a value of _____
- *(50) $6388 \times 3.75 =$ _____
- (51) $509 \times 509 =$ _____
- (52) $25553 \div 1111 =$ _____
- (53) If $(2 - 3i) \div (3 - 2i) = a + bi$, then $a =$ _____
- (54) The coefficient of the 2nd term of the expansion of $(x - 2y)^5$ is _____
- (55) $\frac{111-9!}{10!} =$ _____
- (56) The probability of success is $\frac{8}{17}$. The odds of failure is _____
- (57) $\log_4 256 \div \log_4 16 \times \log_4 64 =$ _____
- (58) ${}_9P_3 \div {}_9C_6 =$ _____
- (59) $\cos 95^\circ \cos 25^\circ - \sin 95^\circ \sin 25^\circ =$ _____
- *(60) $112 \times 123 + 132 \times 121 =$ _____
- (61) $429 \times 357 =$ _____
- (62) If all of the letters of the words "STATE MEET" are put in a bag, what is the probability of drawing out an "E"? _____
- (63) If $x - y = \frac{3}{5}$ and $y + x = -\frac{5}{3}$, then $x =$ _____
- (64) The sum of the measures of the angles in a regular decagon is _____ degrees
- (65) Find $f(-\frac{29}{10})$ if $f(x) = [x]$. _____
- (66) $42^2 + (40^2 - 2^2) =$ _____
- (67) $\frac{11}{14} + \frac{3}{11} - 2 =$ _____
- (68) $25 \times 77 + 25 \times 34 =$ _____
- (69) $135_7 \times 4_7 =$ _____₇
- *(70) $\pi^3 \times e^4 =$ _____
- (71) Change .111₇ to a base 10 fraction. _____
- (72) $1001 \times 25 = 143 \times$ _____
- (73) $\frac{5}{7} + \frac{7}{5} - 3 =$ _____
- (74) If $f(x) = \frac{2x+1}{x-2}$ then $f^{-1}(3) =$ _____
- (75) $7 \times \frac{7}{15} - 7 =$ _____ (mixed number)
- (76) In QI, $\sin \frac{\pi}{6} + \cos \frac{2\pi}{6} = \tan \frac{\pi}{6}$ and $k =$ _____
- (77) $2^3 \times 8^3 \times 5^3 =$ _____
- (78) $\int_0^\pi \cos x \, dx =$ _____
- (79) $7(7!) + 6(6!) + \dots + 2(2!) + 1(1!) =$ _____
- *(80) $16667 \div 8333 \times 555 =$ _____

**The University Interscholastic League
Number Sense Test • HS State • 2022**

Contestant's Number _____

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Final	_____
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1st	_____
Score	Initials

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| <p>(1) $5622 - 1247 + 525 =$ _____</p> <p>(2) $1\frac{2}{3} \times 45.6 =$ _____</p> <p>(3) $3672 \div 12 =$ _____</p> <p>(4) $0.428571428571428571\dots =$ _____ (fraction)</p> <p>(5) $2 - 1 \times (3 + 4) \div 7 - 11 =$ _____</p> <p>(6) $35 \times 28 - 23 \times 35 =$ _____</p> <p>(7) $\frac{11}{25} =$ _____ (decimal)</p> <p>(8) $4\frac{1}{5} + 5\frac{1}{8} =$ _____ (mixed number)</p> <p>(9) $72 \times 88 =$ _____</p> <p>*(10) $50622 - 62250 + 25062 =$ _____</p> <p>(11) Which is greater, $\frac{11}{16}$ or $\frac{16}{21}$? _____</p> <p>(12) The GCD of 72, 54, and 90 is _____</p> <p>(13) The median of 2, 5, 1, 5, 2, 1, 3, 4, 1 is _____</p> <p>(14) $2\frac{25}{84} - \frac{7}{11} =$ _____ (mixed number)</p> <p>(15) The number of prime numbers less than 35 and greater than 5 is _____</p> <p>(16) The number of composite numbers greater than 5 and less than 35 is _____</p> | <p>(17) $DCV + MCCII =$ _____ (Arabic Numeral)</p> <p>(18) How long is it between the beginning of May 6, 2022 and the end of Aug. 15, 2022? _____ days</p> <p>(19) $50622 \div 9$ has a remainder of _____</p> <p>*(20) $650 \times 2220 =$ _____</p> <p>(21) $73 \times 33 =$ _____</p> <p>(22) If 9 pips cost \$45.18, then 11 pips cost \$ _____</p> <p>(23) $74^2 + 33^2 =$ _____</p> <p>(24) $\frac{41}{333} = 0.\text{abcabcabc}\dots$ and $a + b + c =$ _____</p> <p>(25) If $\frac{2x+3}{5} + 7 = 11$, then $x - 4 =$ _____</p> <p>(26) $\sqrt{196} - \sqrt{289} = d$ and $d^3 =$ _____</p> <p>(27) 50 base 10 = _____ base 6</p> <p>(28) The product of the coefficients of $(2x + y)^3$ is _____</p> <p>(29) $7\frac{3}{8} \times 7\frac{5}{8} =$ _____ (mixed number)</p> <p>*(30) $5062022 \div 1247 =$ _____</p> <p>(31) The sum of the coefficients of $(2x - 3y)^5$ is _____</p> <p>(32) $2401 = k^4$ and $k =$ _____</p> <p>(33) Given: 1, 7, 18, 34, 55, p, q, 148, ... $p - q =$ _____</p> |
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- (34) $[20 + 22 \times 50 - 6] \div 4$ has a remainder of _____
- (35) If $4x - 7y = -3$ and $3x + 7y = 10$, then $x =$ _____
- (36) The smaller solution for $|5x + 6| = 22$ is _____
- (37) If $\frac{11}{14} = 78\frac{k}{7}\%$, then $k =$ _____
- (38) The perimeter of a face of a cube is 16". The cube's lateral surface area is _____ sq. in
- (39) Set $N = \{n, u, m, b, e, r\}$. How many distinct subsets of N contain at least 4 elements? _____
- *(40) $\sqrt{6052202} =$ _____
- (41) $70^2 - 69^2 =$ _____
- (42) If $A^k \div A^{-3} \times A^2 = A^5$ and $A > 1$, then $k =$ _____
- (43) Let $3x - 8y = 24$. The abscissa of the x -intercept plus the ordinate of the y -intercept is _____
- (44) $49^2 + 49 =$ _____
- (45) $6! \div 8! \times 2! =$ _____
- (46) Let $(1 + 3i)(6 - 10i) = a + bi$. Find $b - a$. _____
- (47) Let $6\frac{9}{m} \times n\frac{1}{3} = 23$, where m, n are natural numbers. Find $m \times n$. _____
- (48) The sum of the coefficients of the x^3y^2 term and the x^2y^3 term in the expansion of $(x + y)^5$ is _____
- (49) $135^9 \div 7$ has a remainder of _____
- *(50) $0.41666... \div 0.3125 \times 506 =$ _____
- (51) The Greatest Integer Function is written as $f(x) = [x]$. Find $[\sqrt{2} + \sqrt{5} + \sqrt{7}]$. _____
- (52) $\log_3(2) - \log_3(18) =$ _____
- (53) $\sqrt[3]{85184} =$ _____
- (54) The focus of $(y - 2)^2 = 12(x - 5)$ is at (_____, 2).
- (55) The probability of picking a prime number from the set of factors of 45 is _____
- (56) $\sum_{k=1}^{12} (-1)^k(k^2) =$ _____
- (57) The roots of $6x^2 - 5x = 4$ are P and $-\frac{1}{2}$. $P =$ _____
- (58) $34 \times 46 + 36 =$ _____
- (59) $(47)^3 - (47)^2 - 47 =$ _____ 7
- *(60) $333 \times (0.1666... \div \frac{1}{9}) =$ _____
- (61) If $\tan(\theta) = \frac{\sin(30^\circ)}{1 + \cos(30^\circ)}$, then $\theta =$ _____ °
- (62) $2358 =$ _____ 2
- (63) Let $f(x) = x^2 - 4$. Find $f(f(2))$. _____
- (64) A cylinder has a volume of 64π cm³ and its height equals its radius. Find its height? _____ cm
- (65) $222 \times \frac{5}{27} =$ _____ (mixed number)
- (66) $\frac{1}{3} + \frac{3}{5} + \frac{14}{15} + \frac{23}{15} + \frac{37}{15} + 4 + \frac{97}{15} + \frac{157}{15} =$ _____
- (67) $(0.41666...)^{-3} =$ _____ (improper fraction)
- (68) If $x + 4 > 6$, then $4x >$ _____
- (69) Let (x, y) be the rectangular coordinate for the polar coordinate $(6, \frac{\pi}{3})$. $x =$ _____
- *(70) $142857 \times 43 =$ _____
- (71) $8^3 - 6^3 + 4^3 - 2^3 =$ _____
- (72) Let $f(x) = x^3 - x - 5$. Find $f'(3)$. _____
- (73) $\lim_{x \rightarrow 0} \frac{\sin(x)}{x} =$ _____
- (74) $(1.444...)^{-2} =$ _____
- (75) Find x , $0 \leq x \leq 4$, if $3x - 4 \equiv 7 \pmod{5}$. _____
- (76) The vertical asymptote farthest to the left on the graph of $y = \frac{x+5}{(x+3)(x-3)}$ is $x =$ _____
- (77) $\int_0^3 (3 - x) dx =$ _____
- (78) $\frac{5}{63} + \frac{5}{99} + \frac{5}{143} =$ _____
- (79) $5622 \times 13 =$ _____
- *(80) Crawling 6 miles at 6 in/sec takes _____ minutes