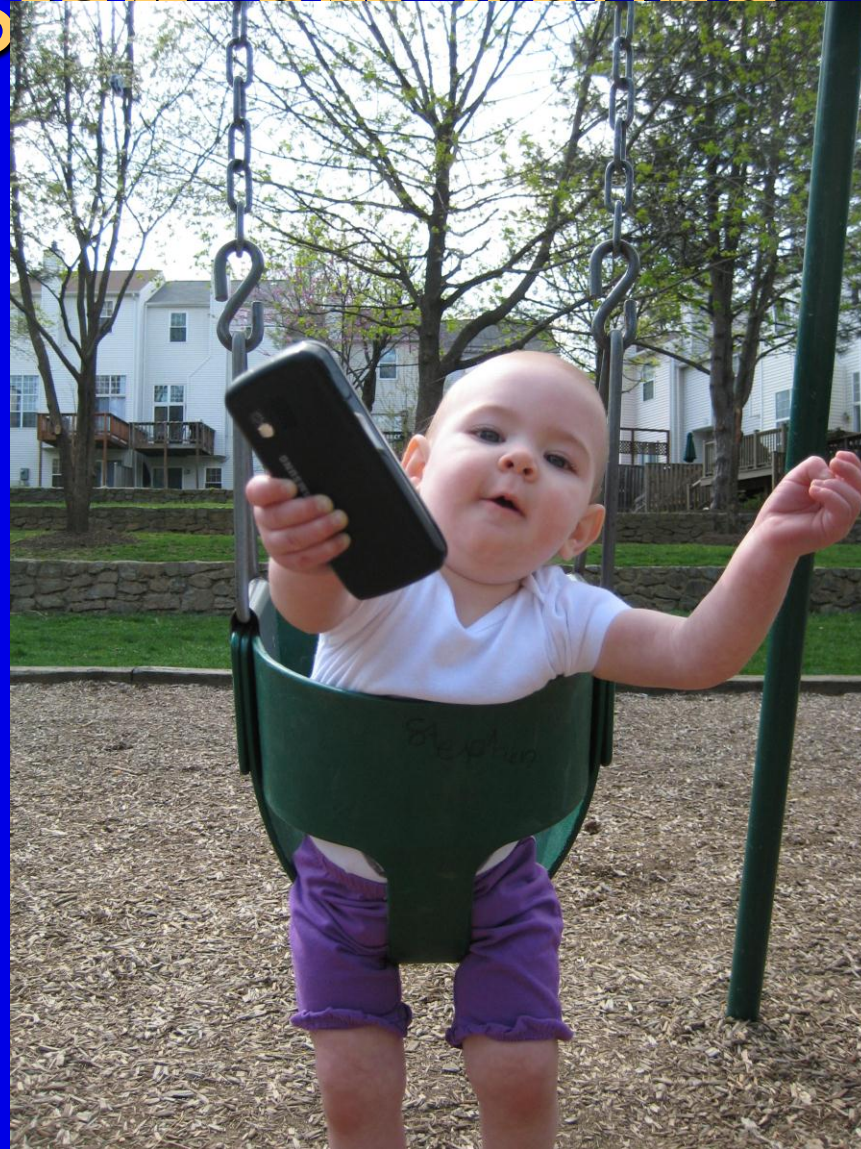# Hands On
MS Calculator Applications

Andy Zapata

Azle High School

Andy Zapata

- Azle Junior High $\rightarrow$ 1974 – 1982
- Azle High School $\rightarrow$ 1982 – Present
- Married (4 children)
- 1 grand daughter
- Co-founder TMSCA (1981)
- Practice test writer 35^{+} years
- azapata@azleisd.net
- Current UIL MS Calculator writer

Start 'em Young

UIL MS Calculator Applications

The calculator applications contest is designed to stimulate the development of mathematical and calculator skills for students in grade 6,7 and 8. Goals are both intellectual and practical: developing mathematical reasoning and knowledge and requiring the application of problem-solving skills toward realistic problems. Students will take a test containing 80 problems in 30 minutes. The contest consists of problems which, may include calculations involving addition, subtraction, multiplication, division, roots, and powers. It also includes straightforward calculation problems, and simple geometric and stated problems similar to those found in recently adopted textbooks.

UIL MS Calculator Applications

Students may use any silent, hand-held calculator that does not require auxiliary electric power. The calculator data and program memory should be cleared prior to the contest; students may not use pre-recorded programs during the contest.

UIL MS Calculator Applications
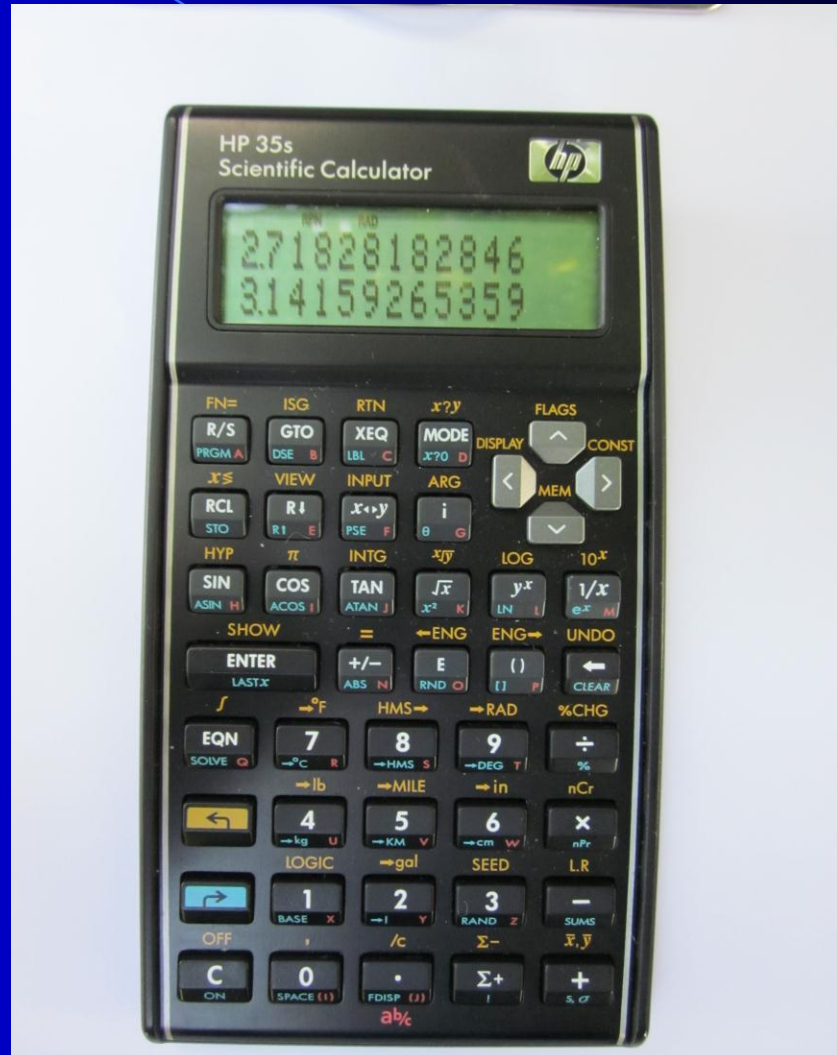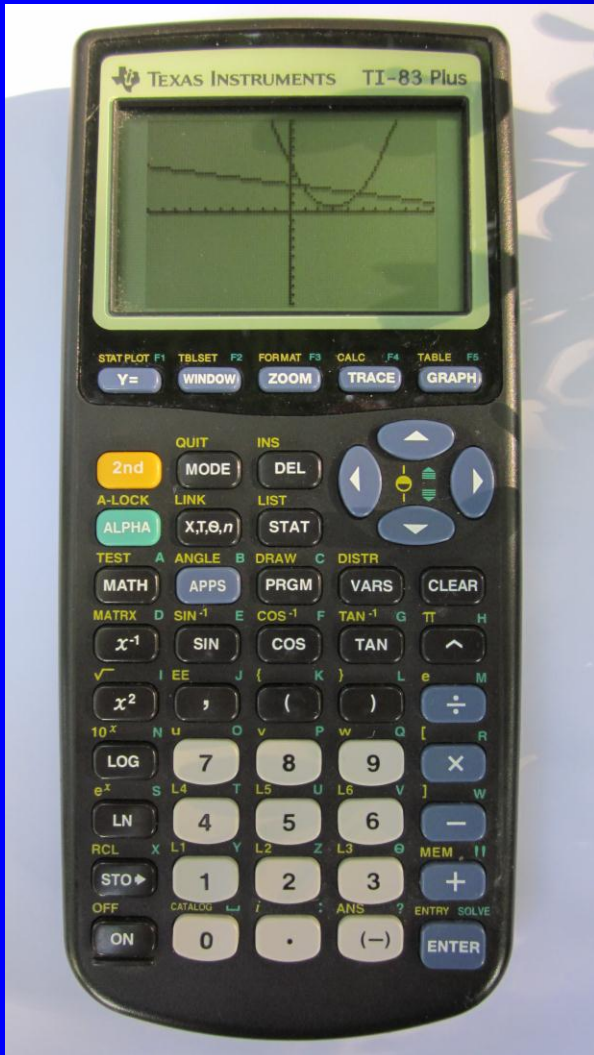
Sample Cruncher Problems

9. $193 \times \pi \times 155$ ---------------- 9=_____

(1) Type "193"

(2) Press "x"　　　　　　Display → 93980.74423 . . . .

(3) Press "← , COS"

(4) Press "x"　　　　　　Answer → 94,000 or 9.40×10^{4}

(5) Type "155"

(6) Press "x"

Sample Cruncher Problems

9. $193 \times \pi \times 155$ ----------------- 9=_____

Ti – 83+

(1) Type "193"

(2) Press "x"   Display →   93980.74423

(3) Press "2nd, ^"

(4) Press "x"   Answer → 94,000 or 9.40×10^{4}

(5) Type "155"

(6) Press "ENTER"

Sample Cruncher Problems

19. $\left[\dfrac{(131 + 137)}{134/130}\right]\left[\dfrac{0.00247}{157}\right]$ --19=_____

Hp 35s

(1) Type "131"

(2) Press "ENTER"

(3) Type "137"

(4) Press "+"

(5) Type "134"

(6) Press "ENTER"

(7) Type "130"

(8) Press "÷"

(9) Press "÷"

(10) Type ".00247"

(11) Press "ENTER"

(12) Type "157"

(13) Press "x"

(14) Press "÷"

Display → 0.00409044586

Answer → .00409 or 4.09×10^{-3}

Sample Cruncher Problems

19. $\left[\dfrac{(131 + 137)}{134/130}\right]\left[\dfrac{0.00247}{157}\right]$ --19=_____

Hp 35s

(1) Type "131"

(2) Press "ENTER"

(3) Type "137"

(4) Press "+"

(5) Type "134"

(6) Press "÷"

(7) Type "130"

(8) Press "x"

(9) Type ".00247"

(10) Press "x"

(11) Type "157"

(12) Press "÷"

Display → 0.00409044586   Answer → .00409 or 4.09×10^{-3}

Sample Cruncher Problems

19. $\left[\dfrac{(131 + 137)}{134/130}\right]\left[\dfrac{0.00247}{157}\right]$ --19=_____

Ti – 83+

(1) Press "("
(2) Type "131"
(3) Press "+"
(4) Type "137"
(5) Press ")"
(6) Press "÷"

(7) Type "134"
(8) Press "x"
(9) Type "130"
(10) Press "x"
(11) Type ".00247"
(12) Press "÷"

(13) Type "157"
(14) Press "ENTER"

Display → 0.00409044586
Answer → .00409 or 4.09×10^{-3}

Sample Cruncher Problems

56. $\sqrt{\dfrac{1/18.2 - 11.8}{(43.8)(17.6 + 75)^2}}$ --- 56=_____

Hp 35s

(1) Type "18.2"
(2) Press "ENTER"
(3) Type "11.8"
(4) Press "−"
(5) Press "1/x"
(6) Type "43.8"
(7) Press "÷"
(8) Type "17.6"

(9) Press "ENTER"
(10) Type "75"
(11) Press "+"
(12) Press "x^2"
(13) Press "÷"
(14) Press "$\sqrt{x}$"

Display → 0.000645003351
Answer → .000645 or 4.09×10^{-4}

Sample Cruncher Problems

56. $\sqrt{\dfrac{1/(18.2 - 11.8)}{(43.8)(17.6 + 75)^2}}$ --- 56=_____

Ti – 83+

(1) Press 2nd, "x^2 "
(2) Press "("
(3) Type "18.2"
(4) Press "–"
(5) Type "11.8"
(6) Press ")"
(7) Press "x^{-1}"
(8) Press "÷"

(9) Press "("
(10) Type "43.8"
(11) Press "x"
(12) Press "("
(13) Type "17.6"
(14) Press "+ "

(15) Type "75"
(16) Press ") "
(17) Press "x^2 "
(18) Press ") "
(19) Press "ENTER "

Display → 0.000645003351
Answer → .000645 or 4.09×10^{-4}

Sample Cruncher Problems

$$45. \sqrt[3]{4.65} - 1190/998 + 1/\sqrt{0.0205} + 0.0045$$

(1) Type "4.65"

(2) Press "ENTER"

(3) Type "1190"

(4) Press "ENTER"

(5) Type "998"

(6) Press "÷"

(7) Press "□"

(8) Type "3"

(9) Press "↰, $\sqrt{x}$ "

(10) Type ".0205"

(11) Press "ENTER"

(12) Type ".0045"

(13) Press "+"

(14) Press "$\sqrt[x]{}$ "

(15) Press "1/x "

(16) Press "+ "

Display → 7.83669608 . . .   Answer → 7.84 or 7.84×10^0

Sample Cruncher Problems

$$45. \sqrt[3]{4.65} - 1190/998 + 1/\sqrt{0.0205} + 0.0045$$

Ti – 83+

(1) Press "MATH"

(2) Press "4"

(3) Type "4.65"

(4) Press "□"

(5) Type "1190"

(6) Press "÷"

(7) Type "998"

(8) Press ") "

(9) Press "+"

(10) Press 2nd, "x^2"

(11) Type ".0205"

(12) Press "+"

(13) Type ".0045"

(14) Press ") "

(15) Press "x^{-1}"

(16) Press "ENTER"

Display →   7.83669608 . . .   Answer → 7.84 or 7.84×10^0

Sample Cruncher Problems

63. $$\dfrac{26! + 25!}{25!}$$

Hp 35s

(1) Type "26"

(2) Press "⤐, ∑+"

(3) Type "25"

(4) Press "⤐, ∑+"

(5) Press "+"

(6) Type "25"

(7) Press "⤐, ∑+"

(8) Press "÷"

Display →   727.0 . . .   Answer →   2.70 or 2.70×10^{1}

Sample Cruncher Problems

63. $\dfrac{26! + 25!}{25!}$

Ti – 83+

(1) Press "("
(2) Type "26"
(3) Press "MATH"
(4) Press ▶, "PRB"
(5) Press "4"
(6) Press "+"
(7) Type "25"
(8) Press ▶, "PRB"

(9) Press "4"
(10) Press ")"
(11) Press "÷"
(12) Type "25"
(13) Press ▶, "PRB"
(14) Press "4"
(15) Press "ENTER"

Display → 27.0 . . .   Answer → 2.70 or 2.70×10^{1}

Sample Cruncher Problems

69. (rad) $$\frac{\sin(0.507) - \tan(0.507)}{\sin(0.507)}$$

Hp 35s

(1) Press "Mode"

(2) Press "2"

(3) Type ".507"

(4) Press "SIN"

(5) Type ".507"

(6) Press "TAN"

(7) Press "⬜"

(8) Type ".507"

(9) Press "SIN"

(10) Press "÷"

Display → ⬜0.1438963 . . .

Answer → ⬜.144 or ⬜ $1.44 \times 10^{\square 1}$

Sample Cruncher Problems

$$69. \quad \text{(rad)} \quad \frac{\sin(0.507) - \tan(0.507)}{\sin(0.507)}$$

Ti − 83+

(1) Press "Mode"

(2) Press "▼"

(3) Press "Radian"

(4) Press 2nd, "Mode"

(5) Press "("

(6) Press "SIN"

(7) Type ".507"

(8) Press ")"

(9) Press "□"

(10) Press "TAN"

(11) Type ".507"

(12) Press ")"

(13) Press ")"

(14) Press "÷"

(15) Press "SIN"

(16) Type ".507"

(17) Press "ENTER"

Display → □ 0.1438963 . . .   Answer → □.144 or □ $1.44 \times 10^{□1}$

Sample Cruncher Problems

$70. \quad (161 - 132)^{0.304} - 0.142$

Hp 35s

(1) Type "1.61"

(2) Press "ENTER"

(3) Type "132"

(4) Press "□"

(5) Type ".304"

(6) Press "ENTER"

(7) Type ".142"

(8) Press "□"

(9) Press "y^{x}"

Display → 1.725474 . . .   Answer → 1.73 or 1.73×10^{0}

Sample Cruncher Problems

70. $(161 - 132)^{0.304 - 0.142}$

Ti − 83+

(1) Press "("
(2) Type "161"
(3) Press "□"
(4) Type "132"
(5) Press ")"
(6) Press "^"

(7) Press"("
(8) Type ".304"
(9) Press "□"
(10) Type".142"
(11) Press ")"
(12) Press "ENTER"

Display → 1.725474 . . .

Answer → 1.73 or 1.73×10^{0}

Sample Stated Problems

06A-11. If pork loin chops cost $3.49/pound and I buy 1.61 pounds of pork loin, how much do I pay for the pork loin chops?----------------------------------11=$_____

$$\$3.49 \times 1.61 = 5.6189$$

= $5.62

Sample Stated Problems

9A-24. A 5-gallon water jug is 95% full. How many 4 ½ ounce cups will this completely fill?------------24=_____cups(integer)

(5 gal $\times$ 128 oz/gal) (.95) = 608 oz

608 oz $\div$ 4.5 oz/cup = 135.1111 cups   **= 135**

Sample Stated Problems

1.   If I have to use 9 inches of floss each time I floss, how many times can I floss if my floss container has 9.5 meters of floss?
--1 =_____(integer)

9 in x 2.54 cm/in = 22.86 cm

9.5 meters x 100 cm/m = 950 cm

950 cm ÷ 22.86 cm/floss = 41.56 flosses   **= 41**

Sample Stated Problems

7A-35. A taco meal cost $5.99 plus 8 ¼ % sales tax. If Javier bought 4 tacos at 89¢ each and two taco meals, how much did it cost, including sales tax, for the food?

---35=$_____

$[4(89¢) + 2(5.99)] \times (1.0825) = 16.82205$

= $16.82

Sample Stated Problems

8Q-13. My utility company charges me 11.5¢ per
kilowatt-hour (kWh) of electricity use. If my bill
for electricity totaled $185.45 for June, what was
my average daily kilowatt-hour usage?   13=_____kWh

$185.45 ÷ $.115/kWh   = 1612.6087 . . . kWh / month

1612.6087 . . . kWh ÷ 30 days/June

53.8 kWh/day

Sample Stated Problems

8Q-24. In 2006, a company produced 286 million cubic feet of natural gas in Parker county. In 2007, the same company produced 300 million cubic feet. What percent increase did this represent in production?   24=_____%

$$\left[\frac{300 \times 10^6 - 286 \times 10^6}{286 \times 10^6} \right] \times 100\% \qquad = \textbf{4.90 \%}$$

Or $\rightarrow$ 486, 300, % change = 4.90 %

Sample Stated Problem

8Q-47. A property valued at $170,000.00 last year was assessed a school tax rate of $1.10 per hundred dollars of property value last year. This year, the tax rate was lowered to $1.03 per hundred dollars but the property value increased by 12%. How much in school taxes was paid for the property this year? --------------------------- 47=_____$

$170,000.00 \times 1.12 = $190,400

$$(\$190,400) \times \left(\frac{\$1.03}{\$100} \right)$$

$1961.12

Sample Stated Problem

8Q-60. Acceleration is defined as the final speed minus the initial speed divided by the time of that change in speed. If a car can accelerate uniformly from 0 to 60 mph in 5.6 seconds, what is its speed 4.0 second after it starts? -------------------------------- 60=_____mph

$$a = \frac{v_f - v_i}{t} \quad \rightarrow \quad v_f = v_i + a \times t$$

$$v_f = 0 + \left(\frac{60\,mph - 0}{5.6\,\text{sec}} \right) \times (4.0\,\text{sec})$$

v_f = 42.9 mph

Sample Stated Problem

06A-59. During acceleration the distance traveled is the product of the average speed and the time during the acceleration. While driving at a highway speed of 65 mph Genny noticed deer near the side of the road and so she slowed down to 50 mph in 8 seconds. How far did she travel during those 8 seconds?-------59=_____ ft
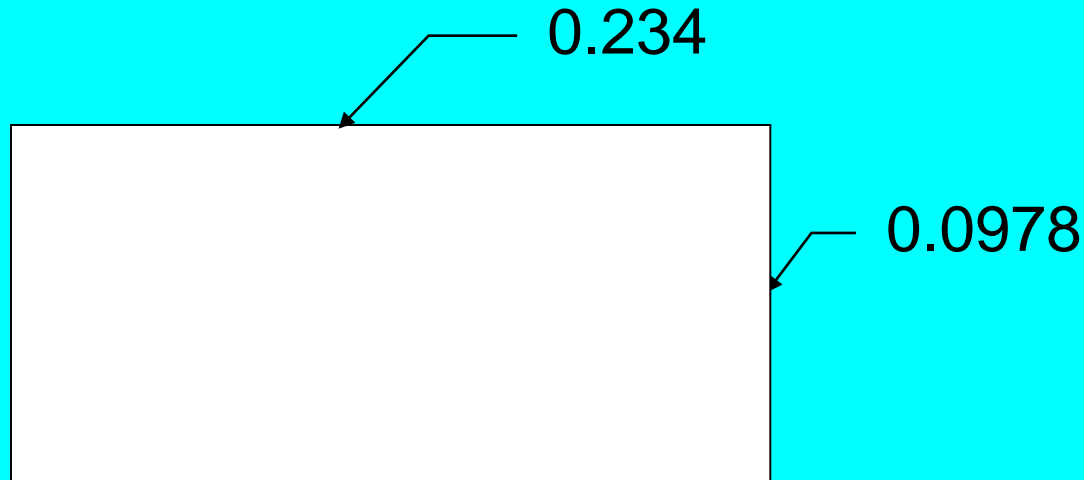
$$\text{distance} = \left[\frac{(65\text{mph} + 50\text{mph})(22/15)}{2} \right] (8\text{sec})$$

distance = 675 feet

$$\frac{5280 \text{ feet}}{3600 \text{ seconds}} = \frac{22 \text{ ft}}{15 \text{ sec}}$$

Note that 22/15 factor converts mph to ft/sec !

Sample Geometry Problem
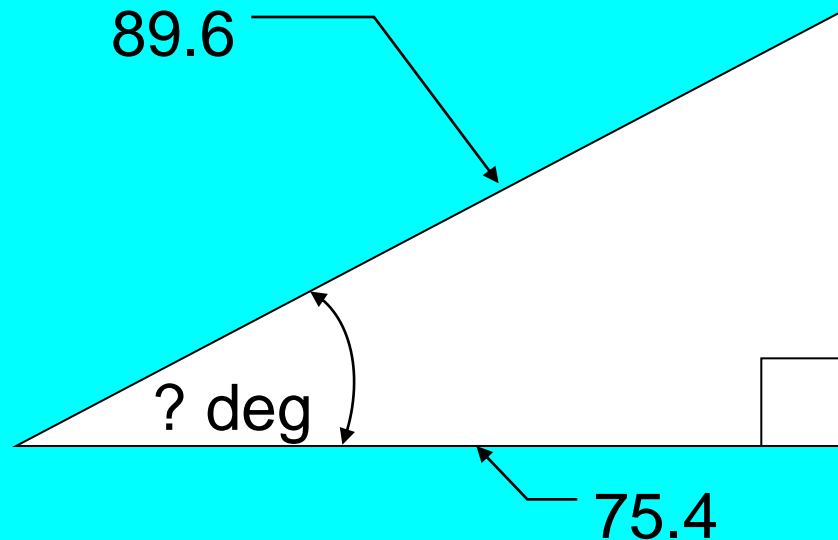
06A-37. **RECTANGLE**

0.234

0.0978

Perimeter = ?

06A-37=_____

$2 \times (0.234 + 0.0978) =$ **0.664**

Sample Geometry Problem

06A-50.   RIGHT TRIANGLE

89.6

? deg

75.4

06A-50=_____deg

? = arccos(75.4/89.6) = **32.7°**

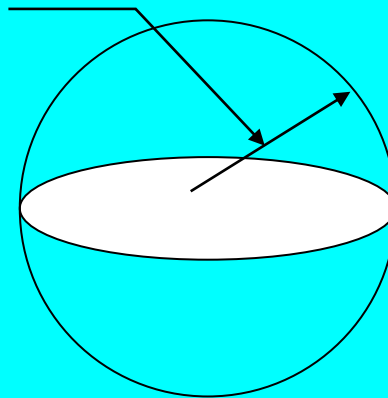# Sample Geometry Problem

06A-61.   SPHERE
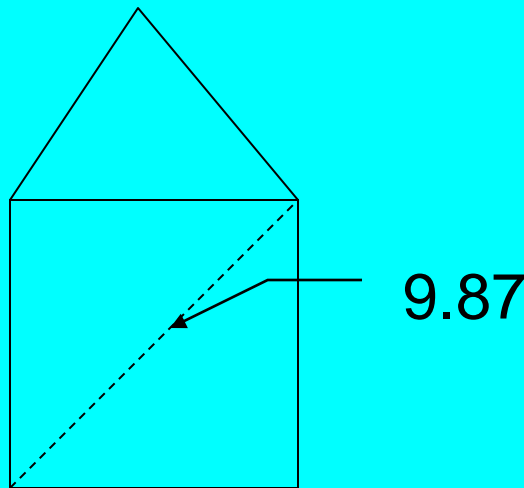
Radius =
0.00783

Surface Area = ?

06A-61=_____

$$? = 4 \times \pi \times 0.00783^2 \;=\;$$ **0.000770 or 7.70$\times$10^{-4}**

Sample Geometry Problem

08A-74. SQUARE, EQUILATERAL TRIANGLE

Total Area = ?

9.87

08A-74= _____

$$A_{Total} = \frac{9.87^2}{2} + \frac{\left(9.87^2/2\right)\left(\sqrt{3}\right)}{4}$$

A_{Total} = 69.8

Area of square   Area of triangle

Sample Geometry Problem

61. CUBE, RIGHT CIRCULAR CONE CAVITY
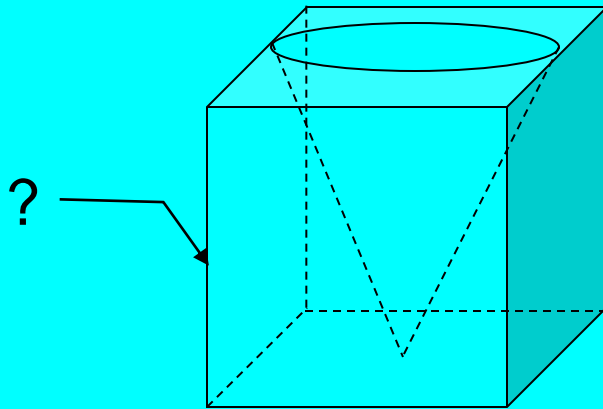
Remaining
Volume =
100

?

61 = _____

$$V_{Remaning} = V_{Cube} - V_{Cone} = ?^3 - (1/3)[\pi(?/2)^2 \times ?] = ?^3\,[1 - \pi/12]$$

$$? = \sqrt[3]{\frac{100}{(1 - \pi/12)}}$$

? = 135

Sample Geometry Problem

62.   **CUBE, RIGHT CIRCULAR CONE**

X
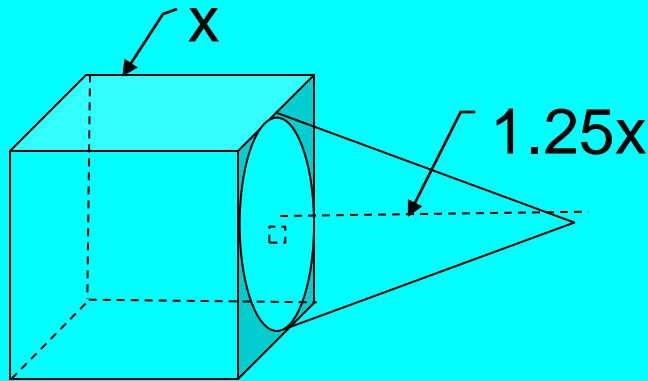
1.25x

Total Volume
= 100

X = ?

62 = _____

$$V_{Total} = V_{Cube} + V_{Cone} = x^3 + (1/3)[\pi(x/2)^2 (1.25x)] = x^3 [1 - 5\pi/48]$$

$$x = \sqrt[3]{\frac{100}{(1 - 5\pi/48)}}$$ **x = 149**

UIL MS Calculator Applications

(1)   A particular meat cost $3.99 per pound. What is the cost of 1.49 pounds of this meat? ---------------------1) $_____

(2)   Cd's at a discounts table cost $2.99 plus 8 ¼ % sales tax. How many CD's can I buy with $50? ---------2) _____integer

(3)   When I turn on my outside faucet I can fill a 64 fluid ounce can in 5.8 seconds with my garden hose. Using the same hose how long would it take me to fill a 55-gallon barrel?

---3) _____minutes

(4)   What is the percent increase in the price of natural gas if it changes from $4.02 to $4.11 in 24 hours?----4) _____%

(5)   What is the perimeter of an equilateral triangle with an area of 100 square centimeters? --------------5) _____cm

5.95; 15; 10.6; 2.24; 45.6

Some Resources

Dr. Numsen/Doug Ray

- PMB 306, 100 Carlos G. Parker Blvd. #108, Taylor, TX 76574

- Phone: 512-797-2158; Fax: 208-575-9617

- Email: doug@academicmeet.com Web site: www.academicmeet.com

Provides workbooks and practice tests for elementary and junior high Number Sense, Calculator Applications and Mathematics.

Some Resources

TMSCA Test Pool

- Texas Math/Sciences Coaches Association

- PO Box 206, Olney Tx, 76374

Offers study materials for math, number sense, calculator and science contests.

Some Resources

Leo Ramirez

- 2908 Flamingo, McAllen, TX 78504

- Phone: 956-682-5185; Fax: 956-682-7281

- Email: toywiz127@aol.com

- Website: http://www.rammaterials.com/

Number Sense, Calculator Applications, Mathematics, and Science Workbooks (including Number Sense: A Starter's Kit, Middle School Magic, Number Sense Magic, Revised Calculator Applications workbook), DVDs and practice tests. Mr. Ramirez is available for writing invitational meet tests and conducting workshops.

Some Resources

AMT Test Writing Service

- 675 Miller Rd., Azle, TX 76020

- ghzapata@gmail.com.com

- Phone: 817-444-3655

Offers Calculator Solutions to UIL High School Tests 1981 – Present.

Calculator Resources*

The Douglas Stewart Co.

2402 Advance Road

Madison, Wisconsin   53718

(800) 279-2795

D & H Distributing

2525 North Seventh Street

Harrisburg, PA   17110

(800) 340-1006

HP 35s		Ti-84 Plus	
Amazon	$43.12	Amazon	$95.00
Wal Mart	$52.88	Wal Mart	$94.00
Best Buy	$49.98	Best Buy	$117.99

* As of 7/5/2012