Final _____ _____

Contestant's Number _____

2nd _____ _____

1st _____ _____

Read directions carefully
before beginning test

DO NOT UNFOLD THIS SHEET
UNTIL TOLD TO BEGIN

Score   Initials

Directions: Do not turn this page until the person conducting this 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 (*) require approximate integral answers; any answer to a starred problem that is within five percent of the exact answer will be scored correct; all other problems require exact answers.

The person conducting this contest should explain these directions to the contestants.

STOP -- WAIT FOR SIGNAL!

(1) $908 + 915 + 922 =$ _____

(2) $922 - 915 - 908 =$ _____

(3) $9 \times 8 + 9 \times 22 =$ _____

(4) $915 \div 9 =$ _____ (mixed number)

(5) $15^2 =$ _____

(6) $45\% =$ _____ (proper fraction)

(7) $12 + 34 + 56 =$ _____

(8) $11 \times 19 =$ _____

(9) $4 + 8 \div 16 \times 32 =$ _____

*(10) $908 + 915 + 922 + 1027 =$ _____

(11) $\frac{3}{80} =$ _____ % (decimal)

(12) The LCM of 14 and 56 is _____

(13) $1522 \div 9$ has a remainder of _____

(14) MXXVII = _____ (Arabic Numeral)

(15) 9 is what percent of 6? _____%

(16) $4\frac{1}{4} \times 8\frac{1}{4} =$ _____ (mixed number)

(17) $\sqrt{441} =$ _____

(18) The largest prime number less than 79 is _____

(19) 8.5% tax on $10.00 is $ _____

*(20) $81522 \div 27 =$ _____

(21) $1795 \times 5 + 25 =$ _____

(22) A team won $\frac{4}{7}$ of its 28 games. How many games did it lose or tie? _____

(23) 54 base 10 is _____ base 4

(24) The average of 8, 22, and 27 is _____

(25) If $f(x) = x^2 - 14x + 49$ then $f(14) =$ _____

(26) $0.131313... =$ _____ (proper fraction)

(27) The set {m,a,t,h} has _____ subsets

(28) 3 square yards = _____ square feet

(29) $|8 - 27| + |22 - 15| =$ _____

*(30) $815 \times 111 =$ _____

(31) If $(2x - 3)^2 = ax^2 + bx + c$ then $a + b + c =$ _____

(32) Given: 2, 1, 3, 4, 7, k, 18 ... . k = _____

(33) 36 plus 25% of 40 is _____

(34) $34^2 - 37^2 =$ _____

(35) A number times five gives the same results as that number added to four. What is the number? _____

(36) $4\frac{1}{5}$ is _____ % less than 7

(37) $(15 \times 22 + 27) \div 8$ has a remainder of _____

(38) The slope of the line $4x + 3y = 7$ is _____

(39) Let $N = \sqrt[3]{2197}$. Find N^2. _____

*(40) $18 \times 20 \times 22 =$ _____

(41) The sum of the roots of $2x^2 - 3x - 4$ is _____

(42) If $9^x = \frac{1}{27}$, then x = _____

(43) The largest integer x, such that $2x - 1 < 17$ is ____

(44) Let $(a^2b) \times (ab^{-2}) \div (a^4b^{-4}) = a^mb^n$. mn = ____

(45) $15_8 + 22_8 + 27_8 =$ _____ 8

(46) (x, 6) is the midpoint of the line segment through endpoints $(-2, 4)$ and $(6, 8)$. x = _____

(47) $(i)^9 = a\sqrt{b}$, where $a,b \in \{-1, 1\}$. Find a. _____

(48) If $3x + y = 5$ and $x - y = 7$, then x = _____

(49) $2 + 0.5 + 0.125 + 0.03125 + ... =$ _____

*(50) $\sqrt{81522} =$ _____

(51) A right triangle with integral side lengths has a hypotenuse length of 5 inches. The area of the right triangle is _____ sq. inches

(52) $\frac{\pi}{5}$ radians = _____ degrees

(53) Find x, if $\log_4(x - 4) = 3$. _____

(54) $11011_2 =$ _____ 4

(55) $16,665 \div 1111 =$ _____

(56) Given: 1,3,3,5,7,11,17,k,43,... . k = _____

(57) The odds of rolling a sum of 9 with two dice is ____

(58) Find the sum of the reciprocals of the first five triangular numbers. _____

(59) If $x^2 + y^2 = 41$, $x > y$ and both x and y are positive integers, then xy = _____

*(60) $(22)^4 = 21 \times$ _____

(61) How many ways can 4 people be seated in a row of 5 chairs? _____

(62) $4! \div 5! =$ _____

(63) $2\sin(\frac{\pi}{4})\cos(\frac{3\pi}{4}) =$ _____

(64) $(x^3 + 2x^2 + x + 4) \div (x + 1)$ has remainder _____

(65) 0.131313... base 5 = _____ base 10 (fraction)

(66) $\cos(\text{Arccos}(-\frac{1}{2})) =$ _____

(67) If 15 workers can do a job in 10 days, how many can do it in 3 days working at the same rate? _____

(68) If $12^5 \div 4 = (3^x)(4^y)$, then x + y = _____

(69) The harmonic mean of the roots of $x^4 - 10x^3 + 35x^2 - 50x + 24 = 0$ is _____

*(70) $7 \times 14 \times 21 \times 28 =$ _____

(71) Let $g(x) = x - 4$. Find g(g(2)). _____

(72) How many positive 3-digit numbers exist? _____

(73) If $35_b = 26$, then $53_b =$ _____

(74) Let $f(x) = x^3 - 2x^2 - 3x + 4$. Find $f'(-1)$. _____

(75) The first four digits of the decimal for $\frac{13}{33}$ base 4 is

0._____ base 4

(76) $\int_{-1}^{1} (x^2)\, dx =$ _____

(77) $2^8 \div 4^3$ has a remainder of _____

(78) $\frac{7}{12} + \frac{7}{20} + \frac{7}{30} =$ _____

(79) $151 \times 252 =$ _____

*(80) $1250 \div 1666 \times 4444 =$ _____