The University Interscholastic League
Number Sense Test, Series YY-SAC

Contestant's Number _____ Contestant's Score _____

Read Directions Carefully Before Beginning Test

Do Not Unfold This Sheet Until Told To Begin

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 per cent 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) $1991 + 1991 =$ _____.

(2) $431 - 134 =$ _____.

(3) $50 \times 42 =$ _____.

(4) $6 \times 14 + 16 \times 6 =$ _____.

(5) $403 \div 9 =$ _____ (mixed number).

(6) $4\frac{7}{8} - 2\frac{3}{4} =$ _____ (mixed number).

(7) $4 + 36 \div 4 \times 2 =$ _____.

(8) $18\frac{1}{2}\ \% =$ _____ (decimal).

(9) $25 \times 121 =$ _____.

*(10) $209 \times 399 =$ _____.

(11) $19\frac{1}{3}\ \% =$ _____ (fraction).

(12) $1\frac{1}{2}$ is what percent of 20? _____ %.

(13) $27^2 =$ _____.

(14) $28 \times 32 =$ _____.

(15) 4 square feet = _____ (square inches).

(16) Which is smaller, $\frac{4}{7}$ or $\frac{5}{9}$? _____.

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

(19) The largest prime divisor of 58^2 is _____.

*(20) $17690 \div 119 =$ _____.

(21) The number of positive integral divisors of 24 is _____.

(22) $1 + 2 + 3 + \ldots + 39 =$ _____.

(23) 150 less 20% of 140 is _____.

(24) $15379 \div 9$ has a remainder of _____.

(25) The average of 21, 19, and 29 is _____.

(26) $412_5 =$ _____ 10.

(27) The LCM of 14, 21, and 28 is _____.

(28) $F(x) = 4x^2 - 8x - 3$, evaluate F(2). _____.

(29) How many integers between 9 and 56 are divisible by 5? _____.

*(30) $316 \times 111 =$ _____.

(31) How many subsets does a 4-element set have? _____.

(32) $1671 \div 4$ has a remainder of _____.

(33) What number times five and added to four, gives the same result? _____.

(34) $(26 + 2 \times 9 + 5) \div 3$ has a remainder of _____.

(35) The square root of 50×18 is _____.

(37) The largest root of $(2x + 1)^2 = \frac{1}{2}$ is _____.

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

(39) The sum of the roots of $4x^2 - 6x + 9 = 0$ is _____.

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

(41) $4^x = 32$, $x =$ _____.

(42) Evaluate $2xy^{1/2}$ if $x = 2$ and $y = 4$. _____.

(43) A circle has an area of 18π sq. in. Its diameter is _____ inches.

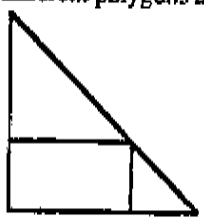
(44) The largest integer x, such that $2x - 1 < 17$ is _____.

(45) $96 \times 97 =$ _____.

(46) The x-intercept farthest to the right for $f(x) = 2x^2 - 5x + 3$ is $x =$ _____.

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

(48) How many different polygons are in the drawing?



_____.

(49) The product of the GCD and LCM of 15 and 28 is _____.

*(50) $39 \times 52 + 40 \times 52 =$ _____.

(51) $(3 + 4i)^2 = a + bi$ and $a =$ _____.

(52) If $\log 4 = .6$, then $\log 16 =$ _____.

(53) What term of the sequence 3,5,7,9,... is 103? _____.

(54) $\frac{\pi}{12}$ radians = _____ degrees.

(55) The next term in the sequence 4,6,10,18,34,... is _____.

(56) $\tan 60° =$ _____.

(57) Find x, if $\log_4 (x + 5) = 3$. _____.

(58) The area of the ellipse $x^2 + 4y^2 = 4$ is $k\pi$ and $k =$ _____.

(59) $4 + 1 + \frac{1}{4} + \ldots =$ _____.

*(60) $\sqrt{360225} =$ _____.

(61) The vertex of the parabola $y = 2x^2 - 4x + 7$ is (h,k) and $h =$ _____.

(62) $2 \sin 135° \cos 45° =$ _____.

(63) The shortest distance between the line $3x + 4y = 5$ and the point (5,0) is _____.

(64) How many three-digit numbers end in a 3? _____.

(65) $\text{Arccos}(\cos 120°) =$ _____ radians.

(66) The probability of rolling a sum of 9 with two dice is _____.

(67) The sum of the coefficients of $(2x + y)^4$ is _____.

(68) $(4, \frac{\pi}{3})$ are polar coordinates for (x,y). $x =$ _____.

(69) $1.222\ldots =$ _____ (fraction).

*(70) $(21)^4 =$ _____.

(71) The number .444... in base 5 is equivalent to what number in base 10? _____.

(72) $3^8 \div 4$ has a remainder of _____.

(73) Find x, if $\det \begin{vmatrix} 4 & 2x \\ 3 & 5 \end{vmatrix} = 8$. _____.

(74) $f(x) = 3x - 1$, find $f^{-1}(x)$. _____.

(75) Find x, $0 \le x \le 6$, if $2x + 3 \equiv 18 \pmod 7$. _____.

(76) Find b, if $35_b = 26$. _____.

(77) $\lim_{x \to 3} \frac{x^3 - 27}{x - 3} =$ _____.

(78) If $f(x) = x^2 + 3x$, then $f'(2) =$ _____.

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

*(80) $28 \times 142857 =$ _____.