The University Interscholastic League

Number Sense Test, Series TT-A

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 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.

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

Stop - Wait for Signal!

(1) $2468 + 1357 =$ _____.

(2) $2 \times 10^3 - 157 =$ _____.

(3) $(8 + 3)(7 + 9) =$ _____.

(4) 31 2/3 % = _____ (fraction).

(5) 6 1/4 x 1400 = _____.

(6) 12 x 231 = _____.

(7) 32 x 38 = _____.

(8) (2 x 1 3/4) + 2 1/2 = _____.

(9) 495 ÷ 11 = _____.

*(10) 197 x 205 + 25 = _____.

(11) $(125)^2 =$ _____.

(12) 1 1/2 is what percent of 5? _____ %.

(13) (98 + 157) ÷ 3 has a remainder of _____.

(14) If a 12 oz. package of candy sells for 93¢, what will one pound cost? $ _____.

(15) $28^2 - 22^2 =$ _____.

(16) The largest prime divisor of 52^2 is _____.

(17) (45 x 14) - (42 x 15) = _____.

(18) If, after a 16 2/3% discount, a TV sold for $500, the original price was $ _____.

(19) 98 x 95 = _____.

*(20) 18 x 20 x 22 + 100 = _____.

(21) $|(16)(-14)| + 1 =$ _____.

(22) If 2/3 of a number plus 5 is 23, the number is _____.

(23) $\sqrt{(98)(50)} =$ _____.

(24) The greatest integer less than $5\sqrt{2}$ is _____.

(25) $.\overline{15} =$ _____ (fraction).

(26) $11011_2 =$ _____ $_8$.

(27) How many real roots does $x^4 = 8x$ have? _____.

(28) The product of the GCD and LCM of 56 and 12 is _____.

(29) A car travels 219 miles in 3 hours. The average speed was _____ mph.

*(30) 34055 ÷ 248 = _____ (integer).

(31) Find k, so that the roots of $4x^2 - 4x + k = 0$ are equal. _____.

(32) The cube root of 1331 is _____.

(33) The power set of {1,0,4,6} is _____.

(34) The positive geometric mean of 4 and 9 is _____.

(35) $253_8 + 417_8 =$ _____ $_8$.

(36) How many positive integers less than 40 are relatively prime to 40? _____.

(37) (65 + 6x7 + 83) ÷ 4 has a remainder of _____.

(38) The next term in the sequence 0,2,1,3,2,4,3 is _____.

(39) Everyone ordered steak or fish. Of 144 people, 96 ordered steak and 55 ordered fish. How many ordered both? _____.

*(40) 102 x 204 x 31 = _____.

(41) A hexagon has _____ sides.

(42) The area of a square increased from 81 to 121. The increase in perimeter was _____.

(43) Find x, if $3^{3x} = 81$. _____.

(44) The number of sides of a regular polygon with an interior angle of 108° is _____.

(45) Find x, if $2^x 7^x = 196$. _____.

(46) The largest integer x, such that $2x - 5 < 11$, is _____.

(47) If $9^2 + x^2 = 41^2$, then $x^2 =$ _____.

(48) The slope of the line passing through (1,4) and (5,0) is _____.

(49) If (5,6) is the midpoint of the line segment from (1,2) to (x,10), then x = _____.

*(50) 49 x 118 + 276 x 120 = _____.

(51) The conjugate of 2 + 3i is _____.

(52) The side opposite 30° in a right triangle is 4. The hypotenuse is _____.

(53) 1 + 3 + 5 + 9 + ... + 39 = _____.

(54) $(3 + 4i)^2 = a + bi$. b = _____.

(55) If $\log_x 16 = 2$, then x = _____.

(56) 132 ft/sec. = _____ mph.

(57) The probability of rolling a sum of 8 with two dice is _____.

(58) If $f(x) = \log_4 x + 3x$, find f(4). _____.

(59) The smallest value of x, such that $|x + 1| \leq 2$, is _____.

*(60) $\sqrt{323761}$ = _____.

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

(62) $3! + 4! =$ _____.

(63) The probability of drawing a red king from a standard deck of cards is _____.

(64) 12° = aπ radians, a = _____.

(65) If the radius of a sphere is doubled, the volume is multiplied by _____.

(66) cos(Arccos 1/2) = _____.

(67) 8 + 4 + 2 + 1 + ... = _____.

(68) Arcsin (-1/2) = x. x = _____°.

(69) The altitude to the hypotenuse of a 3, 4, 5 right triangle is _____.

*(70) 142857 x 19 = _____.

(71) $\lim_{x \to 4} x^2 - 2x + 1 =$ _____.

(72) Change .34, base 5, to a decimal in base ten. _____.

(73) $(1 + i)^{-1} = a + bi$. a = _____.

(74) If $f(x) = \sqrt{x}$, $f'(4) =$ _____.

(75) The horizontal asymptote of $f(x) = 2^x$ is y = _____.

(76) The second derivative of $f(x) = 3x^2 - 6x + 1$ is _____.

(77) Suppose sin .6 = .6. What is cos .6? _____.

(78) If $f(x) = 3^x + 1$ and $g(x) = 3$, find f[g(x)]. _____.

(79) The minimum value of the function $f(x) = x^2 - x$ is _____.

*(80) The perimeter of the ellipse $9x^2 + 4y^2 = 36$ is _____.