The University Interscholastic League

Number Sense Test, Series TT-2

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) $35.87 \times 10^2 - 62 =$ _____.

(2) $2736 + 7263 - 333 =$ _____.

(3) $44 \times 46 =$ _____.

(4) $(4 + 7)(27 + 8) =$ _____.

(5) $2\ 1/3 \times 6\ 3/4 =$ _____.

(6) $5 \times 4 + 15 \times 6 =$ _____.

(7) $14\ 1/2\% =$ _____ (decimal).

(8) $23 \div 2\ 1/2 =$ _____.

(9) $53^2 =$ _____.

*(10) $297 \times 402 =$ _____ (Integer).

(11) $4 - 25 \div 5 \times 5 =$ _____.

(12) $\sqrt{1681} =$ _____.

(13) 6 square feet = _____ square inches.

(14) $111 \times 254 =$ _____.

(15) $4 + 6 + 8 + \ldots + 22 =$ _____.

(16) The GCD of 32 and 88 is _____.

(17) 15 is what percent of 6? _____ %.

(18) If 1 gram = .04 oz., 3600 grams = _____ lbs.

(19) $87 \times 93 =$ _____.

*(20) $62449 \div 249 =$ _____ (Integer).

(21) If after a 30% discount, a TV sold for $602, the original price was $ _____.

(22) Which is larger, .65 or 7/11? _____.

(23) $F(x) = 3x^2 - 4x + 1$. Evaluate F(3). _____.

(24) The simple interest on $800 at 6% for 4 months is $ _____.

(25) $314_5 =$ _____ $_{10}$.

(26) How many positive integers divide 72? _____.

(27) $(4 \times 12 + 75) \div 4$ has remainder of _____.

(28) The product of the prime factors of 20 is _____.

(29) Find x, if $4x + 7 = 3x - 1$. _____.

*(30) $29 \times 30 \times 31 =$ _____ (Integer).

(31) The next term in the sequence 5, 8, 9, 12, 13, 16, . . . is _____.

(32) A trapezoid has bases of 12" and 14". The altitude of 8". The area is _____ square inches.

(33) $(23_6)(4_6) =$ _____ $_6$.

(34) A car travels 2 1/3 hours at an average speed of 48 mph. The total distance traveled was _____ miles.

(35) The sum of the roots of $3x^2 - 7x + 12 = 0$ is _____.

(36) $.3\overline{7} =$ _____ (fraction).

(37) If $x/9 = 16/x$, $x > 0$, then $x =$ _____.

(38) For what value of k does $3x^2 - 5x + k = 0$ have equal roots? _____.

(39) Find y, if $2y = x$ and $2x - y = 9$. _____.

*(40) $29 \times 140 + 130 \times 140 =$ _____ (Integer).

(41) Find x, if $9^x = 81^2$. _____.

(42) The largest integer x, such that $3x - 1 < 13$ is _____.

(43) If $x^2 + 12^2 = 13^2$ and $x > 0$, then $x =$ _____.

(44) The distance between the lines $x = 5$ and $x = -1$ is _____.

(45) The length of a diagonal of a square with sides 3" is _____ inches.

(46) If $x < 0$, and $|2x - 1| = 7$, then $x =$ _____.

(47) The area of an equilateral triangle with altitude 6" is _____ square inches.

(48) The measure of an interior angle of a regular decagon is _____ degrees.

(49) The remainder, in base 6, when 135, base 6, is divided by 5 is _____.

*(50) $\sqrt{130321} =$ _____ (Integer).

(51) If $\log_3 27 = x$, then $x =$ _____.

(52) The sum of the coefficients in the expansion of $(3x - 2y)^2$ is _____.

(53) $i^{50} =$ _____.

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

(55) If $F(x) = 3x + \log_2 x$, find $F(8)$. _____.

(56) The tenth term of the sequence 3, 6, 9, 12, ... is _____.

(57) The length of the minor axis of the ellipse $4x^2 + 9y^2 = 36$ is _____.

(58) If $\log 4 = .6$, then $\log 1/4 =$ _____.

(59) How many 4-digit numbers end in a 2 or a 4? _____.

*(60) $546612 \div 1111 =$ _____ (Integer).

(61) $\sin 240° =$ _____.

(62) How many different 5 letter words real or imaginary, can be constructed using the letters P, R, I, M, E?

_____.

(63) $\text{Arccos}(\sin 30°) =$ _____ degrees.

(64) $9 + 6 + 4 + 8/3 + \ldots =$ _____.

(65) Two dice are tossed. What is the probability that the difference of the faces is 4? _____.

(66) The perimeter of a square decreases from 64" to 40". The area decreases by _____ square inches.

(67) The probability of drawing an ace or a red card from a standard deck of cards is _____.

(68) $\cos(\text{Arccos } 1/2 + \pi) =$ _____.

(69) Find the sum of the squares of the roots of $x^2 + 5x + 6 = 0$. _____.

*(70) $142857 \times 23 =$ _____ (Integer).

(71) The smallest value in the domain of $f(x) = \sqrt{3x + 4}$, so that $f(x)$ is real-valued is _____.

(72) Find x, if $\det \begin{vmatrix} x & 5 \\ 3 & 4 \end{vmatrix} = 1$. _____.

(73) $\lim_{x \to 3} \dfrac{2x^2 - 18}{x - 3} =$ _____.

(74) Change .31, base 5, to a base ten decimal. _____.

(75) The vertex of the parabola $y = 2x^2 - 4x + 3$ is (a,b) and $b =$ _____.

(76) The horizontal asymptote of $f(x) = \dfrac{3x - 1}{2x - 2}$ is $y =$ _____.

(77) $f(x) = x^2 + 1$ and $g(x) = x + 1$. Find $f[g(3)]$. _____.

(78) The slope of the line tangent to $y = 2x^2 + x + 1$ at the point (2,11) is _____.

(79) $\int_1^2 x^2 \, dx =$ _____.

*(80) The perimeter of the ellipse $18x^2 + 14y^2 = 252$ is _____ (Integer).