The University Interscholastic League

Number Sense Test, Series ZZ-4

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) $1993 + 39 - 399 =$ _____.

(2) $\frac{4}{5} \times \frac{15}{8} \times \frac{12}{9} =$ _____.

(3) $8 + 9 \times 123456 =$ _____.

(4) $11 \times 139 =$ _____.

(5) $63^2 =$ _____.

(6) Write 210 in Roman Numerals. _____.

(7) $347 - 743 =$ _____.

(8) $12 \times 87 =$ _____.

(9) $438 \div 9 =$ _____ (Mixed Number).

*(10) $369 \times 199 - 37{,}000 =$ _____.

(11) $44 \div 2\frac{3}{4} =$ _____.

(12) $32 \div 16 - 8 \times 4 =$ _____.

(13) The largest prime divisor of 164 is _____.

(14) $15 \times 68 =$ _____.

(15) $\frac{3}{16} =$ _____ %.

(16) $\frac{16}{39} \times 3\frac{1}{4} =$ _____.

(17) $4 + 6 + 8 + 10 + \ldots + 44 =$ _____.

(18) $17 \times 24 =$ _____.

(19) The simple interest on $800.00 at $3\frac{1}{4}$ % interest for 9 months is $ _____.

*(20) $132 \times 49 + 50 \times 133 =$ _____.

(21) $4\frac{1}{5}$ is what percent less than 7? _____ %.

(22) $\frac{2}{3}$ of a gallon = _____ cubic inches.

(23) The average of 42, 62, 52, and 72 is _____.

(24) $(37 \times 5 + 8) \div 6$ has a remainder of _____.

(25) Find the cost of driving a car 44 miles at $27\frac{1}{2}$ cents per mile. $ _____.

(26) Of A = 6 = B and C = 9 then $AC \div B =$ _____.

(27) The sum of the positive prime divisors of 280 is _____.

(28) $459 =$ _____ 10.

(29) How many positive integers between 5 and 26 are relatively prime to 26? _____.

*(30) $12 \times 14 \times 16 + 800 =$ _____.

(31) Divide 63 into 2 parts such that the larger number exceeds the smaller number by 19. Find the smaller number. _____.

(32) $4\frac{1}{3} \times 8\frac{1}{3} =$ _____ (Mixed Number).

(33) Adding $\frac{1}{4}$ of a number greater than 0 to twice the number is equivalent to multiplying the number by what improper fraction? _____.

(34) $.4777\ldots =$ _____ (fraction).

(35) The product of the roots of $3x^2 - 6x - 9 = 0$ is _____.

(36) If $x = 5$ and $y = -2$ then $9x^2 - 6xy + y^2 =$ _____.

(37) $(327)(47) =$ _____ 7.

(38) Find x if $\frac{1}{x} = y + 3$ and $y = 4$. _____.

(39) The next term of the sequence 8, 9, 6, 11, 4, 13, . . . is _____.

*(40) $\sqrt{51078}$ = _____.

(41) $5124 \div 9 =$ _____ (Mixed Number).

(42) Find the digit $B > 0$ such that $157B64 = [2(23 + B)]^3$. B = _____.

(43) $993^2 =$ _____.

(44) If $x > 0$ and $|x - 12| = 3x$ then x = _____.

(45) The distance between the points (5,4) and (7,9) is _____.

(46) The largest integer x such that $2x - 5 > 3x + 1$ is _____.

(47) $5217 \div 111 =$ _____.

(48) $2112_3 =$ _____ 9.

(49) If $2^{x+3} = 36$ then $2^x =$ _____.

*(50) $142857 \times 15 =$ _____.

(51) The hypotenuse of a right triangle is 85 and one leg is 84. The other leg is _____.

(52) $6^7 \div 12$ has a remainder of _____.

(53) The smaller root of $(2x + 1)^2 = \frac{2}{18}$ is _____.

(54) If $\log_3 x^2 = 4$ and $x < 0$ then x = _____.

(55) A box contains 6 red and 8 blue balls. If 2 balls are drawn without replacement, what is the probability that both are red? _____.

(56) The twenty-third triangular number is _____.

(57) $(1 + 2i)^3 = a + bi$ and a = _____.

(58) If $\log_x 25 = \log_4 16$ then x = _____.

(59) Two dice are tossed. What is the probability that the sum of the faces is 13? _____.

*(60) $(26)^4 =$ _____.

(61) The surface area of a sphere is 64π sq. in. The diameter of the sphere is _____ in.

(62) If $x^2 + y^2 = 113$, $x > y$ and they are positive integers, then y = _____.

(63) tan(Arccos .5) = _____.

(64) $\frac{2}{3} - \frac{1}{3} + \frac{1}{6} - \frac{1}{12} + \ldots =$ _____.

(65) The sum of the coefficients of $(3x^2 - y)^5$ is _____.

(66) .1464646 . . . = _____ (fraction).

(67) $\sin 210^\circ =$ _____.

(68) If $20^5 \div 32 = (2^x)(5^y)$, x and y are integers, then x = _____.

(69) $\frac{2 \tan 15^\circ}{1 - \tan^2 15^\circ} =$ _____.

*(70) $\sqrt{149} + \sqrt{1570010} =$ _____.

(71) Find x, $0 \le x \le 4$, if $3x - 4 \equiv 7 \pmod 5$. _____.

(72) If $f(x) = 2x + 3$ then $f^{-1}(x) =$ _____.

(73) If $f(x) = x - 7$ and $g(x) = x^2 - 2$, find $f[g(2)]$. _____.

(74) Find x, if $\det \begin{vmatrix} x & 3 \\ x & 5 \end{vmatrix} = 20$. x = _____.

(75) The length of the tangent from (10,0) to the circle $x^2 + y^2 = 36$ is _____.

(76) $\lim_{x \to \infty} \frac{4 - 5x^2}{3x^2 + 7} =$ _____.

(77) $f(x) = x^3 - x - 5$, $f'(3) =$ _____.

(78) $\int_0^8 (8 - x)\,dx =$ _____.

(79) $\lim_{x \to 0} \frac{\sin x}{x} =$ _____.

*(80) $16 \times 18 \times 20 \times 22 =$ _____.