The University Interscholastic League

Number Sense Test, Series ZZ-3

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) $21.7 \times 100 - 79 =$ _____.

(2) $922 - 229 =$ _____.

(3) Reduce to lowest terms: $\frac{126}{261} =$ _____.

(4) $357 \div 9 =$ _____ (Mixed Number).

(5) $34\% =$ _____(fraction).

(6) $9 \times 123{,}456 + 7 =$ _____.

(7) $57^2 =$ _____.

(8) CXX = _____(Arabic Numeral).

(9) $\frac{3}{4} + \frac{5}{6} =$ _____ (Improper Fraction).

*(10) $235 + 1642 - 159 + 87 =$ _____.

(11) Which is larger, $\frac{5}{7}$ or $\frac{-2}{5}$?_____.

(12) $(3 + 8)(14 + 37) =$ _____.

(13) The GCD of 84 and 70 is _____.

(14) $20 \div 2\frac{1}{2} =$ _____.

(15) 115 less 20% of 60 is _____.

(16) $187 = 14 \times 14 +$ _____.

(17) $16 \times 23 + 52 \times 16 =$ _____.

(18) The mean of 56 and 34 is _____.

(19) $3 + 5 + 7 + \ldots + 37 =$ _____.

*(20) $239 \times 798 + 399 =$ _____.

(21) $28 + 4 \times 8 \div 4 =$ _____.

(22) $22 \times 89 =$ _____.

(23) The simple interest on $600.00 at 3% for 9 months is $ _____.

(24) $(5 \times 13 - 3) \div 4$ has a remainder of _____.

(25) The smaller root of $2x^2 + 7x + 6 = 0$ is _____.

(26) $\frac{5}{8}$ is what percent more than $\frac{1}{2}$? _____%.

(27) Find the smallest prime p, $p > 0$, such that $4p + 7$ is a prime number. p = _____.

(28) $\sqrt{(7.2)(2000)} =$ _____.

(29) Divide 53 into 2 parts such that the larger number exceeds the smaller number by 17. Find the larger number. _____.

*(30) $77741 \div 269 =$ _____.

(31) At 6 cu. yd. per load, how many loads of dirt will fill a hole 24' x 18' x 12'? _____ loads.

(32) $7\frac{2}{3} \times 7\frac{1}{3} =$ _____ (Mixed Number).

(33) $32_8 =$ _____ $_{10}$.

(34) What number times eight and added to 12, gives the same result? _____.

(35) $96 \times 95 =$ _____.

(36) If the area of a rhombus is 132 and one diagonal is 22, then the other diagonal is _____.

(37) $.484848\ldots =$ _____ (fraction).

(38) $3.7 \times 3.3 =$ _____ (decimal).

(39) Find the digit B > 0, such that $864B6 = [2(144 + B)]^2$. B = _____.

*(40) 52 x 329 + 329 x 18 = _____.

(41) 997^2 = _____.

(42) The number of positive integral divisors of 72 is _____.

(43) 4210 ÷ 9 = _____ (Mixed Number).

(44) The next term in the sequence 1, 5, 6, 11, 17, 28, . . . is _____.

(45) If x > 0 and |2x - 3| = |x + 5| then x = _____.

(46) How many positive integers less than 28 are relatively prime to 28? _____.

(47) 33 x 73 = _____.

(48) Find x if $4^{x+1} = 128$. x = _____.

(49) Find the largest integer x such that 2x - 7 < 13. x = _____.

*(50) $(31)^4$ = _____.

(51) Find the modulus of 5 - 12i. _____.

(52) $\sqrt{-16}\ \sqrt{-81}$ = _____.

(53) If the sides of an equilateral triangle are 8" then its altitude is _____ inches.

(54) The larger root of $(4x - 1)^2 = \frac{4}{49}$ is _____.

(55) Two dice are tossed. What is the probability that the sum of the faces is 6? _____.

(56) $\frac{2}{3} + \frac{4}{9} + \frac{8}{27} + \ldots$ = _____.

(57) The eighteenth triangular number is _____.

(58) The simplified coefficient of the x^2y^3 term in the expansion of $(x - 3y)^5$ is _____.

(59) If 0 < x + 3 < 7 then $x^2 + 5$ < _____.

*(60) $\sqrt{535825}$ = _____.

(61) If $x^2 + y^2 = 61$, x > y and they are positive integers, then x = _____.

(62) If $\log_x 27 = 1.5$ then x = _____.

(63) $6C_4$ = _____.

(64) y varies inversely as x. If x = 3 when y = 15, find y when x = 9. y = _____.

(65) .3666 . . . = _____ (fraction).

(66) $\cos 240^\circ$ = _____.

(67) If $18^6 \div 6 = (2^x)(3^y)$, x and y are integers, then y = _____.

(68) cos(2 Arcsin.5) = _____.

(69) True or False: ln2 > $\log_{10}2$. _____.

*(70) $(29 \times 239)^2 \div (39 \times 120)$ = _____.

(71) The eighth term in the sequence 16, 13, 10, ... is _____.

(72) If $\det \begin{vmatrix} 5 & 2 \\ 4 & 3 \end{vmatrix} = x$ then 2x + 1 = _____.

(73) Find x, $0 \le x \le 6$, if $5x + 2 \equiv 3 \pmod 7$. _____.

(74) Change .28, base 10, to a base 5 decimal. _____.

(75) How many 3-digit numbers end in a 2? _____.

(76) $\lim_{x \to 3} \frac{2x + 4}{x^2 + 1}$ = _____.

(77) If A = [2 3] and $B = \begin{bmatrix} 3 \\ 5 \end{bmatrix}$ then AB = [_____].

(78) If $f(x) = 6x^3 + 12x^2 + 1$ then f'(-1) = _____.

(79) $\int_0^4 (x - 6)\,dx$ = _____.

*(80) 142857 x 27 = _____.