The University Interscholastic League
Number Sense Test, Series UU-C

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) $1462 + 2917 - 1541 =$ _____.

(2) $4 \times 4 + 2 - 2 =$ _____.

(3) $25 \times 83 =$ _____.

(4) $524 \div 9 =$ _____ (Mixed Number).

(5) $50 \times 17.5 =$ _____.

(6) $616 \div 11$ _____.

(7) $42 \times 48 =$ _____.

(8) $9/40 =$ _____ (decimal).

(9) $12 \times 86 =$ _____.

*(10) $498 \times 598 =$ _____ (Integer).

(11) $(3.5)^2 =$ _____.

(12) 3/4 is what percent of 5? _____ %.

(13) $1/12 + 1/20 + 1/30 =$ _____.

(14) The LCM of 6, 15 and 24 is _____.

(15) Find the simple interest on $4800 at 6 1/4% for six months. $ _____.

(16) If 1 gram = .04 oz., 3000 grams = _____ lbs.

(17) $1 + 2 + 3 + \ldots + 17 =$ _____.

(18) The GCD of 42 and 78 is _____.

(19) 22 2/9% of 1620 is _____.

*(20) $265529 \div 239 =$ _____ (Integer).

(21) $5\ 1/4 \times 5\ 3/4 =$ _____.

(22) A car travels 115 miles in 2 1/2 hours. The average speed was _____ mph.

(23) How many real roots does $x^3 = 8x$ have? _____.

(24) Find x, if $3x + 1 = 4x - 5$. _____.

(25) The number of positive integers relatively prime to 40 is _____.

(26) The reciprocal of $(4/5)^{-1}$ is _____.

(27) $32 \times 72 =$ _____.

(28) $9^4 \div 7$ has a remainder of _____.

(29) $43_5 + 44_5 =$ _____ 5.

*(30) $\sqrt{60025} - 5 =$ _____ (Integer).

(31) $1.\overline{23} =$ _____ (fraction).

(32) $41_8 =$ _____ 2.

(33) The sum of three consecutive integers is 126. The smallest of these is _____.

(34) If the area of a rhombus is 140 and one diagonal is 14, the other is _____.

(35) Find y, if $x - y = 4$ and $x + 2y = 7$. _____.

(36) $f(x) = (x - 4)^3 + 2$. Evaluate f(2). _____.

(37) If $a = 4$ and $b = 2$, then $a^3 + 3a^2b + 3ab^2 + b^3 =$ _____.

(38) Find the area of a square if its perimeter is 14. _____.

(39) The smallest fraction greater than each of: .15, .1515, .151515, ... is _____.

*(40) $(CV)^2$ = _____ (Arabic Integer).

(41) If n(B) = 4 and n(C) = 5, then n(B x C) = _____.

(42) If $x^2 + 4x - 5 = 0$, the product of the roots squared is _____.

(43) A regular tetrahedron has _____ congruent triangular regions.

(44) The area of a circle whose circumference is $16\sqrt{\pi}$ is _____.

(45) Find x, if $9^x = 27$. _____.

(46) A radio costs $100. It was discounted 10% for a sale. Tax was 5%. The final selling price was $_____.

(47) $(\pi + 1)^2 = \pi^2 + x\pi + 1$ and x = _____.

(48) The distance between y = 4 and (1,2) is _____.

(49) $(343)^{1/3}$ = _____.

*(50) 177760 ÷ 1111 = _____ (Integer).

(51) $\log_2 6 + \log_2 4 = \log_2$ _____.

(52) ${}_5P_2$ = _____.

(53) The number of terms in the expansion of $[(x + y)^3 (x - y)^3]^3$ is _____.

(54) 1 + 2 + 4 + 8 + ... + 64 = _____.

(55) The modulus of 15 + 3i is _____.

(56) 88 ft/sec = _____ mph.

(57) The smallest value of x, such that $|x + 2^2| \leq 2^3$ is _____.

(58) If (-2,0) is the midpoint of the line segment from (4,18) to (-8,y), then y = _____.

(59) If $\log_x 49 = 2$, then x = _____.

*(60) $(21)^4$ = _____ (Integer).

(61) How many ways can 3 people be seated in 4 chairs? _____.

(62) The altitude to the hypotenuse of a 5, 12, 13 right triangle is _____.

(63) The probability of drawing a black face card from a standard deck of cards is _____.

(64) [x] denotes the greatest integer less than or equal to x. [π] = _____.

(65) Find the volume of a pyramid, if the area of the base is 16 and the altitude is 9. _____.

(66) cos(-60°) = _____.

(67) Using the numeral 1945, write the largest 3-digit number using each digit only once. _____.

(68) Two dice are tossed. What are the odds that the sum of the faces will be 9? _____.

(69) sin θ = cos θ, θ ∈ Q III, θ = _____ degrees.

*(70) The perimeter of the ellipse $x^2/56 + y^2/72 = 1$ is _____ (Integer).

(71) The remainder when $f(x) = x^4 - 4x^3 + 1$ is divided by x + 2 is _____.

(72) The vertical asymptote for y = log x is x = _____.

(73) 1 mile = _____ yards.

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

(75) $(204_7) \div (3_7)$ = _____ 7.

(76) The minimum value of $f(x) = 3x^2 + 2x + 1$ is _____.

(77) f(x) = 4x + 1, find $f^{-1}(x)$ _____.

(78) The slope of the tangent line to $f(x) = 6x^3 + 4x + 1$ at (1,11) is _____.

(79) $\int_2^4 x\,dx$ = _____.

*(80) 285714 x 19 = _____ (Integer).