The University Interscholastic League
Number Sense Test, Series UU-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) $1979 - 1587 =$ _____.

(2) $11 \times 19 =$ _____.

(3) $27\ 1/2\% =$ _____ (fraction).

(4) $24 - 3 \times 12 \div 4 =$ _____.

(5) $16 \times 15 \div 15 \times 34 =$ _____.

(6) $26 \times 24 =$ _____.

(7) $715 \div 9 =$ _____ (Mixed Number).

(8) $7/40 =$ _____ %.

(9) $16\ 1/2 \div 2\ 1/2 =$ _____.

*(10) $159 \times 160 =$ _____ (Integer).

(11) 14 is 6 1/4% of _____.

(12) The mean of 26, 22, and 24 is _____.

(13) The smallest prime divisor of $(21)^3$ is _____.

(14) $27^2 - 23^2 =$ _____.

(15) $15 \times 94 =$ _____.

(16) 4 1/5 minutes = _____ seconds.

(17) $52^2 =$ _____.

(18) $12 \times 49 =$ _____.

(19) The GCD of 16 and x is 2 and their LCM is 144. $x =$ _____.

*(20) $\sqrt{19600} \div 60 =$ _____ (Integer).

(21) If $A = -2$, $B = 3$ and $C = 4$, then $A \div (BC)^2 =$ _____.

(22) $8\ 1/5 \times 8\ 4/5 =$ _____.

(23) $1/3 + 1/12 + 1/20 =$ _____.

(24) $(4^4 + 3 \times 9) \div 4$ has a remainder of _____.

(25) $41 \times 111 =$ _____.

(26) If a 12 oz. package of candy sells for $2.85, what will one pound cost? $_____.

(27) The greatest integer less that $4\sqrt{3}$ is _____.

(28) $42 \times 47 =$ _____.

(29) $42_6 =$ _____ 7.

*(30) $516200 \div 178 =$ _____ (Integer).

(31) How many subsets containing an even number of elements are there in {1, 3, 4, 5}? _____.

(32) The next term in the sequence 3, 5, 8, 10, 13, 15, ... is _____.

(33) Find x, if $2x + y = 8$ and $x + y = 4$. _____.

(34) $3^{-2} \div .\overline{11} =$ _____.

(35) If $3^x + 3x = 36$, then $2x =$ _____.

(36) $42_6 + 34_6 =$ _____ 6.

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

(38) $.3\overline{6} =$ _____ (fraction).

(39) In a rectangle the ratio of the length to the width is 2 to 1 and the area is 32. The width is _____.

*(40) 201 x 498 x 20 = _____ (Integer).

(41) $(24)^{3/2} = a\sqrt{b}$ and a = _____.

(42) x/3 + y/4 = 1 is a line. The y-intercept is y = _____.

(43) Find b, if $33_b = 15$. _____.

(44) $[14^2 + (2 \times 13) + 7] \div 13$ has a remainder of _____.

(45) The sum of the squares of the roots of $x^2 - 3x - 5 = 0$ is _____.

(46) A square has a diagonal of 6. Its area is _____.

(47) If $2^{x-1} = 16$, then x = _____.

(48) If a triangle has sides of 3, x and 5, then 3 + x > _____.

(49) The largest value of x such that $|x + 5| \leq 7$ is _____.

*(50) 142857 x 18 = _____ (Integer).

(51) The length of a median in an equilateral triangle with sides 6" is _____ in.

(52) The vertex of the parabola $y = 2x^2 - 3x + 5$ is (a,b) and a = _____.

(53) 2 + 1/4 + 1/32 + 1/256 + ... = _____.

(54) $\log_5 \sqrt{125}$ = _____.

(55) How many distinct 2 letter codes can be made from 20 letters of our alphabet if repetition of digits is not allowed? _____.

(56) How many positive integers less than 9 x 5 are relatively prime to 9 x 5? _____.

(57) The tenth term in the sequence 4, 7, 10, 13, ... is _____.

(58) 1/2 + 1/4 + 1/8 + ... + 1/32 = _____.

(59) A single card is drawn from a standard deck of cards. If it is an ace, find the probability that it is a red ace. _____.

*(60) $(23)^4$ = _____ (Integer).

(61) $\begin{bmatrix} 2 \\ 1 \end{bmatrix} \cdot \begin{bmatrix} 4 \\ 5 \end{bmatrix} = \begin{bmatrix} x \\ y \end{bmatrix}$, x = _____.

(62) 3 sin 20° = K sin 10° cos 10°, K = _____.

(63) The set 1, 4, 5, 7, 4, 3, 2, 5 is bimodal and the sum of the modes is _____.

(64) (4 + 5i) (4 - 5i) = _____.

(65) $\log_4 (.0625)$ = _____.

(66) If $f(x) = 3^x$ and g(x) = 2x + 1, find f[g(1)]. _____.

(67) sin (Arccos 2/3) = _____.

(68) If the radius of a sphere is doubled then the surface area is multiplied by _____.

(69) $(2 + i)^{-1} = a + bi$ and a = _____.

*(70) 39 x 40 x 41 = _____ (Integer).

(71) 99 ft/sec = _____ mph.

(72) If $(3x + 2)^3 = ax^3 + bx^2 + cx + d$, then a + b + c + d = _____.

(73) The vertical asymptote of $f(x) = \frac{5x + 4}{3 - 2x}$ is _____.

(74) Find x, $0 \leq x < 6$, such that $2x + 1 \equiv 15 \pmod 6$. _____.

(75) Change .44, base 6, to a base ten fraction. _____.

(76) $f(x) = 6x^2 + 4x + 3$, find f'(2). _____.

(77) $204_5 + 3_5$ = _____ 10.

(78) $\int_0^1 \sqrt{x}\, dx$ = _____.

(79) 1 square mile = _____ acres.

*(80) 31 x 111 + 29 x 111 = _____ (Integer).