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

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) $1987 + 7891 =$ _____.

(2) $19.7 \times 10^2 - 31 =$ _____.

(3) $(4 + 7)(29) =$ _____.

(4) $25 \times 140 =$ _____.

(5) $301 \div 9 =$ _____ (mixed number).

(6) $6 \times 14 + 14 \times 14 =$ _____.

(7) $13\ 1/2\% =$ _____ (decimal).

(8) $32^2 =$ _____.

(9) $28 \div 2\ 1/2 =$ _____.

*(10) $199 \times 301 =$ _____ (Integer).

(11) $\sqrt{676} =$ _____.

(12) $1/2 + 1/6 + 1/12 =$ _____.

(13) 5 1/2 square feet = _____ (square inches).

(14) $12 - 6 \div 2 \times 4 =$ _____.

(15) $7\ 1/5\ \% =$ _____ (fraction).

(16) 2 1/4 is what percent of 5? _____ %.

(17) $26 \times 34 =$ _____.

(18) The largest prime divisor of 91^2 is _____.

(19) Which is smaller, 6/7 or 5/9? _____.

*(20) $32595 \div 159 =$ _____ (Integer).

(21) How many positive prime integers divide 28? _____.

(22) 160 less 25% of 160 = _____.

(23) $413_6 =$ _____ $_{10}$

(24) $F(x) = 3x^2 - x + 1$, evaluate F(2). _____.

(25) If $3^x + 3x = 15$, then $x =$ _____.

(26) $243243 \div 1001 =$ _____.

(27) How many subsets containing an odd number of elements are there in the set {a,b,c}? _____.

(28) The largest root of $x^2 - 3x - 28 = 0$ is _____.

(29) How many integers between 10 and 84 are divisible by 6? _____.

*(30) $38 \times 40 \times 42 =$ _____ (Integer).

(31) $(3^3 + 2 \times 16 + 1) \div 3$ has a remainder of _____.

(32) $.\overline{29} =$ _____ (fraction).

(33) The reciprocal of $(2/3)^{-1}$ is _____.

(34) The sum of the integral divisors of 20 is _____.

(35) $18^{3/2} = a\sqrt{b}$ and $b =$ _____.

(36) $(14_5)(3_5) =$ _____ $_5$

(37) A circle has an area of 20π sq. in. Its diameter is _____ inches.

(38) $110101_2 =$ _____ $_8$

(39) $x/2 + y/6 = 1$ is a line. The slope is _____.

*(40) $19 \times 109 + 109 \times 109 =$ _____ (Integer).

(41) If a 4" x 5" picture is enlarged to 8" x 10", its area is multiplied by _____.

(42) The largest integer x, such that $x + 6 < 17$ is _____.

(43) The sum of the roots $6x^2 - 4x + 5 = 0$ is _____.

(44) $3^{-2} \div 3^{-1} =$ _____.

(45) The x-intercept farthest to the right for $f(x) = 2x^2 - 4$ is $x =$ _____.

(46) The next term in the sequence 6, 7, 9, 12, 16, 21, ... is _____.

(47) The sum of the squares of the roots of $x^2 + 8x + 15 = 0$ is _____.

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

(49) The set 1,3,2,4,6,3,2 is bimodal and the smaller mode is _____.

*(50) $142857 \times 266 =$ _____ (Integer).

(51) $(2 + 3i)^2 = a + bi$ and $a =$ _____.

(52) $3 + 1 + 1/3 + \ldots =$ _____.

(53) Find x, if $\log_3(x + 17) = 2$. _____.

(54) The probability of rolling a sum of 10 with two dice is _____.

(55) The smallest value of x such that $|x - 4| \leq 3$ is _____.

(56) If $f(x) = 4x + \log_6 6x$, find f(6). _____.

(57) The radius of the circle $x^2 - 4x + y^2 - 2y = 6$ is _____.

(58) The area of the ellipse $4x^2 + 9y^2 = 36$ is $a\pi$ and $a =$ _____.

(59) How many different sets of two books can be selected from seven distinct books? _____.

*(60) $\sqrt{732736} =$ _____ (Integer).

(61) The surface area of a sphere with radius 5 is $a\pi$ and $a =$ _____.

(62) $2 \cos 30° \sin 30° =$ _____.

(63) How many 3-digit numbers end in a 6? _____.

(64) The probability of rolling a sum of 3 or 8 with two dice is _____.

(65) The perimeter of a square decreases from 48" to 40". The area decreases by _____ square inches.

(66) The area of a triangle with sides 4" and 5" and with an angle of 120° between them is _____ square inches.

(67) $\tan(\text{Arcsin } 4/5) =$ _____.

(68) The coefficient of the x^2 term in the expansion of $(x - 3)^3$ is _____.

(69) Find x if $\det \begin{vmatrix} 4 & 1 \\ 2x & 3 \end{vmatrix} = 6$ _____.

*(70) The perimeter of the ellipse $6x^2 + 8y^2 = 48$ is _____ (Integer).

(71) Find b, if $43_b = 23$. _____.

(72) A is 20% less than B, and B is 10% less than C. A is what % less than C? _____ %.

(73) In a triangle with sides 2, 4 and 4, the area is _____.

(74) $2^8 \div 7$ has a remainder of _____.

(75) $23 \equiv 7 \pmod{m}$, $2 < m < 7$, and $m =$ _____.

(76) $72 \times 73 =$ _____.

(77) $12\ 1/5 \times 12\ 4/5 =$ _____.

(78) $.22_4 =$ _____ 8 (decimal).

(79) In a triangle with sides 3, 4 and 6, the length of the median to side 6 is _____.

*(80) $(28)^4 =$ _____ (Integer).