The University Interscholastic League
Number Sense Test, Series YY-2

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) $1492 + 2974 =$ _____.

(2) $822 - 228 =$ _____.

(3) $25 \times 73 =$ _____.

(4) $\frac{5}{8} \times \frac{16}{25} \times \frac{5}{32} =$ _____.

(5) $32 \times 13 + 38 \times 13 =$ _____.

(6) $3\frac{1}{3} \times 5\frac{2}{5} =$ _____.

(7) $13 + 23 + 33 + 43 + 53 =$ _____.

(8) $\frac{7}{8} =$ _____ %.

(9) $404 \div 9 =$ _____ (mixed number).

*(10) $201 + 699 \times 302 =$ _____.

(11) $4\frac{1}{8} - 1\frac{3}{4} =$ _____ (mixed number).

(12) $70 =$ _____ (Roman Numeral).

(13) 7 is what percent of 40? _____ %.

(14) $57 \times 63 =$ _____.

(15) $5 \div 3\frac{1}{3} =$ _____ (decimal).

(16) $44^2 =$ _____.

(17) $\frac{5}{3}$ of a gallon = _____ cubic inches.

(18) $12 \times 47 =$ _____.

(19) If 1 gram = .04 oz., then 9 oz. = _____ grams.

*(20) $66981 \div 249 =$ _____.

(21) $(48 \times 64) \div (16 \times 12) =$ _____.

(22) $6\frac{1}{2} \times 14\frac{1}{2} =$ _____ (mixed number).

(23) Find the simple interest on $2800.00 at $5\frac{1}{4}$ % for one year. $ _____.

(24) The mean of 28, 41, and 39 is _____.

(25) Which is smaller, $\frac{6}{7}$ or .859? _____.

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

(27) The largest integer less than 90 which is relatively prime to 86 is _____.

(28) $(33 \times 8 + 10) \div 6$ has a remainder of _____.

(29) At 5 cu. yd. per load, how many loads of dirt will fill a hole 18' x 12' x 7'? _____ loads.

*(30) $41 \times 249 + 37 \times 249 =$ _____.

(31) $F(x) = 9x^2 - 24x + 16$, evaluate F(7). _____.

(32) $45_7 =$ _____ 10.

(33) The largest root of $x^2 + 11x + 30 = 0$ is _____.

(34) $\sqrt{64 \times 36} =$ _____.

(35) What number times seven and added to five, gives the same result? _____.

(36) $1011_2 =$ _____ 4.

(37) If the area of a rhombus is 416 and one diagonal is 26, the other diagonal is _____.

(38) $4\frac{1}{4} \times 6\frac{1}{4} =$ _____ (mixed number).

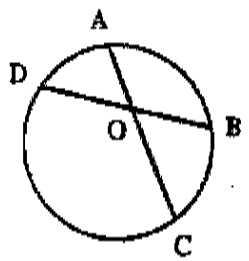
(39) How many integers between 6 and 77 are divisible by 6? _____.

*(40) $49 \times 50 \times 51 =$ _____.

(41) If $4^{x+1} = 20$ then $4^x =$ _____.

(42) The smallest root of $(2x + 1)^2 = \frac{1}{4}$ is _____.

(43) Find AO if BO = 6, CO = 8 and DO = 4. AO = _____.



(44) Evaluate $4xy^{1/2}$ if x = 4 and y = 25. _____.

(45) The next term of the sequence 5,8,6,9,7,10,... is _____.

(46) A circle has an area of 18π sq. in. Its diameter is _____ inches.

(47) The largest value of x such that $|2x - 3| = 21$ is _____.

(48) $34 \times 74 =$ _____.

(49) A regular n-gon has an exterior angle of measure 18 degrees. n = _____ sides.

*(50) $19 \times 142857 =$ _____.

(51) The vertex of the parabola $y = x^2 - 8x$ is (h,k) and k = _____.

(52) $97 \times 104 =$ _____.

(53) The x-intercept farthest to the right for $f(x) = 3x^2 - 7x - 6$ is x = _____.

(54) $96 \times 97 =$ _____.

(55) If $\log_a 8 = .7$ then $\log_a 64 =$ _____.

(56) The product of the GCD and LCM of 19 and 24 is _____.

(57) $\frac{\pi}{12}$ radians = _____ degrees.

(58) $\frac{3}{4} + \frac{3}{16} + \frac{3}{64} + \ldots =$ _____.

(59) $93 \times 111 =$ _____.

*(60) $152207 \div 1111 =$ _____.

(61) $(3 - 5i)^2 = a + bi$ and a = _____.

(62) Find x if $\log_6 (3x + 3) = 2$. _____.

(63) How many 3-digit numbers end in 2, 4, or 7? _____.

(64) If $\sec A = 3$ then $\cos A =$ _____.

(65) The shortest distance between the line $8x + 6y = 20$ and the point (0,10) is _____.

(66) $\cos(\text{Arccos } 4/5) =$ _____.

(67) The probability of rolling a sum of 8 with two dice is _____.

(68) 1.343434... = _____ (improper fraction).

(69) The simplified sum of the coefficients of $(5x + 1)^3$ is _____.

*(70) $\pi^4 =$ _____.

(71) $203_6 + 5_6 =$ _____ 6.

(72) How many gallons are in a rectangular box 5" x 231" x 6"? _____ gallons.

(73) Change .31 base 6, to a base ten fraction. _____.

(74) $\det \begin{vmatrix} 2 & 5 \\ 9 & 4 \end{vmatrix} =$ _____.

(75) $F(x) = 3x - 7$, $F^{-1}(x) =$ _____.

(76) Find x, $0 \le x \le 6$, if $4x - 3 \equiv 6 \pmod 7$. _____.

(77) $\lim_{x \to 4} (x^2 - 2x + 1) =$ _____.

(78) If $f(x) = 4x^2 + 3x$ then $f'(2) =$ _____.

(79) $\int_0^2 (x^2 + x)\, dx =$ _____.

*(80) $(35)^4 =$ _____.