The University Interscholastic League
Number Sense Test, Series VV-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) $9761 + 1989 - 14 =$ _____.

(2) $714 \div 7 \div 2 =$ _____.

(3) $457 - 754 =$ _____.

(4) $424 \div 9 =$ _____ (mixed number).

(5) $12 \times 13 + 6 \times 74 =$ _____.

(6) $(8 + 3)(3 + 21) =$ _____.

(7) $42^2 =$ _____.

(8) $17 - 4 + 3^0 =$ _____.

(9) $14 \div 2\frac{1}{2} =$ _____ (improper fraction).

*(10) $1 + 399 \times 701 =$ _____.

(11) $25 \times 431 =$ _____.

(12) $.135 \times 10^2 \div 3 =$ _____.

(13) 12 square feet = _____ square inches.

(14) $33 \times 6\frac{1}{3} =$ _____.

(15) If 6 pencils cost 48 cents, then 24 cost $ _____.

(16) $.576 \div 2.4 =$ _____.

(17) The GCD of 32, 16 and 20 is _____.

(18) $43 \times 37 =$ _____.

(19) Find the average of 31, 42 and 53. _____.

*(20) $(399 \times 401)^2 \div (401 \times 398) =$ _____.

(21) 16% of 6 is _____ % of 48.

(22) $72^2 - 66^2 = 6 \times$ _____.

(23) $2 + 4 + 6 + 8 + \ldots + 58 =$ _____.

(24) $(14 \times 10 + 73) \div 4$ has a remainder of _____.

(25) $61 \times 69 =$ _____.

(26) 214 is what percent more than 200? _____ %.

(27) The discriminant of $x^2 - 7x + 6 = 0$ is _____.

(28) $\sqrt{(102)(408)} =$ _____.

(29) If A = 4, B = 6 and C = 8, then (BC) ÷ A = _____.

*(30) $\sqrt{52898} =$ _____.

(31) $8\frac{1}{5} \times 8\frac{4}{5} =$ _____ (mixed number).

(32) The sum of the positive integral divisors of 16 is _____.

(33) $124_6 =$ _____ $_{10}$.

(34) .102 = _____ (fraction).

(35) If $x = 2$ and $y = 4$, then $x^2 + 4xy + 4y^2 =$ _____.

(36) The next term in the sequence 1,2,5,4,9,6,13,... is _____.

(37) $(22_6)(4_6) =$ _____ $_6$.

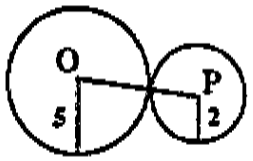
(38) The area of an equilateral triangle with side 6 is _____.

(39) $26026 \div 1001 =$ _____.

*(40) $15^4 + 15^3 \times 68 =$ _____.

(41) $1011_2 =$ _____ 4.

(42) Points O and P are centers of the circles. Find OP.



OP = _____.

(43) $111 \times 35 =$ _____.

(44) Find x, if $3^{x+1} = 81$. x = _____.

(45) A right triangle has a leg of 5". The hypotenuse is _____".

(46) If $x < 0$ and $|2x - 1| = 15$, then x = _____.

(47) How many distinct triangles can be drawn inside a hexagon using any 3 vertices at a time? _____.

(48) If $x^2 + 7 > 5 + 4$, then $x^2 >$ _____.

(49) $67 \times 47 =$ _____.

*(50) $39 \times 139 + 40 \times 139 =$ _____.

(51) $(3 + 4i)(2 - i) = a + bi$ and a = _____.

(52) $F(x) = 2x - \log_4 x$. Evaluate F(16). _____.

(53) How many ways can 3 people sit in a row of 6 chairs? _____.

(54) The distance between (2,4) and x = 7 is _____.

(55) $104 \times 105 =$ _____.

(56) The vertex of the parabola $y = x^2 - 6x + 12$ is (h,k). k = _____.

(57) $6^{3/2} = a\sqrt{b}$ and a = _____.

(58) $8^4 \div 5$ has a remainder of _____.

(59) The middle term in the expansion of $(2x - 1)^4$ is _____.

*(60) $(32)^4 =$ _____.

(61) If ${}_8C_2 = {}_8C_n$, $n \neq 2$, then n = _____.

(62) $[2\ \ 4] \times \begin{bmatrix} 6 \\ -2 \end{bmatrix} = [$ _____ $]$.

(63) On the graph of $y = 3 \sin 2x$, the amplitude is _____.

(64) If $f(x) = 3x$ and $g(x) = x + 4$, find $f[g(2)]$. _____.

(65) How many 4-member committees can be formed from a group of 6 people? _____.

(66) In a triangle with sides 6, 10 and 8, the area is _____.

(67) Two dice are tossed. What is the probability that the sum of the faces is 5? _____.

(68) If $\log_2 8 = \log_4 x$, then x = _____.

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

*(70) $28 \times 29 \times 30 \times 31 =$ _____.

(71) The surface area of a sphere with radius 2 is $k\pi$ and k = _____.

(72) $(8, \frac{\pi}{3})$ are polar coordinates for (x,y). x = _____.

(73) Find x, if $\det \begin{vmatrix} 7 & 3 \\ x & 4 \end{vmatrix} = 13$. x = _____.

(74) Change $\frac{11}{36}$ to a base 6 decimal. _____.

(75) If f(2) = 4, then $f^{-1}(4) =$ _____.

(76) $\lim_{x \to 3} \frac{x^2 - 9}{x - 3} =$ _____.

(77) $\lim_{x \to \infty} \frac{2x + 3}{x - 4} =$ _____.

(78) $f(x) = x^2 + 2x - 1$, $f'(4) =$ _____.

(79) $\int_{-1}^{1} x^3\ dx =$ _____.

*(80) $16^3 - 15^3 =$ _____.