# The University Interscholastic League
## Number Sense Test, Series VV-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 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) $2478 + 5943 =$ _____.

(2) $10^0 + 10 - 2 =$ _____.

(3) $24 \div 6 - 24 \times 3 =$ _____.

(4) $(13 + 4)(7 + 4) =$ _____.

(5) $16 \div 2\frac{1}{3} =$ _____.

(6) $389 \div 9 =$ _____ (mixed number).

(7) $71^2 =$ _____.

(8) $17 \times 19 + 17 \times 31 =$ _____.

(9) $31 \times 12 =$ _____.

*(10) $15 \times 201 \times 9 - 10 =$ _____.

(11) $75 \times 1.6 =$ _____.

(12) 7 square feet = _____ square inches.

(13) $33 \times 4\frac{1}{3} =$ _____.

(14) $1 + 2 + 3 + \ldots + 23 =$ _____.

(15) $\frac{5}{4}$ is _____ % of 10.

(16) $36^2 - 28^2 = 2 \times$ _____.

(17) If 3 dozen balls cost $22.32, how much do 5 balls cost? $ _____.

(18) The LCM of 15, 12 and 30 is _____.

(19) $(6^2 \times 4^2 \times 5) \div (6 \times 5) =$ _____ (numeral).

*(20) $(33 \times 31)^2 =$ _____.

(21) If $A = 3$, $B = 4$ and $C = 6$, then $B^2 \div AC =$ _____.

(22) The range of the set 5,14,9,3,12 is _____.

(23) 66 less $33\frac{1}{3}$% of 42 is _____.

(24) If $x = 4$ and $y = -3$, then $x^2 - 2xy + y^2 =$ _____.

(25) $52 \times 58 =$ _____.

(26) $\sqrt{(15)(60)} =$ _____.

(27) The GCD of 4, 42 and 56 is _____.

(28) $52_8 - 35_8 =$ _____

(29) $(15 + 3 \times 8 + 6) \div 7$ has a remainder of _____.

*(30) $\sqrt{50001} =$ _____.

(31) $23_4 =$ _____

(32) The sum of three consecutive integers is 144. The middle number is _____.

(33) $.\overline{342} =$ _____ (fraction).

(34) The line $2x + 3y = 9$ has a slope of _____.

(35) Find k, if $x^2 + kx + 1 = 0$ and the sum of the roots is 3. _____.

(36) How many real roots does $x^3 = -1$ have? _____.

(37) $(32_7)(4_7) =$ _____

(38) On a hot day 36 people ordered tea, 29 ordered coke and 15 ordered both. How many people were there? _____.

(39) $11101_2 =$ _____ $_8$.

*(40) $14^4 \div 14^3 \times 7^2 =$ _____.

(41) The product of the roots of $x^3 + 6x^2 + 12x + 8 = 0$ is _____.

(42) $(\frac{1}{27})^{-2/3} =$ _____.

(43) The distance from (3,4) to (5,12) is $b\sqrt{a}$. $b =$ _____.

(44) Find x, if $9^2 + 40^2 = x^2$, $x > 0$. $x =$ _____.

(45) If $\sqrt{2x+1} = 5$, then $x =$ _____.

(46) The remainder in base 7, when 532, base 7, is divided by 6 is _____.

(47) If $x > 0$ and $|3x + 1| = 37$, then $x =$ _____.

(48) Find y, if $2x^2 + y = 6$ and $x = 4$. $y =$ _____.

(49) How many distinct diagonals can be drawn in a pentagon? _____.

*(50) $115 \times 116 + 115 \times 125 =$ _____.

(51) $(1 + i)^2 = a + bi$ and $b =$ _____.

(52) In the expansion of $(2x + 3y)^{10}$ the term $kx^7y^3$ is the _____.

(53) $\frac{1}{4} + \frac{1}{12} + \frac{1}{36} + \ldots =$ _____.

(54) Find the probability that an integer picked at random between 20 and 30 is divisible by 4. _____.

(55) $(\log_3 2)(\log_2 3) =$ _____.

(56) A can has a volume of $48\pi$ and its radius is 4. The height is _____.

(57) The length of the major axis of the ellipse $2x^2 + 4y^2 = 8$ is _____.

(58) Two dice are tossed. What is the probability that the sum is 14? _____.

(59) $98 \times 103 =$ _____.

*(60) $.\overline{4} \times 143.856 =$ _____.

(61) $\tan 28° = \cot A$, $0° < A < 90°$. $A =$ _____°.

(62) If the radius of a circle is increased by 10% then the area is increased by _____ %.

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

(64) $i^{38} =$ _____.

(65) If y varies inversely as x and $x = 4$ when $y = 9$, find x when $y = 2$. _____.

(66) $1 - \cos^2 60° =$ _____.

(67) How many distinct sets of 2 books can be selected from 5 distinct books? _____.

(68) $\sin(\text{Arcsin}\frac{4}{5}) =$ _____.

(69) The odds of winning are 3 to 10. What is the probability of winning? _____.

*(70) The perimeter of the ellipse $18x^2 + 14y^2 = 252$ is _____.

(71) The largest value in the range of $y = -2x^2 + 4$ is _____.

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

(73) The smallest value in the domain of $y = \sqrt{2x - 1}$, so that y is real-valued is _____.

(74) The horizontal asymptote for $y = \frac{x+2}{x}$ is $y =$ _____.

(75) Find x, $0 \le x \le 8$, if $2x + 1 \equiv 25 \pmod 9$. _____.

(76) $\det \begin{vmatrix} 3 & 1 \\ 2 & 3 \end{vmatrix} + \det \begin{vmatrix} 1 & 2 \\ 3 & 4 \end{vmatrix} =$ _____.

(77) $f(x) = x^2 + 1$. Find $f[f(2)]$. _____.

(78) The slope of the line tangent to $y = 3x^3 + 1$ at the point (2,25) is _____.

(79) $\int_2^4 x^2 \, dx =$ _____.

*(80) $111 \times 219 + 1111 \times 219 =$ _____.