The University Interscholastic League
Number Sense Test, Series ZZ-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 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) $1992 \div 2991 =$ _____.

(2) $10 \times 23 \times 200 =$ _____.

(3) $781 - 187 =$ _____.

(4) $\frac{1}{2} + \frac{1}{3} =$ _____.

(5) $431 \div 9 =$ _____ (Mixed Number).

(6) Which is larger, $\frac{2}{5}$ or .49? _____.

(7) $9 \times 3 \div 6 + 4 =$ _____.

(8) $3\frac{1}{4} - 1\frac{5}{8} =$ _____ (Mixed Number).

(9) $16^2 =$ _____.

*(10) $283 + 979 + 1671 =$ _____.

(11) $13 \times 12 + 13 \times 28 =$ _____.

(12) The GCD of 14 and 56 is _____.

(13) 45% = _____ (fraction).

(14) XXI = _____ (Arabic Numeral).

(15) $2 + 4 + 6 + 10 + 12 + 14 + 16 =$ _____.

(16) The mean of 16 and 28 is _____.

(17) The LCM of 15, 10 and 12 is _____.

(18) $2\frac{1}{4} \times 2\frac{2}{3} =$ _____.

(19) The largest prime number less than 91 is _____.

*(20) $\sqrt{224} + \sqrt{291} =$ _____.

(21) The number 42 has _____ positive prime divisors.

(22) $12 \times 28 =$ _____.

(23) If 7 pencils cost 84 cents, then one dozen cost $ _____.

(24) $213_5 =$ _____ 10-

(25) Evaluate F(5) if $F(x) = x^4 + 4x^2 + 4$. _____.

(26) If $x + y = 5$ and $x - y = 2$ then $2x =$ _____.

(27) .151515 ... = _____ (fraction).

(28) $\sqrt{324} =$ _____.

(29) Divide 8 into 2 parts such that the larger number exceeds the smaller number by 2. Find the larger number. _____.

*(30) $249 \times 587 =$ _____.

(31) If $ax^2 + bx + c = (2x + 3)^2$ then $b =$ _____.

(32) The sum of the positive integral divisors of 15 is _____.

(33) An octagon has _____ sides.

(34) 3241 ÷ 4 has a remainder of _____.

(35) How many positive integral divisors does 42 have? _____.

(36) A square has how many distinct diagonals? _____.

(37) The next number in the sequence, 210, 280, 350, 420, ... is _____.

(38) $15 \times 94 =$ _____.

(39) $1121 \div 9 =$ _____ (Mixed Number).

*(40) $13 \times 41 + 42 \times 13 =$ _____.

(41) A right triangle has legs of 7 and 24. The length of the hypotenuse is _____.

(42) $996^2 =$ _____.

(43) The measure of the exterior angle of a regular hexagon is _____ °.

(44) $42^2 - 52^2 =$ _____.

(45) The graph of $y = x^3$ has exactly how many turning points? _____.

(46) If $2^{x+y} = 16$ then $x + y =$ _____.

(47) The distance between the points (2,7) and (5,4) is _____.

(48) $3^{-2} =$ _____.

(49) The vertex of $y = x^2 - 2x - 3$ is (h,k) and h = _____.

*(50) $\sqrt{36000} =$ _____.

(51) If $x^2 + y^2 = 29$, $x > y$ and they are positive integers, then x = _____.

(52) If 2, 7 and x are the sides of a triangle, then $x + 2 >$ _____.

(53) $(2 + 3i)^2 = a + bi$ and a = _____.

(54) If $x + 4 > 6$ then $4x >$ _____.

(55) A googol is the number 10^n where n = _____.

(56) $i^6 =$ _____.

(57) A die is rolled. What is the probability that it shows an odd number? _____.

(58) $\log_4 2 =$ _____.

(59) How many ways can you place 4 distinct books on a bookshelf? _____.

*(60) $5624 \div 124 =$ _____.

(61) Find the greatest integer x such that $2x + 3 < 9$. _____.

(62) The third triangular number is _____.

(63) The simplified coefficient of the x^2 term in the expansion of $(2x + 3)^4$ is _____.

(64) $1 + \frac{1}{2} + \frac{1}{4} + \frac{1}{8} + \frac{1}{16} =$ _____.

(65) A cylinder has a volume of 64π. If the height equals to the radius of the cylinder, find the height. _____

(66) $1 + \frac{1}{3} + \frac{1}{9} + \ldots =$ _____.

(67) y varies directly as x. If y = 12 when x = 8, find y when x = 6. _____.

(68) If $f(x) = x^2 - 4$, find $f[f(2)]$. _____.

(69) $\cos 135^\circ =$ _____.

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

(71) $\csc 30^\circ =$ _____.

(72) The remainder when $x^3 + 2x^2 + x + 4$ is divided by x - 2 is _____.

(73) If the surface area of a cube equals its volume numerically, then the length of an edge of the cube is _____.

(74) $12^5 \div 4 = (3^x)(4^y)$ and y = _____.

(75) $231_4 \div 3 =$ _____ 4.

(76) $\lim_{x \to 2} \frac{x^2 - 4}{x - 2} =$ _____.

(77) The graph of $y = \log_2(x + 2)$ has a vertical asymptote of x = _____.

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

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

*(80) $(1 + 2 + 3 + \ldots + 24)^2 =$ _____.

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