The University Interscholastic League

Number Sense Test, Series TT-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 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) $4(13) + 4(8) + 4(9) =$ _____.

(2) $649 \div 11 =$ _____.

(3) 18% = _____ (fraction).

(4) $12 \times 145 =$ _____.

(5) $61^2 =$ _____.

(6) $35 \times 45 =$ _____.

(7) $8\ 1/4 \times 4\ 1/4 =$ _____.

(8) 6 1/4% of 3200 = _____.

(9) $(105)^2 =$ _____.

*(10) $198 \times 201 + 150 =$ _____ (Integer).

(11) 12453 ÷ 9 has a remainder of _____.

(12) $(4 \times 5^2 \times 7^2) + (5 \times 7) =$ _____ (numeral).

(13) $37^2 - 35^2 =$ _____.

(14) The negative reciprocal of 2 1/4 is _____ (fraction).

(15) $5.6 \times 75 =$ _____.

(16) 61 1/2 is what percent more than 50? _____ %.

(17) At 900 pesos per dollar, 3150 pesos = $_____.

(18) The median of 16, 14, 20, 18 is _____.

(19) Find the smallest prime p, such that $3p + 1$ is a prime number. _____.

*(20) $10 \times 12 \times 14 + 20 =$ _____ (Integer).

(21) 420 less 33 1/3% of 240 = _____.

(22) The LCM of 14, 28, and 21 is _____.

(23) The smallest prime divisor of 45^3 is _____.

(24) The cube root of -1728 is _____.

(25) Three times a number plus 8 is 18. The number is _____.

(26) $111011_2 =$ _____ 4.

(27) How many subsets does {a,b,c,d} have? _____.

(28) $\sqrt{(18)(32)} =$ _____.

(29) If a 4" by 6" picture is enlarged to 12" by 18", its perimeter is multiplied by _____.

*(30) $760310 \div 379 =$ _____ (Integer).

(31) If $x = 2$, $y = 3$ and $z = 4$, then $yz^2 \div x =$ _____.

(32) $.\overline{15} =$ _____ (fraction).

(33) The area of a square whose diagonal is 8" is _____ square inches.

(34) $3^5 =$ _____.

(35) The smaller root of $x^2 + 3x + 2 = 0$ is _____.

(36) The remainder of a/7 is 4 and b/7 is 3. The remainder of ab/7 is _____.

(37) $213_5 + 141_5 =$ _____ 5.

(38) How many positive integers less than or equal to 15 are relatively prime to 15? _____.

(39) The next term in the sequence 1, 3, 4, 7, 11, 18, . . . is _____.

*(40) $130 \times 2 + 260 \times 4 + 130 =$ _____ (Integer).

(41) The distance between the point (2,4) and the line $y = 1$ is _____.

(42) $16^{3/2} =$ _____.

(43) Everyone ordered tea or coffee. Of 40 people, 26 ordered tea and 25 ordered coffee. How many ordered both tea and coffee? _____.

(44) If $\sqrt{x+1} = 4$, then x = _____.

(45) The area of a 30° - 60° right triangle with hypotenuse 8 is _____.

(46) The slope of the line passing through (0,2) and (2,2) is _____.

(47) (x,y) is the midpoint of the line segment from (4,6) to the origin. y = _____.

(48) If $3^x = 30$, then 3^{x-1} = _____.

(49) If 32 and 44 are in base 6, their greatest common divisor in base 10 is _____.

*(50) $\sqrt{168201}$ = _____ (Integer).

(51) Using the numeral 1987, write the smallest 3-digit number using each digit only once. _____.

(52) $\log_5 2 - \log_5 50$ = _____.

(53) The y-intercept of $x^2 + x + y = 4$ is (0,y). y = _____.

(54) $(1 + i)^2 = a + bi$. a = _____.

(55) If $2 \log_4 x = 1$, then x = _____.

(56) The circle $x^2 + 2x + y^2 = 4$, has a center (a,b), and a = _____.

(57) The odds of winning are 3 to 2. What is the probability of not winning? _____.

(58) In how many different ways can 6 people be seated at a round table? _____.

(59) How many 3 member committees can be formed from a group of 5 people? _____.

*(60) 49728 ÷ 111 = _____ (Integer).

(61) 2 sin 15° cos 15° = _____.

(62) The volume of a sphere with radius 3 is aπ. a = _____.

(63) tan 135° + cot 45° = _____.

(64) 1 + 1/2 + 1/4 + . . . = _____.

(65) The area of a triangle with sides 3" and 4", and with an angle of 30° between them is _____square inches.

(66) The edge of a cube is 4, the surface area is _____sq. in.

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

(68) 1 + 2 + 3 + 4 + . . . + 60 = _____.

(69) Find the sum of the squares of the roots of $x^2 - x - 12 = 0$. _____.

*(70) 1450 x 1950 = _____ (Integer).

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

(72) The smallest real value in the range of $f(x) = x^2 - 1$ is _____.

(73) Change .24, base 5, to a base ten fraction. _____.

(74) The remainder when $f(x) = 3x^3 + 4x^2 + 4$ is divided by x + 2 is _____.

(75) $(102_4) \div (3_4)$ = _____$_4$.

(76) If A = [2 4] and $B = \begin{bmatrix} 3 \\ -1 \end{bmatrix}$, AB = [_____].

(77) The maximum value of $f(x) = -2x^2 + x$ is _____.

(78) $F(x) = 3x^3 - 4x^2 + 6$. Find $F''(x)$_____.

(79) $\int_0^1 2x^3\,dx$ = _____.

*(80) 142857 x 17 = _____ (Integer).