The University Interscholastic League
Number Sense Test, Series WW-1

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) $1234 + 213 - 156 =$ _____.

(2) $25 \times 53 =$ _____.

(3) $\frac{4}{5} \times \frac{6}{14} \times \frac{10}{8} =$ _____.

(4) $211 \div 9 =$ _____ (mixed number).

(5) $\frac{3}{8} =$ _____ %.

(6) $34^2 =$ _____.

(7) $(4 + 7)(13 + 22) =$ _____.

(8) 6 is _____ % of 120.

(9) $17.5 \times 10^2 - 31 =$ _____.

*(10) $51 \times 369 + 11 =$ _____.

(11) Write 95 in Roman Numerals. _____.

(12) $12(14) + 12(17) =$ _____.

(13) $8\frac{1}{2} \div 2\frac{1}{2} =$ _____ (improper fraction).

(14) The largest prime divisor of 143 is _____.

(15) Which is smaller, $\frac{-9}{8}$ or $\frac{10}{-9}$? _____.

(16) $.4 + 4 \div 4 + .6 =$ _____.

(17) The GCD of 72 and 102 is _____.

(18) $\frac{7}{2^4(5^2)} =$ _____ (decimal).

(19) $15 \times 46 =$ _____.

*(20) $62410 \div 249 =$ _____.

(21) $46 \times 54 =$ _____.

(22) 12 % of 24 is 16 % of _____.

(23) $1 + 3 + 5 + \ldots + 27 =$ _____.

(24) If A = 6, B = 8 and C = 10, then $AC \div B =$ _____.

(25) How many positive integers divide 28? _____.

(26) A car travels 126 miles in $2\frac{1}{3}$ hours. The average speed was _____ mph.

(27) $.363636\ldots =$ _____ (fraction).

(28) The simple interest on $850.00 at 8% for 6 months is $ _____.

(29) $12\frac{1}{5} \times 8\frac{1}{5} =$ _____ (mixed number).

*(30) $42 \times 63 + 42 \times 47 =$ _____.

(31) $222_7 =$ _____ $_{10}$

(32) The largest root of $2x^2 - 3x - 2 = 0$ is _____.

(33) $(5 \times 16 + 7) \div 4$ has a remainder of _____.

(34) Find x, if $3x - 1 = 5x - 4$. _____.

(35) A square has a perimeter of 24 and its diagonal is _____.

(36) Change 34 base 6 to base 5. _____.

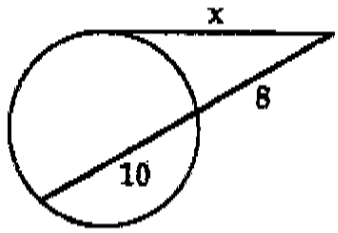
(37) Find k, if $kx^2 - x - 12 = 0$ and the product of the roots is -2. k = _____.

(38) $96 \times 103 =$ _____.

(39) The next term in the sequence 12,9,15,12 is _____.

*(40) $39 \times 40 \times 41 - 10^4 =$ _____.

(41) A secant and a tangent line are shown. Find the value of x. $x =$ _____.



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

(43) If $0 < x < 5$, then $x^2 + 4 <$ _____.

(44) The measure of an interior angle of a regular octagon is _____ degrees.

(45) $996 \times 995 =$ _____.

(46) The area of an equilateral triangle with a side of 16 is _____.

(47) $231 \times 111 =$ _____.

(48) The hypotenuse of a right triangle is 61 and one leg is 11. The other leg is _____.

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

*(50) $\sqrt{14641} =$ _____.

(51) $\log_{10} 2 - \log_{10} 200 =$ _____.

(52) $45 + 15 + 5 + \ldots =$ _____.

(53) How many 5-digit numbers are even? _____.

(54) $\sqrt{-2}\ \sqrt{-8} =$ _____.

(55) If two dice are rolled, the probability the sum is 5 or 8 is _____.

(56) If $2 \log_6 x = 1$, then $x =$ _____.

(57) The probability of winning is $\frac{7}{12}$. The probability of losing is _____.

(58) $(a - 7i)^2 = -24 - 70i$ and $a =$ _____.

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

*(60) $13 \times 15 \times 17 \times 19 =$ _____.

(61) The volume of a pyramid is 48 and its height is 12. The area of the base is _____.

(62) If ${}_7C_4 = {}_7C_n$, $n \neq 4$, then $n =$ _____.

(63) How many positive integers are relatively prime to 60? _____.

(64) $\csc 150° =$ _____.

(65) $[x]$ denotes the greatest integer function. $[4.3] =$ _____.

(66) $\text{Tan}^{-1} 1 =$ _____ degrees.

(67) The surface area of a sphere with a radius of 7 is $k\pi$ and $k =$ _____.

(68) $\sin 80° = 2 \sin A \cos A$, $A < 90°$, $A =$ _____°.

(69) Find x, if $\det \begin{vmatrix} 3x & 7 \\ 2x & 5 \end{vmatrix} = 3$. _____.

*(70) $(33)^4 =$ _____.

(71) Change .45, base 6, to a base 10 fraction. _____.

(72) $f(x) = x^2 + 1$, find $f[f(3)]$. _____.

(73) $\lim_{x \to 4} \frac{x^2 - 16}{x - 4} =$ _____.

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

(75) $(223_5) \div (3_5) =$ _____ $_5$.

(76) $f(x) = (2x + 1)^2$, find $f'(x)$. _____.

(77) $f(x) = x^4 + (x + 1)^2$, find $f''(x)$. _____.

(78) $\int_1^2 x^2\ dx =$ _____.

(79) $\lim_{x \to 0} \frac{\sin x}{x} =$ _____.

*(80) $142857 \times 31 =$ _____.