The University Interscholastic League
Number Sense Test, Series ZZ-A

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) $1993 + 3993 =$ _____.

(2) $354 - 453 =$ _____.

(3) $34^2 =$ _____.

(4) $48 \times 4 \div 16 - 4 =$ _____.

(5) $1992 \times 5 =$ _____.

(6) $523 \div 9 =$ _____ (Mixed Number).

(7) $12\frac{1}{4} - 11\frac{7}{8} =$ _____ (decimal).

(8) $11 \times 47 =$ _____.

(9) The negative reciprocal of .8 is _____.

*(10) $325 \div 239 \times 149 =$ _____.

(11) $12 \times 43 =$ _____.

(12) 240 plus 20% of 150 is _____.

(13) The mean of 24, 30 and 42 is _____.

(14) $75 \times 7.2 =$ _____.

(15) If 3 pencils cost 57 cents, then one dozen pencils cost $ _____.

(16) $22 \times 44 =$ _____.

(17) The median of 4, 8, 10 and 6 is _____.

(18) $\frac{9}{(5^2)(2^3)} =$ _____ (decimal).

(19) $13 \times 47 + 47 \times 27 =$ _____.

*(20) $14 \times 16 \times 18 =$ _____.

(21) Find the simple interest on $2000 at 4% for two years. $ _____.

(22) one gallon = _____ cubic inches.

(23) How many positive prime integers divide 48? _____.

(24) Find x if $4^x = 32$. $x =$ _____.

(25) $F(x) = x^4 - 4x^3 - 3$. Evaluate F(4). _____.

(26) The line $4x - 2y = 4$ has a slope of _____.

(27) $3^{-1} + 3^{-3} =$ _____.

(28) $26435 \div 4$ has a remainder of _____.

(29) $4\frac{1}{2} \times 6\frac{1}{2} =$ _____ (Mixed Number).

*(30) $29746 \div 139 =$ _____.

(31) Divide 13 into 2 parts such that the larger number exceeds the smaller number by 3. Find the smaller number. _____.

(32) $124_6 =$ _____ 10.

(33) The area of a rhombus with diagonals 15" and 24" is _____ square inches.

(34) $(125)^{1/3} =$ _____.

(35) .121212 . . . = _____ (fraction).

(36) The largest root of $(2x - 1)^2 = \frac{1}{9}$ is _____.

(37) $(13_4)(3_4) =$ _____ 4.

(38) $32825 \div 101 =$ _____.

(39) The sum of the positive integral divisors of 36 is _____.

*(40) $16^4 \div 16^2 \times 5^2 =$ _____ .

(41) $23_5 + 32_5 =$ _____ 5.

(42) $2513 \div 9 =$ _____ (Mixed Number).

(43) $1 + 2 + 3 + \ldots + 19 =$ _____ .

(44) $998^2 =$ _____ .

(45) Find k, so that the 3 digit number 41k is divisible by 9. k = _____ .

(46) $76 \times 36 =$ _____ .

(47) The next term in the sequence 2, 5, 3, 6, 4, 7, ... is _____ .

(48) $96 \times 95 =$ _____ .

(49) The graph of $y = x^2 + 1$ has exactly how many turning points? _____ .

*(50) $\bar{3} \times 124{,}254 =$ _____ .

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

(52) If $x^2 + y^2 = 41$, $x > y$ and they are both negative integers then x = _____ .

(53) $\log_5 125 =$ _____ .

(54) $\cos 300^\circ =$ _____ .

(55) The vertex of the parabola $y = x^2 + 2x + 1$ is (h,k) and h = _____ .

(56) $\frac{5\pi}{6}$ radians = _____ degrees.

(57) Find the modulus of $3 - 4i$. _____ .

(58) $102 \times 105 =$ _____ .

(59) A committee consists of 4 members. In how many ways can the committee reach a majority decision? _____ .

*(60) $(22)^4 =$ _____ .

(61) If 2 a's = 5 b's and 10 b's = 8 c's then a = _____ c's.

(62) The 4th triangular number is _____ .

(63) ${}_6P_4 =$ _____ .

(64) On the graph of $y = 3\cos 4x$, the amplitude is _____ .

(65) The probability of drawing a red ace from a standard deck of 52 cards is _____ .

(66) The 7th term in the sequence 1, 3, 9, 27, ... is _____ .

(67) If $f(x) = 3x$ and $g(x) = 2x + 1$, find $f[g(2)]$. _____ .

(68) $15^6 \div 3 = (3^y)(5^x)$ and x = _____ .

(69) Arcsin (.5) = _____ degrees.

*(70) $310 \times 24 + 309 \times 26 =$ _____ .

(71) If $2^x = 7.48$ then $2^{x+1} =$ _____ .

(72) Change .32, base 4, to a base 10 fraction. _____ .

(73) The vertical asymptote for $y(x + 2) = 1$ is x = _____ .

(74) Find x, $0 \leq x \leq 6$, if $2x + 3 \equiv 2 \pmod 7$. x = _____ .

(75) $(1 - 2i)^2 =$ _____ .

(76) The smallest value in the domain of $y = \sqrt{3x + 5}$ so that y is real valued is _____ .

(77) The odds of winning are 4 to 7. What is the probability of not winning? _____ .

(78) $\lim_{x \to 2} \frac{1}{2x} =$ _____ .

(79) $\int_1^2 (x + 1)\,dx =$ _____ .

*(80) $\sqrt{145}\ \sqrt{1850} =$ _____ .