The University Interscholastic League
Number Sense Test, Series YY-B

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) $893 - 398 =$ _____.

(2) $1\frac{1}{4} \times 16\frac{4}{5} =$ _____.

(3) $332 \div 9 =$ _____ (mixed number).

(4) $11 \times 127 =$ _____.

(5) $11 + 21 + 31 + 41 + 51 =$ _____.

(6) $\frac{1}{40} =$ _____ (decimal).

(7) $120 \div 3\frac{1}{3} =$ _____.

(8) $55 =$ _____ (Roman numeral).

(9) The negative reciprocal of .6 is _____.

*(10) $149 \times 160 =$ _____.

(11) 120 less 25 % of 60 is _____.

(12) $(11 \times 15) + (45 \times 13) =$ _____.

(13) $5\frac{1}{8} - 2\frac{1}{2} =$ _____ (mixed number).

(14) 30 is what percent more than 25? _____ %.

(15) $4.8 \times 75 =$ _____.

(16) $\frac{7}{(5^3)(2^2)} =$ _____ (decimal).

(17) $86^2 =$ _____.

(18) The largest integer less than 100 which is relatively prime to 100 is _____.

(19) The LCM of 18, 20, and 36 is _____.

*(20) $18 \times 20 \times 22 =$ _____.

(21) How far do you travel in 2 hours 20 minutes at a constant speed of 48 mph? _____ miles.

(22) Which is larger, .427 or $\frac{3}{7}$? _____.

(23) $16\frac{1}{2} \div 2\frac{1}{2} =$ _____ (improper fraction).

(24) $(3^4 + 6 \times 5) \div 4$ has a remainder of _____.

(25) $F(x) = x^2 - 6x + 9$, evaluate $F(4.6)$. _____.

(26) If a 3 x 6 picture is enlarged to 9 x 18, its perimeter is multiplied by _____.

(27) $3.8 \times 3.2 =$ _____.

(28) If 2 pencils cost 51 cents, then one dozen cost $ _____.

(29) $42_7 =$ _____ 6.

*(30) $56635 \div 241 =$ _____.

(31) Find y if $2x + y = 7$ and $x - y = 5$. _____.

(32) $12\frac{1}{3} \times 12\frac{2}{3} =$ _____ (mixed number).

(33) Find k, so that the roots of $4x^2 - 20x + k = 0$ are equal. _____.

(34) The product of the prime factors of 98 is _____.

(35) The smallest root of $(3x + 1)^2 = \frac{1}{9}$ is _____.

(36) $(42_5)(2_5) =$ _____ 5.

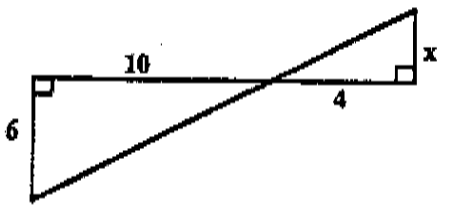
(37) The discriminant of $x^2 - 2x + 5 = 0$ is _____.

(38) 1011_2 = _____ 8.

(39) What is the perimeter of a square whose diagonal is 8?
_____.

*(40) 4 x 16.5 x 130 + 201 = _____.

(41) Find x in the drawing. x = _____.



(42) Evaluate $3yx^{1/2}$ if x = 4 and y = 9. _____.

(43) $(32)^{3/2} = a\sqrt{b}$ and a = _____.

(44) (x,y) is the midpoint of the line segment through endpoints (4,7) and (9,3). y = _____.

(45) The conjugate of - 4 + 5i is _____.

(46) The number of sides of a regular polygon with an interior angle of 120° is _____.

(47) 41_8 = _____ 4.

(48) Find the smallest number greater than 4 that 168 is divisible by. _____.

(49) 72 x 73 = _____.

*(50) 39 x 201 + 200 x 49 = _____.

(51) If 23 and 31 are in base 5, find the remainder when their sum is divided by 4. _____.

(52) 1 + 3 + 5 + ... + 19 = _____.

(53) Given the parabola $y^2 = 20x$, the focus is at (h, 0) and h = _____.

(54) The largest integer x such that 3x - 4 < 49 is _____.

(55) The sum of the squares of the roots $x^2 + 4x + 1 = 0$ is
_____.

(56) The odds of winning are 3 to 5. The probability of losing is _____.

(57) A book sells for $8.00 plus 8 1/4% sales tax. The total cost of the book is $ _____.

(58) (2 + 3i) (4 + 5i) = a + bi and a = _____.

(59) 103 x 96 = _____.

*(60) $15^4 - 13^4$ = _____.

(61) .53333... = _____ (fraction).

(62) When two dice are rolled, what is the probability that the sum is a 3 or 9? _____.

(63) $3^7 \div 4$ has a remainder of _____.

(64) Find the distance between the lines 3x + 4y = 2 and 3x + 4y = 12. _____.

(65) If cos53° = sinA and A is in Q I, then A = _____°.

(66) How many 3-digit numbers can be formed from {1,5,7} if repetition of digits is allowed? _____.

(67) Find x, if $\log_5(3x - 1) = 2$. _____.

(68) The probability of drawing a red king from 2 standard decks of 52 cards each is _____.

(69) The area of the ellipse $4x^2 + y^2 = 4$ is $k\pi$ and k = ____.

*(70) $(31)^4$ = _____.

(71) In a triangle with sides 3,3 and 4, the area is _____.

(72) Find x if $\det \begin{vmatrix} x & 7 \\ 9 & 3 \end{vmatrix} = 6$ _____

(73) Find x, $0 \le x \le 4$, if $4x - 9 \equiv 8 \pmod 5$. _____.

(74) Change .42, base 6, to a base 10 fraction. _____.

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

(76) Two dice are thrown. What is the probability that their sum is divisible by 3? _____.

(77) $\lim_{x \to \infty} \frac{3x - 1}{x + 1}$ = _____.

(78) If $f(x) = 3x^3 + x + 1$ then f" (2) = _____.

(79) $\int_{-2}^{2} x^4 \, dx$ = _____.

*(80) 142857 x 39 = _____.