The University Interscholastic League
Number Sense Test, Series XX-2

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) $1475 - 230 - 270 =$ _____.

(2) $46 \times 25 =$ _____.

(3) $\frac{2}{3} \times \frac{8}{12} \times \frac{4}{6} =$ _____.

(4) $\frac{7}{12} - 1 + \frac{5}{6} =$ _____.

(5) $46^2 =$ _____.

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

(7) $12 \times 26 =$ _____.

(8) $75 \times 46 =$ _____.

(9) $610 \div 9 =$ _____ (mixed number).

*(10) $69 \times 89 + 31 =$ _____.

(11) 6 is _____ % of 480.

(12) The largest prime divisor of 511 is _____.

(13) $4 \div 2\frac{1}{2} =$ _____ (decimal).

(14) If 1 gram = .04 oz., then 7 oz. = _____ grams.

(15) $(68 \times 66) \div (17 \times 12) =$ _____.

(16) $\frac{1}{3}$ of a gallon = _____ cubic inches.

(17) If a box of candy weighing 12 oz. sells for $1.65, find the equivalent selling price per pound. $_____.

(18) $\frac{3}{8}$ is what percent of $1\frac{7}{8}$? _____ %.

(19) $12\frac{1}{2} \times 4\frac{4}{5} =$ _____.

*(20) $\sqrt{67400} + 210 =$ _____.

(21) The number half way between 23 and 91 is _____.

(22) $6 \times 6\frac{6}{7} =$ _____ (mixed number).

(23) At 4 cu. yd. per load, how many loads of dirt will fill a hole 3' x 36' x 90' ? _____ loads.

(24) $74 \times 66 =$ _____.

(25) $34_7 =$ _____ 10.

(26) If A = 4, B = -6 and C = 18, then $AC \div B =$ _____.

(27) Find the cost of driving a car 185 miles at $.22 a mile. $ _____.

(28) $\sqrt{5\frac{4}{9}} =$ _____ (improper fraction).

(29) $(56 \times 12 + 9) \div 6$ has a remainder of _____.

*(30) $141 \times 48 + 141 \times 51 =$ _____.

(31) $3\frac{1}{4} \times 5\frac{1}{4} =$ _____ (mixed number).

(32) How many positive integers between 3 and 21 are relatively prime to 21? _____.

(33) The LCM of 16, 20 and 32 is _____.

(34) What number times four and subtracted from four gives the same result? _____.

(35) .2636363... = _____ (fraction).

(36) Subtracting $9\frac{1}{2}$ % of a number from the number is equivalent to multiplying the number by what decimal?

_____.

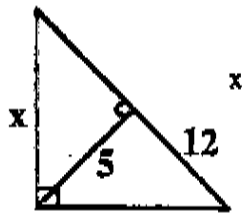
(37) $(23_6)(5_6) =$ _____ 6.

(38) The smallest root of $2x^2 + 13x + 20 = 0$ is _____.

(39) If $x = 2$ and $y = 4$, then $x^2 + 8xy + 16y^2 =$ _____.

*(40) $(61)^3 =$ _____.

(41) In the drawing, find x.



x = _____.

(42) If $9^x = 27$, then x = _____.

(43) How many degrees are there in $6\frac{2}{3}$ % of a straight angle? _____ degrees.

(44) $\frac{1}{12}$ mile = _____ feet.

(45) Find the smallest number greater than 3 that 651 is divisible by. _____.

(46) If $x^2 - 7 < 5$, then $2x^2 - 1 <$ _____.

(47) $7^3 - 5^3 =$ _____.

(48) Find the smaller of x and y such that $x + y = 10$ and $x - y = 6$. _____.

(49) $(45)^{3/2} = a\sqrt{b}$ and b = _____.

*(50) $(130 \times 24)^2 \div (129 \times 48) =$ _____.

(51) $\frac{\pi}{18}$ radians = _____ degrees.

(52) If 24 men do a job in 5 days, at the same rate, how long will it take 10 men? _____ days.

(53) $94 \times 97 =$ _____.

(54) Given the parabola, $y = x^2 - 6x + 9$, the vertex is at (a,b). a = _____.

(55) $\sec\frac{2\pi}{3} =$ _____.

(56) The simplified coefficient of the x^3y^2 term in the expansion of $(3x - y)^5$ is _____.

(57) $5^{-1} + 5^{-2} + 5^{-3} + \ldots =$ _____.

(58) Using {1,9,9,1} write the largest 3-digit number divisible by 3. _____.

(59) A box contains 18 red, 27 blue and 45 green balls. A ball is drawn. Find the probability that the ball is not red. _____.

*(60) $193401 \div 247 =$ _____.

(61) $(2 - 5i)^2 =$ _____.

(62) The odds of winning are 5 to 9. What is the probability of not winning? _____.

(63) $47397 \div 111 =$ _____.

(64) The volume of a cone is 75π and its height is 9. The radius of the base is _____.

(65) $\cos 35^\circ \sin 35^\circ = \frac{1}{2}\sin$ _____ °.

(66) In how many ways can 5 people be seated at a round table? _____.

(67) If $\log_x 9 = \frac{2}{3}$, then x = _____.

(68) The ninth term in the sequence 34,28,22,16,... is ____.

(69) Find the smallest value of x so that $f(x) = \sqrt{3x + 5}$ is real valued. _____.

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

(71) If $f(6) = 4$, then $f^{-1}(4) =$ _____.

(72) If $3^2 + x \equiv 2 \pmod 5$, $0 \le x \le 4$, then x = _____.

(73) $\det \begin{vmatrix} -4 & 5 \\ -7 & 3 \end{vmatrix} =$ _____.

(74) The horizontal asymptote of $y = 4^x + 2$ is _____.

(75) $\lim_{x \to 3} (x^2 - 5x + 7) =$ _____.

(76) If $f(x) = x^4 - 3x$, $f'(-2) =$ _____.

(77) $\int_0^1 (3 - x)\,dx =$ _____.

(78) $f(x) = 2\sin x$, $f'(x) =$ _____.

(79) $f'(x) = 5$, $f(1) = 3$, find $f(x)$. _____.

*(80) $142857 \times 34 =$ _____.