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

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) $1990 - 991 =$ _____.

(2) $1990 + 1990 =$ _____.

(3) $25 \times 1990 =$ _____.

(4) $1990 \div 4 =$ _____ (mixed number).

(5) $17 \times 19 + 19 \times 83 =$ _____.

(6) $19^2 =$ _____.

(7) $75 \times 1990 =$ _____.

(8) $91 \div 7 =$ _____.

(9) $4 + 64 \div 16 \times 8 =$ _____.

*(10) $502 \times 788 =$ _____.

(11) $\sqrt{729} =$ _____.

(12) $24 \times 36 =$ _____.

(13) $2\frac{1}{4} \times 3\frac{1}{3} =$ _____ (mixed number).

(14) $19\frac{3}{5}\% =$ _____ (fraction).

(15) $2\frac{1}{4} + 3\frac{1}{3} =$ _____.

(16) $3\frac{1}{4} \times 13\frac{1}{4} =$ _____ (mixed number).

(17) $12 \times 18 =$ _____.

(18) $91 \div 19 =$ _____ (mixed number).

(19) $9' \times 4' \times 3' =$ _____ cubic yards.

*(20) $95304 \div 209 =$ _____.

(21) $6 \times 6\frac{6}{7} =$ _____ (mixed number).

(22) A team won $\frac{16}{19}$ of its 114 games. How many did it lose? _____.

(23) $15 \times 64 =$ _____.

(24) $\frac{3}{4}$ is what percent of 5? _____ %.

(25) Which is larger, $\frac{11}{14}$ or $\frac{12}{17}$? _____.

(26) $(32 \times 91) - (16 \times 182) =$ _____.

(27) $9 \div .36 =$ _____.

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

(29) What number times three and added to three gives the same result? _____.

*(30) $315 \times 1111 =$ _____.

(31) The set {a,b,c} has _____ subsets.

(32) $37_8 =$ _____ $_{10}$.

(33) What is the original price of a coat that sells for $90 at a 25% discount? $ _____.

(34) The square root of 75×27 is _____.

(35) Find z, if $\frac{1}{z} = x + y^3$ when $x = 2$ and $y = -3$. _____.

(36) $37^2 - 34^2 =$ _____.

(37) What is the largest divisor of 180 which is less than 60? _____.

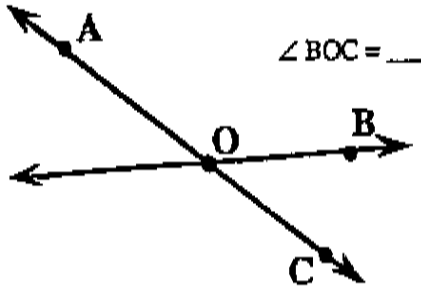
(38) $3\frac{1}{2}$ is the square root of what number? _____.

(39) The area of an isosceles triangle with sides 5, 5, and 6 is _____.

*(40) 19 x 20 x 21 x 22 = _____.

(41) The sum of the GCD and LCM of 15 and 21 is _____.

(42) In the drawing find ∠ BOC, if ∠ AOB = 120°.



∠ BOC = _____°.

(43) If $4^x = \frac{1}{16}$, then x = _____.

(44) Find the average of 70, 14, 82 and 14. _____.

(45) The smaller root of $\sqrt{25 - x^2} = 3$ is _____.

(46) i^8 = _____.

(47) Find the smaller of x and y, such that x + y = 1 and x - y = 3. _____.

(48) (35 + 3 x 7 + 1) ÷ 4 has a remainder of _____.

(49) The number halfway between 38 and 124 is _____.

*(50) $(24)^4$ = _____.

(51) The next term of 1,3,3,5,7,11,17,... is _____.

(52) $14^3 - 12^3$ = _____.

(53) A card is drawn at random from an ordinary deck of 52 playing cards. Find the probability that it is a queen or a spade. _____.

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

(55) The base of a triangle remains fixed at 27". The altitude is increased from 13" to 17". Find the corresponding increase in area. _____ sq. in.

(56) tan 135° = _____.

(57) If $\log_2 4 = \log_4 x$, then x = _____.

(58) When two dice are tossed, what is the probability that the difference of the faces will be three? _____.

(59) 1 + 2 + 3 + ... + 100 = _____.

*(60) $\sqrt{522729}$ = _____.

(61) If 15 men can do a job in 10 days, at the same rate, how many can do it in 3 days? _____.

(62) 4 ! = _____.

(63) Find the smallest number greater than 5 that 945 is divisible by. _____.

(64) Find the largest value of x, so that $f(x) = \sqrt{81 - 4x^2}$ is real-valued. _____.

(65) $(2 + i)^2 = a + bi$ and b = _____.

(66) What is the smallest positive integer x, such that for y a positive integer 12x = 21y? _____.

(67) If $f(x) = x + \log_5 x$, find f(1). _____.

(68) $\cos(\text{Cos}^{-1}\frac{1}{3})$ = _____.

(69) The smaller of two numbers whose sum is 40 is 60% of the larger. Find the smaller number. _____.

*(70) $[1 \times 3 \times 5 \times 7]^2$ = _____.

(71) 2.444... = _____ (fraction).

(72) If |x + 4| = 6 and x < 0, then x = _____.

(73) How many 3-digit numbers are there? _____.

(74) Change .24, base 6, to a base ten fraction. _____.

(75) $(24_6) \div (4_6)$ = _____ 6.

(76) $12 + 6 + 3 + \frac{3}{2} + \ldots$ = _____.

(77) Suppose cos .4 = .9. What is sec .4? _____.

(78) If $f(x) = x^2 + 2x$, f ' (2) _____.

(79) $\int_0^1 \sqrt{x}\, dx$ = _____.

*(80) 142857 x 36 = _____.