

The University Interscholastic League
Number Sense Test, Series YY-3

Contestant's Number _____

Contestant's Score _____

Read Directions Carefully
Before Beginning Test

Do Not Unfold This Sheet
Until Told To Begin

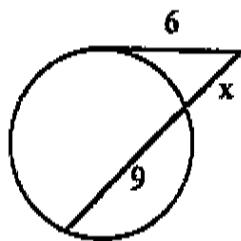
DIRECTIONS: Do not turn this page until the person conducting this test gives the signal to begin. This is a ten-minute test. There are 80 problems. Solve accurately and quickly as many as you can in the order in which they appear. ALL PROBLEMS ARE TO BE SOLVED MENTALLY. Make no calculations with paper 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) $4759 + 4665 =$ _____
- (2) $1992 + 4 \times 1993 =$ _____
- (3) $185 - 581 =$ _____
- (4) $25 \times 413 =$ _____
- (5) $537 \div 9 =$ _____ (mixed number).
- (6) $32 \frac{1}{2} \% =$ _____ (fraction).
- (7) $210 =$ _____ (Roman numeral).
- (8) $\frac{7}{12} \times \frac{3}{5} \times \frac{16}{28} =$ _____
- (9) $18 \times 23 + 57 \times 18 =$ _____
- *(10) $398 \times 298 - 498 =$ _____
- (11) $12^2 \div 6 \times 4 - 2 =$ _____
- (12) If 1 gram = .04 oz., then 1400 grams = _____ lbs.
- (13) $(6 \times 7^2 \times 8) \div (7 \times 4) =$ _____
- (14) $(103)^2 =$ _____
- (15) If a dozen balls cost \$25.32, how much does one ball cost? \$ _____
- (16) The negative reciprocal of $1 \frac{3}{5}$ is _____
- (17) 46 is what percent more than 40? _____ %.
- (18) $12 \times 72 =$ _____
- (19) The LCM of 6, 16, and 24 is _____
- *(20) $95634 \div 578 =$ _____
- (21) Find the average of 42, 32, and 46. _____
- (22) $(4 + 7)(23 + 12) =$ _____
- (23) $8 + 10 + 12 + \dots + 18 =$ _____
- (24) $48^2 - 44^2 = (2)$ _____
- (25) $34791 \div 9$ has a remainder of _____
- (26) Find the smallest prime number p , such that $7p + 2$ is a prime number _____
- (27) If $3 + 2^x = 35$ then $x =$ _____
- (28) How far do you travel in two minutes at 22 ft/sec? _____ ft.
- (29) Change 23 base seven to base 9. _____ 9.
- *(30) $221 \times 147 + 221 \times 149 =$ _____
- (31) $F(x) = x^2 - 4x + 4$, evaluate $F(3.7)$. _____
- (32) $101111_2 =$ _____ 4.
- (33) If a 4" x 6" picture is enlarged to 12" x 18", its area is multiplied by _____
- (34) $41 \times 49 =$ _____
- (35) $.424242\dots =$ _____ (fraction).
- (36) The smaller root of $x^2 + 8x + 15 = 0$ is _____
- (37) The number of integral divisors of 63 is _____
- (38) $7 \frac{1}{4} \times 7 \frac{3}{4} =$ _____ (mixed number).
- (39) The area of an isosceles right triangle with hypotenuse $3\sqrt{2}$ is _____

- *(40) $79 \times 80 \times 81 =$ _____
- (41) The sum of the positive integral divisors of 44 is _____
- (42) The largest root of $(4x + 1)^2 = \frac{1}{16}$ is _____
- (43) A tangent and a secant line are shown. Find the value of x . $x =$ _____



- (44) If 117 is divided into three parts proportional to 2, 4 and 7, then the largest part is _____
- (45) Find x , if $8^x = 128$. _____
- (46) $42 \times 62 =$ _____
- (47) How many positive integers less than 42 are relatively prime to 42? _____
- (48) $78 \times 111 =$ _____
- (49) The next term of the sequence 3, 8, 5, 10, 7, 12, ... is _____
- *(50) $1692053 \div 1111 =$ _____
- (51) The area of a 30° - 60° right triangle with hypotenuse 8 is _____
- (52) How many real roots does $x^4 - 4 = 0$ have? _____
- (53) What term of the sequence 6, 13, 20, 27, ... is 1406? _____
- (54) The circle $x^2 + y^2 + 4y = 21$ has a radius of _____
- (55) The odds of winning are 4 to 5. What is the probability of winning? _____
- (56) If ${}_x C_3 = {}_x C_4$ then $x =$ _____
- (57) A tin can has a diameter of 8 and a height of 6. The volume is $k\pi$ and $k =$ _____
- (58) $3^7 \div 8$ has a remainder of _____
- (59) How many three-digit positive integers are multiples of 7? _____
- *(60) $142857 \times 53 =$ _____
- (61) Find x , if $\log_8 (4x + 1) = \frac{2}{3}$ _____

- (62) $(3 - i)(2 + 5i) = x + yi$ and $x =$ _____
- (63) Find the shortest distance between the lines $3x - 4y = 16$ and $3x - 4y = 1$. _____
- (64) If $\cos 32^\circ = \sin C$, $0^\circ < C < 90^\circ$, then $C =$ _____ $^\circ$.
- (65) The length of the tangent from (13,0) to the circle $x^2 + y^2 = 25$ is _____
- (66) $\sqrt{-18} \sqrt{-8} =$ _____
- (67) Two cards are drawn from a standard deck of cards without replacement. What is the probability that both cards are aces? _____
- (68) $\frac{2}{3} + \frac{2}{27} + \frac{2}{243} + \dots =$ _____
- (69) $(\log_3 5)(\log_5 3) =$ _____
- *(70) $(53)^4 =$ _____
- (71) Find x if $\det \begin{vmatrix} x & 3 \\ x & 5 \end{vmatrix} = 8$. _____
- (72) $40^\circ \text{ C} =$ _____ $^\circ \text{ F}$.
- (73) If $A = [1 \ 5]$ and $B = \begin{bmatrix} 2 \\ 7 \end{bmatrix}$ then $AB = [\quad]$.
- (74) Change .34, base 5, to a base 10 decimal. _____
- (75) $\lim_{x \rightarrow 4} \frac{x^2 - 4}{x + 4} =$ _____
- (76) $f(x) = 2x^2 + 3x - 7$, $f'(0) =$ _____
- (77) $f(x) = 2x - 5$, find $f[f(2)]$. _____
- (78) $216_8 \div 2_8 =$ _____ $_8$.
- (79) $\int_0^3 x^4 dx =$ _____
- *(80) $e^3 =$ _____ (where $e = 2.7183$).