

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

- | | |
|---|--|
| <p>(1) $1991 - 9119 =$ _____</p> <p>(2) $32 \times 7\frac{3}{8} =$ _____</p> <p>(3) $8875 \div 25 =$ _____</p> <p>(4) $72^2 =$ _____</p> <p>(5) $-4^2 + 2^2 + 2^0 =$ _____</p> <p>(6) $75 \times .56 =$ _____</p> <p>(7) $534 \div 9 =$ _____ (mixed number).</p> <p>(8) $4 \times 76 + 76 \times 26 =$ _____</p> <p>(9) $8875 \div 125 =$ _____</p> <p>*(10) $72 \times 230 - 230 =$ _____</p> <p>(11) 144 is 20% more than what number? _____</p> <p>(12) $(41 \times 15) + (82 \times 2\frac{1}{2}) =$ _____</p> <p>(13) $1\frac{3}{5} + 2\frac{1}{3} =$ _____</p> <p>(14) $12\frac{1}{2}\%$ of 42.4 = _____</p> <p>(15) $48 \div 12 \times 4 - 7 =$ _____</p> <p>(16) 2 inches is what percent of a foot? _____ %.</p> <p>(17) $9 \times 9\frac{8}{9} =$ _____</p> <p>(18) Which is the smallest, $\frac{10}{13}$, $\frac{17}{19}$, or $\frac{11}{14}$? _____</p> <p>(19) A team won $\frac{13}{16}$ of its 128 games. How many did it win?
 _____</p> | <p>*(20) $187782 \div 263 =$ _____</p> <p>(21) If towels cost 47 cents each or \$5.50 a dozen, how much is saved by buying a dozen? _____ cents.</p> <p>(22) $(2\frac{1}{2})^3 =$ _____ (improper fraction).</p> <p>(23) $\frac{7}{4(5^3)} =$ _____ (decimal).</p> <p>(24) How many seconds are in $2\frac{1}{3}$ hours? _____</p> <p>(25) Find x, if $\frac{1}{x} = \frac{1}{4} + \frac{1}{7}$. _____</p> <p>(26) $37_9 =$ _____ 10_7</p> <p>(27) .0636363... = _____ (fraction).</p> <p>(28) $34^2 - 28^2 = (3)$ _____</p> <p>(29) What number times 4 and subtracted from 2 gives the same result? _____</p> <p>*(30) $237 \times 48 + 49 \times 236 =$ _____</p> <p>(31) The product of the distinct positive prime divisors of 194 is _____</p> <p>(32) $(32_6)(4_6) =$ _____ 6_7</p> <p>(33) The product of the roots of $2x^2 - 8x - 5 = 0$ is _____</p> <p>(34) $6\frac{1}{7} \times 6\frac{6}{7} =$ _____ (mixed number).</p> <p>(35) If $x = 4$ and $y = 3$, then $4x^2 + 4xy + y^2 =$ _____</p> <p>(36) The sum of the positive integral divisors of 28 is
 _____</p> |
|---|--|

- (37) Find the largest integer less than 200 which divides 539.

- (38) $\frac{1}{8}$ mile = _____ feet.
- (39) On a hot day 42 people ordered coke, 39 ordered tea and 13 ordered both. How many people were there? _____
- *(40) $(249 \times 79)^2 \div (39 \times 499) =$ _____
- (41) $104 \times 109 =$ _____
- (42) If $2\sqrt{3x} = 3$, then $x =$ _____
- (43) The next term of 3, 14, 59, 14, ... is _____
- (44) If $3^{x+y} = 7$ and $3^{x-y} = 2$, then $3^{2x} =$ _____
- (45) The area of $30^\circ - 60^\circ$ right triangle with hypotenuse 12 is _____
- (46) If $2^x = 15$, then $2^{x-2} =$ _____
- (47) If 33 and 220 are in base 8, their greatest common divisor in base 10 is _____
- (48) $33 \times 73 =$ _____
- (49) The average of 15, 23, 74, 37 and 71 is _____
- *(50) $(81)^3 =$ _____
- (51) If 16 machines can do a job in 6 hours, how long will the job take if 4 machines are out of order? _____ hrs.
- (52) $\csc \frac{7\pi}{6} =$ _____
- (53) The area of the sector is 4π . Find r .
- $r =$ _____
- (54) Given the parabola, $y = 3x^2 + 6x + 7$, the vertex is at (a,b). $b =$ _____
- (55) $(32)^{3/2} = a\sqrt{b}$ and $a =$ _____
- (56) The circle $x^2 + 6x + y^2 = 7$ has a radius of _____
- (57) $(3 + 5i)^2 = a + bi$ and $a =$ _____
- (58) How many 5 member committees can be formed from a group of 7 people? _____
- (59) Using {1,9,9,1} write the largest 2-digit prime number.

- *(60) $18 \times 20 \times 22 =$ _____
- (61) The surface area of a sphere is 1024π . Its radius is _____
- (62) $\frac{3}{5} + \frac{9}{25} + \frac{27}{125} + \dots =$ _____
- (63) $(314_g) + (4_g) =$ _____ $_8$
- (64) A die is rolled. The top face shows a 3 and the bottom face is a _____
- (65) $\sum_{k=1}^4 (2k - 1)^2 =$ _____
- (66) Two cards are drawn from a standard deck without replacement. What is the probability that the two cards belong to the same suit? _____
- (67) $\cos(\sin^{-1} \frac{2}{3}) =$ _____
- (68) If $\log_g 16 = \log_x 81$, then $x =$ _____
- (69) The number of digits in the number $N = 4^3 \times 5^4$ is _____
- *(70) Evaluate the det $\begin{vmatrix} 12 & 6 & 30 \\ 8 & 2 & 50 \\ 15 & 0 & 1 \end{vmatrix} =$ _____
- (71) Change $\frac{7}{25}$ to a base 5 decimal. _____
- (72) If $f(x) = 3x^3 + 4x + k$, determine k so that $f(x)$ is divisible by $x + 3$. _____
- (73) If $4x - 11 \equiv 6 \pmod{5}$, $0 \leq x \leq 4$, then $x =$ _____
- (74) $\lim_{x \rightarrow 1} \frac{x^2 - 1}{x - 1} =$ _____
- (75) $\lim_{x \rightarrow \infty} \frac{4 - 6x}{2x + 1} =$ _____
- (76) The smallest possible value of $f(x) = 3x^2 + 4x + 1$ is _____
- (77) $\int_1^2 (3 - x^2) dx =$ _____
- (78) $f(x) = \sin 2x$, $f'(x) =$ _____
- (79) $f'(x) = -4$, $f(2) = 3$, find $f(x)$. _____
- *(80) $142857 \times 17 =$ _____