

The University Interscholastic League
Number Sense Test, Series UU-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 only approximate 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) $111 - 10.4 \times 10 + .3 =$ _____</p> <p>(2) $-3^0 + 4 - 2 =$ _____</p> <p>(3) $12 \div 6 - 12 \times 4 =$ _____</p> <p>(4) $12 + 4 \frac{1}{4} =$ _____</p> <p>(5) $25 \times 121 =$ _____</p> <p>(6) $(3 + 8)(17 + 15) =$ _____</p> <p>(7) $211 + 9 =$ _____ (Mixed Number)</p> <p>(8) $46^2 =$ _____</p> <p>(9) $13 \times 37 - 13 \times 17 =$ _____</p> <p>*(10) $21 \times 241 - 41 =$ _____ (Integer)</p> <p>(11) $12 \times 37 =$ _____</p> <p>(12) The reciprocal of $2 \frac{3}{5}$ is _____ (fraction)</p> <p>(13) $75 \times .52 =$ _____</p> <p>(14) 9 square feet = _____ square inches.</p> <p>(15) Write 202 using Roman Numerals. _____</p> <p>(16) The LCM of 4, 10 and 16 is _____</p> <p>(17) $97 \times 96 =$ _____</p> <p>(18) If 2 pencils cost 30 cents, then 12 dozen cost \$ _____</p> <p>(19) $\frac{1}{6} + \frac{1}{12} + \frac{1}{20} =$ _____</p> <p>*(20) $\sqrt{42436} - 6 =$ _____ (Integer)</p> <p>(21) $6 \frac{1}{3} \times 3 \frac{1}{3} =$ _____</p> | <p>(22) $\sqrt{(72)(18)} =$ _____</p> <p>(23) $.12 =$ _____ (fraction)</p> <p>(24) The product of the LCM and GCD of 18 and 22 is _____</p> <p>(25) The smallest integer larger than $4\sqrt{2}$ is _____</p> <p>(26) $65 \times 62 =$ _____</p> <p>(27) The number of integral divisors of 48 is _____</p> <p>(28) $32_4 =$ _____</p> <p>(29) $23 \times 1111 =$ _____</p> <p>*(30) $356700 \div 145 =$ _____ (Integer)</p> <p>(31) Find k, so that the roots of $2x^2 - 4x + k = 0$ are equal.
 _____</p> <p>(32) If $\frac{3}{x} = \frac{x}{7}$, $x > 0$, then $x =$ _____</p> <p>(33) $62_7 - 35_7 =$ _____</p> <p>(34) $5^4 \div 11$ has a remainder of _____</p> <p>(35) In checking 140 houses with bugs, a company finds 105 with roaches and 75 with ants. How many have only roaches? _____</p> <p>(36) $.3\bar{3} - .\bar{1} =$ _____ (fraction)</p> <p>(37) Find the perimeter of an equilateral triangle, if the altitude is $\sqrt{12}$. _____</p> <p>(38) The next term in the sequence 15, 12, 7, 0, -9, ... is _____</p> <p>(39) If $a = 3$ and $b = 2$, then $(a - b)(a^3 + a^2b + ab^2 + b^3) =$ _____</p> |
|---|--|

- (40) $28860 \div 111 =$ _____ (Integer).
- (41) If set A has 2 elements and set B has 5 elements, then the number of elements in the Cartesian product is _____.
- (42) If $3^x - 1 = 7.2$, then $3^x =$ _____.
- (43) If $2x^2 - 5x + 6 = 0$, then the sum of the roots squared is _____.
- (44) The difference between the number of sides of a nonagon and a pentagon is _____.
- (45) A book sells for \$8.00 plus a 6 1/4% sales tax. The total cost is \$_____.
- (46) What is the length of the tangent to a circle from a point $\sqrt{12}$ from the center, if the radius is 2" inches. _____
- (47) The largest x integer, such that $2x + 3^2 < 29$ is _____.
- (48) The sum of the measures of the interior angles of a regular hexagon is _____.
- (49) If the area of a right triangle is 5 and one leg is $\sqrt{5}$, find the hypotenuse. _____.
- (50) $50 \times 60 \times 68 =$ _____ (Integer).
- (51) ${}^7C_3 =$ _____.
- (52) $\pi/18$ radians = _____ degrees.
- (53) If 51 is in base 7, then its square root in base 10 is _____.
- (54) $(\log_6 10)(\log_{10} 6) =$ _____.
- (55) The perimeter of a square increases from 36" to 48", the area increases by _____ sq. in.
- (56) The x-intercept farthest to the left for $y = x^2 - 4x + 3$ is $x =$ _____.
- (57) $(1 + i)^2 = a + bi$ and $a =$ _____.
- (58) The odds of winning are 4 to 5. The probability of winning is _____.
- (59) $i^{23} =$ _____.
- (60) $(\pi^3 - 1)^2 =$ _____ (Integer).
- (61) $\log_6 81 - \log_6 3 = \log_6$ _____.
- (62) $\text{Arcsin}(-1/2) =$ _____ degrees.
- (63) If $f(x) = 3x - \log_4 x$, find $f(16)$. _____.
- (64) In a triangle with sides 5, 6 and 7, the area is _____.
- (65) $[2 \ 3] \times \begin{bmatrix} 4 \\ 5 \end{bmatrix} = [\text{_____}]$.
- (66) $\log_5 (1/125) =$ _____.
- (67) $\cos(2 \text{Arcsin } 1/3) =$ _____.
- (68) How many 4-digit numbers end in a 3 or 8? _____.
- (69) The probability of drawing an ace from 2 standard decks of 52 cards each is _____.
- (70) $21 \times 201 + 202 \times 201 =$ _____ (Integer).
- (71) Find x, $x > 0$, if $\det \begin{vmatrix} x & 4 \\ 9 & x \end{vmatrix} = 0$. _____.
- (72) 1 mile = _____ feet.
- (73) The horizontal asymptote for $y = e^x$, is $y =$ _____.
- (74) Change .31, base 4, to a base ten decimal. _____.
- (75) In the system of integers modulo eight, the least nonnegative value for 5×3 is _____.
- (76) $\lim_{x \rightarrow \infty} \frac{4x + 3}{x - 1} =$ _____.
- (77) In a triangle with sides 5, 6 and 7, the length of the median to side 7 is _____.
- (78) $f(x) = 4x^5 + 2x^3 + 1$, find $f''(2)$. _____.
- (79) $\int_1^2 x^2 dx =$ _____.
- (80) $.1\bar{6} \times 6^6 =$ _____ (Integer).