

**The University Interscholastic League**  
**Number Sense Test, Series VV-1**

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!**

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| <p>(1) <math>1991 + 899 + 31 =</math> _____</p> <p>(2) <math>871 - 178 =</math> _____</p> <p>(3) <math>25 \times 43 =</math> _____</p> <p>(4) <math>7 \times 14 + 26 \times 7 =</math> _____</p> <p>(5) <math>215 \div 9 =</math> _____ (mixed number).</p> <p>(6) <math>50 \times 31 =</math> _____</p> <p>(7) <math>1 + \frac{1}{6} + \frac{1}{7} =</math> _____ (improper fraction).</p> <p>(8) <math>29^2 =</math> _____</p> <p>(9) <math>2.34 \times 10^2 - 15.9 \times 10 =</math> _____</p> <p>*(10) <math>122 \times 199 \div 2 =</math> _____</p> <p>(11) <math>2\frac{4}{5}\% =</math> _____ (fraction).</p> <p>(12) <math>\sqrt{289} =</math> _____</p> <p>(13) <math>3^0 + 4 \times 3 + 3^{-1} =</math> _____</p> <p>(14) <math>11 \times 192 =</math> _____</p> <p>(15) <math>42 - 7 \div 6 \times 24 =</math> _____</p> <p>(16) Which is smaller, <math>\frac{2}{13}</math> or <math>\frac{3}{19}</math>? _____</p> <p>(17) <math>(67 + 8)(9 + 6) =</math> _____</p> <p>(18) <math>45 \div 2\frac{1}{2} =</math> _____</p> | <p>(19) Find the simple interest on \$800 at 8% for 3 months.<br/>       \$ _____</p> <p>*(20) <math>28875 + 231 =</math> _____</p> <p>(21) The LCM of 24, 12 and 18 is _____</p> <p>(22) <math>15 \times 68 =</math> _____</p> <p>(23) <math>(319 + 44) \div 4</math> has a remainder of _____</p> <p>(24) <math>57^2 - 53^2 = 2 \times</math> _____</p> <p>(25) 30 plus 40% of 30 is _____</p> <p>(26) How many positive integral divisors does 36 have?<br/>       _____</p> <p>(27) <math>F(x) = x^4 + 8x^2 + 16</math>, evaluate <math>F(-2)</math>. _____</p> <p>(28) The largest root of <math>x^2 + 11x + 30 = 0</math> is _____</p> <p>(29) <math>212_7 =</math> _____ <math>10</math></p> <p>*(30) <math>\sqrt{(325)(225)} =</math> _____</p> <p>(31) Two times a number plus 8 equals to the number plus 7. The number is _____</p> <p>(32) <math>.113113113 \dots =</math> _____ (fraction).</p> <p>(33) The product of the GCD and LCM of 19 and 20 is _____</p> <p>(34) The positive geometric mean of 14 and 4 is _____</p> <p>(35) <math>4\frac{1}{5} \times 6\frac{1}{5} =</math> _____</p> <p>(36) How many integers between 2 and 36 are relatively prime to 36? _____</p> |
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- (37)  $25_7 + 44_7 =$  \_\_\_\_\_  $_7$ .
- (38) Find  $k$ , if  $2x^2 - 5x + k = 0$  and the product of the roots is  $-\frac{3}{2}$ .  $k =$  \_\_\_\_\_.
- (39)  $\frac{1}{5}$  mile = \_\_\_\_\_ feet.
- \*(40)  $15 \times 16 \times 17 =$  \_\_\_\_\_.
- (41)  $5^4 - 1 =$  \_\_\_\_\_ (base 5).
- (42) Find  $k$ , so that  $25k$  is the smallest 3-digit number divisible by 6. \_\_\_\_\_.
- (43)  $111 \times 52 =$  \_\_\_\_\_.
- (44) Find  $x$ , if  $x + y = 2$  and  $x - 2y = -7$ .  $x =$  \_\_\_\_\_.
- (45)  $1\bar{6} + \bar{3} =$  \_\_\_\_\_ (fraction).
- (46) If  $x + 1 > 8$ , then  $x - 3 >$  \_\_\_\_\_.
- (47)  $98 \times 93 =$  \_\_\_\_\_.
- (48) How many distinct diagonals can be drawn in an octagon? \_\_\_\_\_.
- (49) The next term in the sequence 1,2,2,4,3,6,... is \_\_\_\_\_.
- \*(50)  $142857 \times 24 =$  \_\_\_\_\_.
- (51) The eleventh term in the sequence 4,2,0,... is \_\_\_\_\_.
- (52)  $34 \times 74 =$  \_\_\_\_\_.
- (53) If  $3^x = 12.5$ , then  $3^{x+1} =$  \_\_\_\_\_.
- (54) A regular  $n$ -gon has an exterior angle of measure 22.5 degrees.  $n =$  \_\_\_\_\_ sides.
- (55) If  $\sqrt{3x - 2} = 7$ , then  $x =$  \_\_\_\_\_.
- (56) If 2 a's = 3 b's and 4 b's = 9 c's, then one a = \_\_\_\_\_ c's.
- (57)  $27^{2B} =$  \_\_\_\_\_.
- (58)  $\cos 420^\circ =$  \_\_\_\_\_.
- (59) If  $\log_3 x = 2$ , then  $x =$  \_\_\_\_\_.
- \*(60) An angle of one radian = \_\_\_\_\_ degrees.
- (61) If  $\log_x 8 = -3$ , then  $x =$  \_\_\_\_\_.
- (62) A square is to a triangle as an octagon is to a polygon of \_\_\_\_\_ sides.
- (63)  $\csc(\sin^{-1} \frac{1}{2}) =$  \_\_\_\_\_.
- (64) The area of the ellipse  $3x^2 + 6y^2 = 18$  is  $k\pi$  and  $k =$  \_\_\_\_\_.
- (65)  $\log_3 (\log_3 27) =$  \_\_\_\_\_.
- (66) The expansion of  $(2x - 4)^3$  has \_\_\_\_\_ terms.
- (67) If  $23_{b+1} = 13$ , then  $b =$  \_\_\_\_\_.
- (68)  $\frac{1}{3} + \frac{1}{9} + \frac{1}{27} + \dots =$  \_\_\_\_\_.
- (69)  $\begin{bmatrix} x \\ y \end{bmatrix} + \begin{bmatrix} 2 \\ 4 \end{bmatrix} = \begin{bmatrix} 5 \\ 7 \end{bmatrix}$   $x =$  \_\_\_\_\_.
- \*(70)  $131 \times 129 + 129 \times 129 =$  \_\_\_\_\_.
- (71) The circle  $x^2 + 2x + y^2 - 4 = 0$  has a radius of \_\_\_\_\_.
- (72) Three coins are tossed, what is the probability of getting three heads? \_\_\_\_\_.
- (73) Change  $_{23}$ , base 5, to a base ten fraction. \_\_\_\_\_.
- (74) Find  $x$ ,  $0 \leq x < 4$ , if  $x + 3 \equiv 13 \pmod{4}$ . \_\_\_\_\_.
- (75) If  $f(x) = 2x + 1$ , then  $f^{-1}(x) =$  \_\_\_\_\_.
- (76)  $\lim_{x \rightarrow 2} 2x^4 - 3 =$  \_\_\_\_\_.
- (77) The horizontal asymptote for  $y = \frac{1}{x}$  is  $y =$  \_\_\_\_\_.
- (78) If  $f(x) = x^2 + x$ , then  $f'(3) =$  \_\_\_\_\_.
- (79)  $\int_1^2 x^4 dx =$  \_\_\_\_\_.
- \*(80)  $_{2} \times 10^4 \times 250^{-1} \times 90 =$  \_\_\_\_\_.