

**The University Interscholastic League**  
**Number Sense Test, Series VV-2**

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>1990 + 722 - 57 =</math> _____</p> <p>(2) <math>752 - 257 =</math> _____</p> <p>(3) <math>\frac{1}{3} + 1 + \frac{1}{7} =</math> _____ (improper fraction).</p> <p>(4) <math>7 \times 13 + 47 \times 7 =</math> _____</p> <p>(5) <math>47 \times 25 =</math> _____</p> <p>(6) <math>314 \div 9 =</math> _____ (mixed number).</p> <p>(7) <math>29 \times 50 =</math> _____</p> <p>(8) <math>3.42 \times 10^2 + 1 =</math> _____</p> <p>(9) <math>28^2 =</math> _____</p> <p>*(10) <math>399 \times 221 + 11 =</math> _____</p> <p>(11) <math>\sqrt{361} =</math> _____</p> <p>(12) <math>2^0 + 3 \times 5 + 4^{-1} =</math> _____</p> <p>(13) <math>11 \times 276 =</math> _____</p> <p>(14) <math>3\frac{3}{5}\% =</math> _____ (fraction).</p> <p>(15) <math>47 - 12 \div 5 \times 15 =</math> _____</p> <p>(16) Which is larger, <math>\frac{3}{13}</math> or <math>\frac{4}{19}</math>? _____</p> <p>(17) <math>(9 + 6)(57 + 18) =</math> _____</p> <p>(18) <math>31 \div 2\frac{1}{2} =</math> _____</p> <p>(19) How far do you travel in 3 hours 15 minutes at a constant speed of 40 miles per hour? _____ miles.</p> | <p>*(20) <math>27219 \div 129 =</math> _____</p> <p>(21) <math>(56 + 286) \div 4</math> has a remainder of _____</p> <p>(22) The LCM of 36, 18 and 27 is _____</p> <p>(23) <math>48^2 - 44^2 = 2 \times</math> _____</p> <p>(24) <math>72 \times 15 =</math> _____</p> <p>(25) 20 plus 20% of 40 is _____</p> <p>(26) <math>F(x) = x^4 - 6x^2 + 9</math>, evaluate <math>F(3)</math>. _____</p> <p>(27) <math>213_7 =</math> _____ 10</p> <p>(28) The smallest root of <math>x^2 - 5x + 6 = 0</math> is _____</p> <p>(29) How many positive integral divisors does 28 have?<br/>       _____</p> <p>*(30) <math>\sqrt{(256)(145)} =</math> _____</p> <p>(31) <math>.125125125\dots =</math> _____ (fraction).</p> <p>(32) The sum of the GCD and LCM of 17 and 20 is _____</p> <p>(33) Three times a number minus 8 equals to the number plus 5. The number is _____</p> <p>(34) The mean (average) of 14, 4 and 7 is _____</p> <p>(35) <math>4\frac{2}{5} \times 6\frac{2}{5} =</math> _____</p> <p>(36) Find k, if <math>3x^2 - kx + 2 = 0</math> and the sum of the roots is <math>\frac{7}{3}</math>. <math>k =</math> _____</p> <p>(37) How many integers between 3 and 33 are relatively prime to 33? _____</p> |
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- (38)  $43_7 + 26_7 =$  \_\_\_\_\_  $7$ .
- (39)  $\frac{1}{3}$  mile = \_\_\_\_\_ feet.
- \*(40)  $19 \times 20 \times 21 =$  \_\_\_\_\_.
- (41)  $5^2 - 1 =$  \_\_\_\_\_ (base 5).
- (42)  $111 \times 59 =$  \_\_\_\_\_.
- (43) Find  $k$ , so that  $k1k$  is the smallest 3-digit number divisible by 6. \_\_\_\_\_.
- (44)  $.1\bar{4} + .\bar{1} =$  \_\_\_\_\_ (fraction).
- (45) Find  $y$ , if  $x + y = -2$  and  $2x - y = 5$ .  $y =$  \_\_\_\_\_.
- (46)  $97 \times 96 =$  \_\_\_\_\_.
- (47) How many distinct diagonals can be drawn in a hexagon? \_\_\_\_\_.
- (48) If  $x + 3 > 7$ , then  $x - 2 >$  \_\_\_\_\_.
- (49) The next term in the sequence 4, 1, 5, 2, 6, 3, ... is \_\_\_\_\_.
- \*(50)  $142857 \times 27 =$  \_\_\_\_\_.
- (51) The tenth term in the sequence 9, 6, 3, ... is \_\_\_\_\_.
- (52) If  $4^x = 84.4$ , then  $4^{x-1} =$  \_\_\_\_\_.
- (53)  $23 \times 83 =$  \_\_\_\_\_.
- (54) A regular  $n$ -gon has an interior angle of measure 108 degrees.  $n =$  \_\_\_\_\_ sides.
- (55) If  $\sqrt{3x+1} = 8$ , then  $x =$  \_\_\_\_\_.
- (56) If 3 a's = 4 b's and 5 b's = 6 c's, then one a = \_\_\_\_\_ c's.
- (57)  $16^{3/2} =$  \_\_\_\_\_.
- (58)  $\sin 450^\circ =$  \_\_\_\_\_.
- (59) If  $\log_5 x = 3$ , then  $x =$  \_\_\_\_\_.
- \*(60) An angle of one radian = \_\_\_\_\_ degrees.
- (61) If  $\log_x 27 = -3$ , then  $x =$  \_\_\_\_\_.
- (62) A triangle is to a pentagon as a hexagon is to a polygon of \_\_\_\_\_ sides.
- (63)  $\sec(\cos^{-1} \frac{1}{3}) =$  \_\_\_\_\_.
- (64)  $\log_4 (\log_4 16) =$  \_\_\_\_\_.
- (65) The area of the ellipse  $2x^2 + 8y^2 = 16$  is  $k\pi$  and  $k =$  \_\_\_\_\_.
- (66) The expansion of  $(2x + y)^5$  has \_\_\_\_\_ terms.
- (67) If  $32_{b-1} = 20$ , then  $b =$  \_\_\_\_\_.
- (68)  $2 + \frac{1}{2} + \frac{1}{8} + \dots =$  \_\_\_\_\_.
- (69)  $\begin{bmatrix} x \\ 4 \end{bmatrix} + \begin{bmatrix} 3 \\ y \end{bmatrix} = \begin{bmatrix} 8 \\ 6 \end{bmatrix}$   $y =$  \_\_\_\_\_.
- \*(70)  $151 \times 149 + 149 \times 149 =$  \_\_\_\_\_.
- (71) The circle  $x^2 + y^2 - 4y = 12$  has a radius of \_\_\_\_\_.
- (72) Three coins are tossed, what is the probability of not getting a head? \_\_\_\_\_.
- (73) Change .14, base 5, to a base ten fraction. \_\_\_\_\_.
- (74) Find  $x$ ,  $0 \leq x < 4$ , if  $x - 4 \equiv 7 \pmod{4}$ . \_\_\_\_\_.
- (75) If  $f(x) = 3x - 1$ , then  $f^{-1}(x) =$  \_\_\_\_\_.
- (76) The horizontal asymptote for  $y = \frac{2}{x}$  is  $y =$  \_\_\_\_\_.
- (77)  $\lim_{x \rightarrow 3} (2x - 1)^3 =$  \_\_\_\_\_.
- (78) If  $f(x) = x^2 - 2x$ , then  $f'(4) =$  \_\_\_\_\_.
- (79)  $\int_0^3 x^3 dx =$  \_\_\_\_\_.
- \*(80)  $.4 \times 10^3 \times 125^{-1} \times 900 =$  \_\_\_\_\_.