

The University Interscholastic League
Number Sense Test, Series VV-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 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) $3415 + 7897 =$ _____</p> <p>(2) $\frac{1}{2} \div \frac{5}{8} =$ _____</p> <p>(3) $236 - 632 =$ _____</p> <p>(4) $50 \times 43 =$ _____</p> <p>(5) $19 \times 12 \cdot 12 \times 15 =$ _____</p> <p>(6) $16 \div 2\frac{1}{2} =$ _____</p> <p>(7) $34^2 =$ _____</p> <p>(8) $11 \times 127 =$ _____</p> <p>(9) $511 \div 9 =$ _____ (mixed number).</p> <p>* (10) $121 \times 99 - 121 =$ _____</p> <p>(11) $12 \times 31 =$ _____</p> <p>(12) $7\frac{1}{4}\% =$ _____ (fraction).</p> <p>(13) $32 + 8 \times 2 - 4 \times 8 =$ _____</p> <p>(14) $15 \times 38 =$ _____</p> <p>(15) Write 21 using Roman Numerals. _____</p> <p>(16) If 6 pencils cost 42 cents, then 9 pencils cost \$ ____.</p> <p>(17) $(21 + 4)(33 + 2) =$ _____</p> <p>(18) The LCM of 24, 8 and 16 is _____</p> <p>(19) 4% of 2 is _____ % of 32.</p> <p>* (20) $\sqrt{67500} =$ _____</p> | <p>(21) $43^2 - 39^2 = 8 \times$ _____</p> <p>(22) How many positive prime integers divide 60? _____</p> <p>(23) $2^{-2} + 2^{-3} =$ _____</p> <p>(24) $45551 \div 101 =$ _____</p> <p>(25) The product of the LCM and GCD of 22 and 28 is _____</p> <p>(26) $f(x) = x^3 - 3x^2 + 16$. Evaluate $f(3)$. _____</p> <p>(27) The area of a rhombus with diagonals 20" and 30" is _____ square inches.</p> <p>(28) $152_7 =$ _____ 10.</p> <p>(29) If $2^x + x = 20$, then $x =$ _____</p> <p>* (30) $30456 \div 141 =$ _____</p> <p>(31) $(21_4)(3_4) =$ _____ 4.</p> <p>(32) $3\frac{1}{3} \times 6\frac{1}{3} =$ _____</p> <p>(33) The sum of the positive integral divisors of 60 is _____</p> <p>(34) $\frac{1}{2} + \frac{1}{3} + \frac{1}{4} =$ _____</p> <p>(35) $.150 =$ _____ (fraction).</p> <p>(36) In a rectangle the ratio of the width to the length is 3 to 5 and the perimeter is 80. The width is _____</p> <p>(37) $32_6 + 14_6 =$ _____ 6.</p> |
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- (38) $34 \times 74 =$ _____
- (39) The next term in the sequence 4,7,9,12,14,17,... is _____
- *(40) $14 \times 16 \times 18 =$ _____
- (41) If $\frac{a}{12}$ has a remainder of 5 and $\frac{b}{12}$ has a remainder of 11, then $\frac{ab}{12}$ has a remainder of _____
- (42) $\bar{4} - \bar{15} =$ _____ (fraction).
- (43) How many distinct triangles can be drawn inside of a square? _____
- (44) Find x , if $8^x = 32$. $x =$ _____
- (45) If 1 a = 3 b's and 2 b's = 4 c's, then 1 a = _____ c's.
- (46) How many distinct diagonals does a square have? _____
- (47) $9^4 \div 5$ has a remainder of _____
- (48) If $x^2 - 1 > 4$, then $x^2 + 5 >$ _____
- (49) $93 \times 98 =$ _____
- *(50) $19 \times 109 + 109 \times 20 =$ _____
- (51) $1 + \frac{1}{3} + \frac{1}{9} + \dots =$ _____
- (52) The vertex of the parabola $y = x^2 - 6x + 1$ is (h,k).
h = _____
- (53) $\log_3 5 + \log_3 7 = \log_3$ _____
- (54) How many ways can 2 people sit in a row of 4 chairs?

- (55) If $\log 3 = .5$, then $\log 9 =$ _____
- (56) Find the modulus of $5 + 12i$. _____
- (57) Two dice are tossed. What is the probability that the sum of the faces is 7? _____
- (58) $103 \times 106 =$ _____
- (59) How many 3-digit numbers are even? _____
- *(60) $21^4 =$ _____
- (61) Find the volume of a pyramid, if the area of the base is 16 and the altitude is 9. _____
- (62) Find A, if $\cos A = \sin 130^\circ$, $0^\circ < A < 90^\circ$. $A =$ _____
- (63) The volume of a unit sphere is $k\pi$. $k =$ _____
- (64) The arc length in a circle of radius 3" and central angle of 60° is _____ in.
- (65) $\begin{bmatrix} 4 \\ 3 \end{bmatrix} + \begin{bmatrix} -1 \\ -4 \end{bmatrix} = \begin{bmatrix} x \\ y \end{bmatrix}$. $y =$ _____
- (66) $\cos(\text{Arcsin } 1) =$ _____
- (67) The tenth term in the sequence 1,2,4,8,... is _____
- (68) $(1 + i)^4 =$ _____
- (69) A can 4" high holds 12 oz. A similar can 2" high holds how many oz.? _____ oz.
- *(70) $\sqrt{150} \sqrt{1970} =$ _____
- (71) Change .22, base 4, to a base ten decimal. _____
- (72) Find x , $0 \leq x \leq 3$, such that $3x \equiv 14 \pmod{4}$. _____
- (73) The vertical asymptote for $y(x - 1) = 2$ is $x =$ _____
- (74) $\lim_{x \rightarrow 4} \frac{\sqrt{x} - 2}{x - 4} =$ _____
- (75) The maximum value of $f(x) = -3x^2 + 1$ is _____
- (76) If $f(x) = 2x + 1$, then $f^{-1}(x) =$ _____
- (77) If $f(3) = 1$, then $f^{-1}(1) =$ _____
- (78) $\int_1^4 x \, dx =$ _____
- (79) $f'(x) = ax$, $f(x) = bx^2 + c$, find b . _____
- *(80) $.2\bar{4} \times 4.5 \times 10^3 =$ _____