

The University Interscholastic League
Number Sense Test, Series VV-D

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) $215 + 41 \cdot 198 + 37 =$ _____</p> <p>(2) $5 \times 6 \div 3 + 2 =$ _____</p> <p>(3) $\frac{7}{9} \times 7 =$ _____ (mixed number).</p> <p>(4) $50 \times 14.5 =$ _____</p> <p>(5) $24 \times 26 =$ _____</p> <p>(6) $33 \times 47 + 57 \times 47 =$ _____</p> <p>(7) $6\frac{1}{4}\%$ of 1200 is _____</p> <p>(8) $11 \times 149 =$ _____</p> <p>(9) $8\frac{1}{2} \div 2\frac{1}{2} =$ _____</p> <p>*(10) $499 \times 798 =$ _____</p> <p>(11) $1 + \frac{1}{4} + \frac{1}{5} =$ _____ (improper fraction).</p> <p>(12) $12 \times 141 =$ _____</p> <p>(13) $63^2 =$ _____</p> <p>(14) $(4^2 \times 5^2 \times 6^2) \div (2 \times 5 \times 6) =$ _____ (numeral).</p> <p>(15) $\frac{3}{4}$ of 6 feet 4 inches = _____ inches.</p> <p>(16) The LCM of 16, 20 and 32 is _____</p> <p>(17) $15 \times 68 =$ _____</p> <p>(18) $\frac{1}{3} + \frac{1}{4} + \frac{1}{5} =$ _____</p> | <p>(19) $38^2 - 35^2 =$ _____</p> <p>*(20) $\sqrt{115700} =$ _____</p> <p>(21) $7\frac{1}{4} \times 7\frac{3}{4} =$ _____</p> <p>(22) Find the average of 16, 20, 18 and 24. _____</p> <p>(23) If 1 cm = .39 in., then 2 meters = _____ in.</p> <p>(24) If $x = 3$, then $x^4 - 8x^2 + 16 =$ _____</p> <p>(25) The sum of the GCD and LCM of 15 and 25 is _____</p> <p>(26) $42 \times 62 =$ _____</p> <p>(27) $241_7 =$ _____ 10</p> <p>(28) $(8^3 + 2 \times 3) \div 4$ has a remainder of _____</p> <p>(29) The number of integral divisors of 43 is _____</p> <p>*(30) $549822 \div 741 =$ _____</p> <p>(31) If $2x = 3$, then $x =$ _____</p> <p>(32) How many integers between 1 and 20 are relatively prime to 20? _____</p> <p>(33) $\frac{1}{3}$ mile = _____ feet.</p> <p>(34) $1.0\bar{1} =$ _____ (fraction).</p> <p>(35) Find x, if $2x + y = 4$ and $x + 2y = 6$. _____</p> <p>(36) $111 \times 35 =$ _____</p> |
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- (37) $35_8 = \underline{\hspace{2cm}}$ 2.
- (38) Find the area of a circle whose circumference is $6\sqrt{\pi}$ in.
 $\underline{\hspace{2cm}}$ square inches.
- (39) Find the next term of 3,6,11,18,... $\underline{\hspace{2cm}}$
- *(40) $(41)^3 = \underline{\hspace{2cm}}$
- (41) A book sells for \$12.00 plus a $7\frac{1}{4}\%$ sales tax. The total cost is \$ $\underline{\hspace{2cm}}$
- (42) In $n(A) = 4$ and $n(A \times C) = 24$, then $n(C) = \underline{\hspace{2cm}}$
- (43) The difference between the number of integral factors and prime factors of 12 is $\underline{\hspace{2cm}}$
- (44) $97 \times 104 = \underline{\hspace{2cm}}$
- (45) $5^3 - 1 = \underline{\hspace{2cm}}$ (base 5).
- (46) If $x^2 - 3 > 7$, then $2x^2 + 1 > \underline{\hspace{2cm}}$
- (47) The shortest distance between the point (4,0) and the line $y = x$ is $\underline{\hspace{2cm}}$
- (48) $(28)^{3/2} = a\sqrt{b}$ and $a = \underline{\hspace{2cm}}$
- (49) How many distinct triangles can be drawn in a pentagon? $\underline{\hspace{2cm}}$
- *(50) $68 \times 70 \times 72 - 100 = \underline{\hspace{2cm}}$
- (51) The coefficient of the x^2y^3 term in the expansion of $(2x - y)^5$ is $\underline{\hspace{2cm}}$
- (52) Using {1,9,8,9} write the smallest 3-digit number that is divisible by 3. $\underline{\hspace{2cm}}$
- (53) The circle $x^2 + 2x + y^2 + 4y = 4$ has a radius of $\underline{\hspace{2cm}}$
- (54) If $3 \log_8 x = 2$, then $x = \underline{\hspace{2cm}}$
- (55) $|3 - 4i| = \underline{\hspace{2cm}}$
- (56) $1 - 2 \sin^2 10^\circ = \cos \underline{\hspace{2cm}}$
- (57) $\log_5 32 + \log_5 2 = \underline{\hspace{2cm}}$
- (58) The lateral area of a right circular cylinder whose height is 8 and radius is 3 is $k\pi$. $k = \underline{\hspace{2cm}}$
- (59) $\sec(\cos^{-1} \frac{4}{7}) = \underline{\hspace{2cm}}$
- *(60) $309 \times 309 - 310 \times 10 = \underline{\hspace{2cm}}$
- (61) $2^{-1} - 2^{-2} + 2^{-3} - 2^{-4} + \dots = \underline{\hspace{2cm}}$
- (62) If $2x^2 - 6x + b$ is a trinomial square, then $b = \underline{\hspace{2cm}}$
- (63) Two dice are rolled. The top faces show 3 and 5. What is the sum of the two bottom faces that are not exposed? $\underline{\hspace{2cm}}$
- (64) The odds of winning are 4 to 5. What is the probability of winning? $\underline{\hspace{2cm}}$
- (65) $1 + 4 + 7 + 10 + \dots + 28 = \underline{\hspace{2cm}}$
- (66) Find x , if $\det \begin{vmatrix} 1 & 3 \\ x & 2 \end{vmatrix} = \det \begin{vmatrix} 4 & 1 \\ 5 & 1 \end{vmatrix}$ $\underline{\hspace{2cm}}$
- (67) If $f(x) = 2x - 1$ and $f(g(x)) = x$, then $g(x) = \underline{\hspace{2cm}}$
- (68) If $u = (-3,4)$ and $v = (8,5)$ are vectors, then their dot product is $\underline{\hspace{2cm}}$
- (69) How many ways can four people sit around a circular table. $\underline{\hspace{2cm}}$
- *(70) $142857 \times 31 = \underline{\hspace{2cm}}$
- (71) Find x , $0 \leq x \leq 8$, such that $4x - 1 \equiv 21 \pmod{9}$ $\underline{\hspace{2cm}}$
- (72) Change $\frac{9}{16}$ to a base 4 decimal. $\underline{\hspace{2cm}}$
- (73) The graph of $y = \frac{x-3}{x^2-1}$ has $\underline{\hspace{2cm}}$ vertical asymptotes.
- (74) $\lim_{x \rightarrow 0} \frac{1 - \sqrt{1+x}}{x} = \underline{\hspace{2cm}}$
- (75) $\lim_{x \rightarrow \infty} \frac{2x}{x+1} = \underline{\hspace{2cm}}$
- (76) $12^{10} \div 4^5$ has a remainder of $\underline{\hspace{2cm}}$
- (77) $f'(x) = 2x$, $f(0) = 1$, find $f(x)$. $\underline{\hspace{2cm}}$
- (78) $\int_{-1}^1 x \, dx = \underline{\hspace{2cm}}$
- (79) $\int \frac{1}{x} \, dx = \underline{\hspace{2cm}}$
- *(80) The perimeter of the ellipse $25x^2 + 36y^2 = 900$ is $\underline{\hspace{2cm}}$