The University Interscholastic League
Number Sense Test, Series ZZ-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!

(1) $715 \div 517 - 157 =$ _____.

(2) $50 \times 134 =$ _____.

(3) $\frac{3}{8} + \frac{5}{16} =$ _____.

(4) $123 \times 9 \div 4 =$ _____.

(5) $25^2 =$ _____.

(6) $\frac{7}{40} =$ _____ %.

(7) $13 \times 34 + 13 \times 46 =$ _____.

(8) $13 \div 2\frac{1}{2} =$ _____ (decimal).

(9) The largest prime divisor of 51 is _____.

*(10) $169 \times 271 =$ _____.

(11) $340 \div 9 =$ _____ (Mixed Number).

(12) 8 is what percent less than 25? _____ %.

(13) Subtract $62\frac{1}{2}$ % of \$14.08 from \$14.08. \$_____.

(14) $12 \times 32 =$ _____.

(15) Which is larger, $\frac{3}{7}$ or $\frac{21}{50}$? _____.

(16) If 1 gram = .04 oz., then 144 grams = _____ oz.

(17) 24 is _____ % of 320.

(18) The GCD of 30 and x is 6 and their LCM is 240. x = _____.

(19) $7\frac{1}{2} \times 48 =$ _____.

*(20) $28819 \div 179 =$ _____.

(21) $34_7 =$ _____ 10.

(22) $(48 \times 19) - (12 \times 36) =$ _____.

(23) Find the digit $B > 0$ such that $3600 = [3(14 + B)]^2$. _____.

(24) If $x = 7$ and $y = 9$ then $(x - y)^3 =$ _____.

(25) $(32 \times 4 + 6) \div 5$ has a remainder of _____.

(26) The sum of the roots of $2x^2 - 5 = 4x$ is _____.

(27) If A = 3, B = 16 and C = 2, then $AC \div B =$ _____.

(28) $F(x) = x^2 - 13x + 12$, evaluate $F(3)$. _____.

(29) .363636 . . . = _____ (fraction).

*(30) How many seconds in 9 days? _____.

(31) Find the smaller of two integers whose product is 76 and whose sum is 23. _____.

(32) $54 \times 56 =$ _____.

(33) Divide 41 into 2 parts such that the larger number exceeds the smaller number by 23. Find the larger number. _____.

(34) The LCM of 12, 18 and 20 is _____.

(35) How many positive integers between 3 and 27 are relatively prime to 27? _____.

(36) Find x if $\frac{1}{x} = \frac{1}{3} + \frac{1}{7}$. _____.

(37) $4\frac{1}{3} \times 4\frac{2}{3} =$ _____ (Mixed Number).

(38) $7^3 - 5^3 =$ _____ .

(39) What number times five and subtracted from five gives the same result? _____ .

*(40) $(250 \times 40)^2 \div (39 \times 125) =$ _____ .

(41) The product of the prime divisors of 30 is _____ .

(42) $3421 \div 9 =$ _____ (Mixed Number).

(43) $\frac{1}{4}$ mile = _____ feet.

(44) If $\sqrt{5x} = 7$ then x = _____ .

(45) $105 \times 107 =$ _____ .

(46) $(24_6)(5_6) =$ _____ $_6$.

(47) On a hot day, 36 people ordered coke, 43 ordered tea and 11 ordered both. How many people were there? _____ .

(48) $992^2 =$ _____ .

(49) $4^6 \div 6$ has a remainder of _____ .

*(50) $(.666\ldots)(126{,}789) =$ _____ .

(51) The area of 30° - 60° right triangle with hypotenuse 16 is _____ .

(52) $2\csc 30^\circ =$ _____ .

(53) Given the parabola, $y = 4x^2 + 8x - 3$, the vertex is at (h,k). k = _____ .

(54) $8^{3/2} = a\sqrt{2}$ and a = _____ .

(55) If $x^2 + y^2 = 17$, $x > y$ and they are positive integers, then y = _____ .

(56) $(3 - i)^2 =$ _____ .

(57) A cube has a surface area of 294 sq. units and its volume is _____ cubic units.

(58) $\log_2 4 + \log_2 8 =$ _____ .

(59) Using {1,9,9,3}, write the largest two digit prime number. _____ .

*(60) $49 \times 50 \times 51 =$ _____ .

(61) The seventh triangular number is _____ .

(62) $(253_7) \div (4_7) =$ _____ $_7$.

(63) $4^{-1} + 4^{-2} + 4^{-3} + \ldots =$ _____ .

(64) When two dice are tossed, what are the odds that the sum of the faces will be a 4? _____ .

(65) If $\log_x 16 = \frac{4}{3}$ then x = _____ .

(66) $\cos(\sin^{-1} \frac{1}{4}) =$ _____ .

(67) If $\det \begin{vmatrix} 1 & 4 \\ 5 & x \end{vmatrix} = 6$ then x = _____ .

(68) A box contains 17 red, 18 blue and 34 green balls. If one ball is drawn, what is the probability that the ball is blue? _____ .

(69) $15^6 \div 25 = (3^x)(5^y)$ and y = _____ .

*(70) $142857 \times 23 =$ _____ .

(71) Change $\frac{3}{25}$ to a base 5 decimal. _____ .

(72) If $16 + x \equiv 4 \pmod 5$, $0 \le x \le 4$, then x = _____ .

(73) If $f^{-1}(2) = 4$ then $f(4) =$ _____ .

(74) The vertical asymptote of $y = \log_3 x$ is x = _____ .

(75) $\lim_{x \to 3} \frac{x}{x^2 - 9} =$ _____ .

(76) $\lim_{x \to \infty} \frac{2x}{3x + 2} =$ _____ .

(77) $f(x) = \sin 4x$, $f''(x) =$ _____ .

(78) $\int_0^3 (3 - x)\, dx =$ _____ .

(79) $f''(x) = 3$, $f(2) = 5$, find $f(x)$. _____ .

*(80) $(22)^5 =$ _____ .