

**The University Interscholastic League
Number Sense Test, Series 9781**

Final _____
2nd _____
1st _____
Score _____ Initials _____

Contestant's Number _____

**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) $9781 + 1879 =$ _____
- (2) $38 \times 75 =$ _____
- (3) $121 \div 9 =$ _____ (mixed number).
- (4) $\frac{15}{17} \times 15 =$ _____ (mixed number).
- (5) $4321 - 1234 =$ _____
- (6) $21 \times 29 + 29 \times 29 =$ _____
- (7) $531 \times 9 - 2 =$ _____
- (8) $\frac{7}{10} + \frac{10}{7} =$ _____ (mixed number).
- (9) $24 \div 1\frac{1}{2} =$ _____
- *(10) $17 + 177 + 1777 + 17777 =$ _____
- (11) $42^2 =$ _____
- (12) $\frac{5}{6} - \frac{5}{12} - \frac{3}{18} =$ _____
- (13) Which is smaller, $\frac{-11}{12}$ or $\frac{-13}{14}$? _____
- (14) $.56\% =$ _____ (fraction).
- (15) $18 \times 7 \div 6 - 2 =$ _____
- (16) $\frac{7}{40} =$ _____ % (decimal).
- (17) $109 \div 7$ has a remainder of _____
- (18) $1 + 3 + 5 + \dots + 23 =$ _____
- (19) The mean of 16, 18 and 23 is _____
- *(20) $139 \times 214 =$ _____
- (21) Find the cost of driving a car 63 miles at \$.25 per mile.
\$ _____
- (22) The GCD of 24, 56 and 104 is _____
- (23) 24% of 40 is _____ % of 80.
- (24) $14^2 + 28^2 =$ _____
- (25) How many days are there from May 14, 1998 to Aug. 10, 1998? _____
- (26) Evaluate $F(3)$ if $F(x) = x^2 - 8x + 16$. _____
- (27) If 8 pens cost \$4.88 then 6 pens cost \$ _____
- (28) $\frac{5}{9} - \frac{9}{19} =$ _____
- (29) If the area of a rectangle is 5 times its width, then its length is _____ units.
- *(30) $4\frac{1}{3} \times 72840 \div 13 =$ _____
- (31) How many even integers are between 13 and 41? _____

- (32) $34 \times 46 =$ _____
- (33) The number of positive integral divisors of 33 is _____
- (34) Find the LCM of 24 and 28. _____
- (35) $5\frac{1}{3} \times 5\frac{2}{3} =$ _____ (mixed number).
- (36) $.242424\dots =$ _____ (fraction).
- (37) If $\frac{21}{x} = \frac{3x}{7}$, $x < 0$, then $x =$ _____
- (38) $257 \times 253 =$ _____
- (39) The simple interest on \$100 at 8% for $4\frac{1}{2}$ months is \$ _____
- *(40) $104643 \div 231 =$ _____
- (41) If $x + 2y = 2$ and $x - y = 11$ then $x =$ _____
- (42) $214_8 =$ _____
- (43) If $x > 0$ and $x^{4/3} = 16$ then $x =$ _____
- (44) Find k , $k > 0$, so that the roots of $x^2 + kx + 25 = 0$ are equal. $k =$ _____
- (45) $\frac{1}{11}$ of a gallon = _____ cubic inches.
- (46) The largest integer x such that $3x + 7 < 32$ is _____
- (47) If $3x - 4 = 8$ then $3x + 2 =$ _____
- (48) If $31^2 - 27^2 = 4y$ then $y =$ _____
- (49) If $9^{-1} + x^{-1} = 5^{-1}$ then $x =$ _____
- *(50) $36 \times 35 - 23 \times 34 =$ _____
- (51) $(3 + 5i)(2 - 3i) = a + bi$ and $a =$ _____
- (52) $103 \times 112 =$ _____
- (53) The next term of 16, 8, 4, 2, ... is _____
- (54) 92 is what percent more than 80? _____ %.
- (55) $\log_3 6 - \log_3 2 =$ _____
- (56) The smallest palindrome larger than 307 is _____
- (57) If $47_{b+3} = 27$ then $b =$ _____
- (58) If $x > y$ are positive integers and $x^2 + y^2 = 13$ then $x =$ _____
- (59) The simplified coefficient of the third term of $(x - y)^5$ is _____
- *(60) $\sqrt{47961} =$ _____
- (61) If a regular polygon of n sides has an exterior angle of 20° then $n =$ _____
- (62) $\cos(-120^\circ) =$ _____
- (63) $4 + 7 + 10 + 13 + \dots + 67 =$ _____
- (64) Find $F(-1)$ if $F(x) = 3 + 6^{x+1}$. _____
- (65) If $\sec A = 3$ then $\cos A =$ _____
- (66) How many positive integers less than or equal to 38 are relatively prime to 38? _____
- (67) $\tan^{-1}(1) =$ _____ degrees.
- (68) Five coins are tossed. Find the probability of getting 2 heads and 3 tails. _____
- (69) If $\log_2 x = 3$ then $\log_x 2 =$ _____
- *(70) $17 \times 18 \times 19 =$ _____
- (71) Write the first four nonzero digits of the decimal for $\frac{37}{90} \div 0$. _____
- (72) $.096096\dots =$ _____ (fraction).
- (73) $\det \begin{vmatrix} 3 & 4 \\ 7 & 3 \end{vmatrix} =$ _____
- (74) Change .13, base 4, to a base 8 decimal. _____
- (75) Let t_n denote the n th triangular number. Find the value of $t_6 - t_5$. _____
- (76) $3^{14} \div 7$ has a remainder of _____
- (77) In a 9, 40, 41 right triangle, if $\cos A = \frac{9}{41}$ then $\cos 2A =$ _____
- (78) The n th term of 5, 11, 17, 23, ... is _____
- (79) $\int_1^5 x^{-2} dx =$ _____
- *(80) $50 \log_{10} 300 =$ _____