The University Interscholastic League
Number Sense Test ● HS SAC ● 2025

Final _____ _____

Contestant's Number _____ 2nd _____ _____

1st _____ _____

Score **Initials**

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 percent 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) $913 + 927 =$ _____

(2) $1025 - 111 =$ _____

(3) $12 \times \frac{12}{13} =$ _____ **(mixed number)**

(4) $20.25 \div 5 =$ _____ **(decimal)**

(5) $2 + 3 \times (5 + 7) \div (11 - 13) =$ _____

(6) $12\frac{1}{2}\% =$ _____ **(fraction)**

(7) $25^2 =$ _____

(8) $111 \times \frac{1}{37} =$ _____

(9) The sum of the proper factors of 10 is _____

***(10)** $913 + 927 + 1025 + 1101 =$ _____

(11) $1327 \div 9$ has a remainder of _____

(12) 312×14 is _____

(13) If 3 pints of ice cream sells for $12.60, what will it cost to buy a gallon of ice cream? $ _____

(14) The LCM of 30 and 26 is _____

(15) $10^2 - 6^2 = 8 \times$ _____

(16) $22\frac{2}{9}\%$ of 927 is _____

(17) $1 + 3 + 5 + 7 + 9 + \ldots + 29 + 31 =$ _____

(18) $1198 \times 2 + 4 =$ _____

(19) 1 gram = .04 oz. and 8 oz. = _____ grams

***(20)** $197 \times 268 - 345 =$ _____

(21) $\overline{\text{VCDXXXII}} =$ _____ **(Arabic Numeral)**

(22) 9% of $133\frac{1}{3} =$ _____

(23) $53 \times 53 =$ _____

(24) How many subsets can be formed from the set {9, 2, 7}? _____

(25) $8\frac{1}{4} \times 12\frac{1}{4} =$ _____ **(mixed number)**

(26) $8^2 \div 4^2 \times 2^2 =$ _____

(27) $\frac{3}{8} =$ _____ **(decimal)**

(28) If $f(x) = x^2 - 6x + 9$, then $f(13) =$ _____

(29) $\sqrt[3]{1728} =$ _____

***(30)** $\sqrt{913927} =$ _____

(31) $9\frac{1}{3} + 9\frac{2}{7} =$ _____ **(mixed number)**

(32) $\frac{2}{7} - \frac{11}{34} =$ _____

(33) The reciprocal of 0.75 is _____

(34) The 8^{th} term of the sequence 1, 3, 9, 27, ... is 2187. The 7^{th} term is _____

(35) 0.242424... = _____ (proper fraction)

(36) 213_4 = _____ 10

(37) The sum of the roots of $6x^2 - 5x - 4 = 0$ is _____

(38) $(3^5 + 2^5 - 7) \div 5$ has a remainder of _____

(39) If $\frac{x-2}{x+3} + \frac{x+3}{x-2} = 2 + \frac{B}{x^2+x-6}$, then B = _____

*(40) 255 inches is equivalent to _____ centimeters

(41) 34×74 = _____

(42) The sum of the roots plus the product of the roots of $x^3 + 6x^2 + 12x + 8 = 0$ is _____

(43) 47×47 = _____

(44) An isoscles right triangle has side lengths of x, x, $\sqrt{8}$. Find x. _____

(45) If $3^x = 140$, then 3^{x+1} = _____

(46) $(2x + 5)^2 = ax^2 + bx + c$ and $a + b + c$ = _____

(47) How many distinct 3-letter sets can be made from the letters in the words "UIL SAC"? _____

(48) The point (2, 5) is reflected across the line y = x to the point (h, k). Find h + k. _____

(49) $1317_8 + 2501_8$ = _____ 8

*(50) 72697 ÷ 139 = _____

(51) 34 base 6 × 10 base 6 = _____ base 6

(52) Find the sum of the reciprocals of the first nine triangular numbers. _____

(53) 1.625 = _____ (improper fraction)

(54) $6^2 - 1$ = _____ 6

(55) If ${}_6C_3 + {}_6C_4 = {}_nC_4$, then n = _____

(56) A box contains 3 white and 4 blue chips. If 2 are drawn without replacement, what is the probability that both are blue? _____

(57) $235_7 \div 11_7$ has a remainder of _____

(58) The sum of the digits of a 3-digit number is 3. How many such numbers exist? _____

(59) $4 + 2 + 1 + 0.5 + ...$ = _____

*(60) $\sqrt[3]{13272501}$ = _____

(61) $9 \times 9 + 7$ = _____

(62) $7^{50} \div 15$ has a remainder of _____

(63) If xy = 2 and x + y = 4 then $x^3 + y^3$ = _____

(64) $\cos(480°)$ = _____

(65) Let f(x) = (2x + 3). Find $f(f(4) - 1)$. _____

(66) If 1 cubit = k inches, then $\lfloor k \rfloor$ = _____

(67) $98 \times 9 + 6$ = _____

(68) If $\frac{3}{11}$ base 7 = 0.ababab... base 7, then a + b = ____

(69) $\sqrt[3]{4913}$ = _____

*(70) A right cylinder is 2' high with a 9" diameter. Its lateral surface area is _____sq. in.

(71) Let $f(x) = \frac{1}{4} - \frac{2x}{3}$. If $f^{-1}(x) = ax + b$, then a = ___

(72) 102^3 = _____

(73) Change $\frac{12}{25}$ to a base 5 decimal. _____ 5

(74) $h(x) = x^3 + 6x^2 + 9x + 12$ and $h'(3)$ = _____

(75) $\sum_{k=1}^{k=5} (-1)^k(k)$ = _____

(76) $\int_0^2 (x + 2)\,dx$ = _____

(77) $\frac{3}{8}$ of 25% of 40 is _____

(78) The product of the roots of $6x^2 - 5x = 4$ is _____

(79) 7^{50} mod 15 = _____

*(80) $\sqrt[4]{91392710251101}$ = _____

University Interscholastic League - Number Sense Answer Key HS ● SAC ● Fall 2025

***number) x — y means an integer between x and y inclusive**

NOTE: If an answer is of the type like $\frac{2}{3}$ it cannot be written as a repeating decimal

(1) 1,840

(2) 914

(3) $11\frac{1}{13}$

(4) 4.05

(5) — 16

(6) $\frac{1}{8}$

(7) 625

(8) 3

(9) 8

***(10) 3,768 — 4,164**

(11) 4

(12) 4,368

(13) 33.60

(14) 390

(15) 8

(16) 206

(17) 256

(18) 2,400

(19) 200

***(20) 49,829 — 55,073**

(21) 5,432

(22) 12

(23) 2,809

(24) 8

(25) $101\frac{1}{16}$

(26) 16

(27) .375

(28) 100

(29) 12

***(30) 909 — 1,003**

(31) $18\frac{13}{21}$

(32) — $\frac{9}{238}$

(33) $\frac{4}{3}, 1\frac{1}{3}$

(34) 729

(35) $\frac{8}{33}$

(36) 39

(37) $\frac{5}{6}$

(38) 3

(39) 25

***(40) 616 — 680**

(41) 2,516

(42) — 14

(43) 2,209

(44) 2

(45) 420

(46) 49

(47) 20

(48) 7

(49) 4020

***(50) 497 — 549**

(51) 340

(52) 1.8, $\frac{9}{5}, 1\frac{4}{5}$

(53) $\frac{13}{8}$

(54) 55

(55) 7

(56) $\frac{2}{7}$

(57) 4

(58) 6

(59) 8

***(60) 225 — 248**

(61) 88

(62) 4

(63) 40

(64) — .5, — $\frac{1}{2}$

(65) 23

(66) 17

(67) 888

(68) 6

(69) 17

***(70) 645 — 712**

(71) — 1.5, — $\frac{3}{2}$, — $1\frac{1}{2}$

(72) 1,061,208

(73) .22

(74) 72

(75) — 3

(76) 6

(77) 3.75, $\frac{15}{4}, 3\frac{3}{4}$

(78) — $\frac{2}{3}$

(79) 4

***(80) 2,938 — 3,246**