The University Interscholastic League
Number Sense Test • HS Regional • 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) $2526 =$ _____ $+ 2025$

(2) $26.25 \div 4 =$ _____ **(decimal)**

(3) $\frac{4}{5} \times \frac{2}{3} \times \frac{5}{6} =$ _____

(4) $22\frac{2}{9}\%$ **of 5.4 =** _____ **(improper fraction)**

(5) $\frac{3}{16} =$ _____**%** **(decimal)**

(6) $4252 \div 6 =$ _____

(7) The reciprocal of — 2.5 is _____

(8) $(4 \div 2 + 5 \times 2 - 6) \times 25 =$ _____

(9) $26^2 =$ _____

***(10)** $425 + 2025 + 5202 + 624 =$ _____

(11) $4\frac{2}{5} - 2\frac{5}{6} =$ _____ **(mixed number)**

(12) The LCM of 34 and 51 is _____

(13) The arithmetic mean of 24, 25, 26, and 20 is _____

(14) 426 feet = _____ **fathoms**

(15) The number of positive integral divisors of $2 \times 5 \times 6$ **is** _____

(16) The sum of the GCD and LCM of 40 and 56 is ____

(17) If 4 lbs of nuts cost $2.50, then 6 lbs cost $ _____

(18) $1294 \times 6 + 36 =$ _____

(19) $97 \times 106 =$ _____

***(20)** $\sqrt{425} \times \sqrt{624} =$ _____

(21) The additive inverse of $5^{(-2)}$ **is** _____

(22) $0.444... + 0.222... + 0.666... =$ _____

(23) $[26 + 25 \times 25 - 20] \div 4$ **has a remainder of** _____

(24) $(5^5 + 6^5 - 4) \div 11$ **has a remainder of** _____

(25) 4 is to 25 as k is to 5. Find k. _____

(26) The product of the roots minus the sum of the roots of $4x^3 + 2x^2 - 5x - 6 = 0$ **is** _____

(27) $252_6 =$ _____ $_{10}$

(28) $26^2 \div 13^2 \times 6.5^2 =$ _____

(29) The 11^{th} **term of 2, 3, 5, 7, ..., 79, 83, ... is** _____

***(30)** $625204 \div 5220 =$ _____

(31) 37.5% of $24.80 is $ _____

(32) 42.5% of $24.80 is $ _____

(33) 32.5% of $24.80 is $ _____

(34) If $4x + 25 = 26$, **then** $4x - 20 =$ _____

(35) The third hexagonal number is _____

(36) Write four and a fourth million twenty-six thousand twenty-five in digits. _____

(37) If $f(x) = x^3 + 3x^2 + 3x + 1$, then f(8) is _____

(38) $\sqrt[3]{29791}$ = _____

(39) If $(2x - 5)(2x + 6) = ax^2 + bx + c$, then $a + b + c$ = _____

*(40) $26^2 + 4(25)(25) + 20^2$= _____

(41) $22_5 \times 4_5 - 202_5$ = _____ 5

(42) 14×1357 = _____

(43) 11 is what percent less than 25? _____ %

(44) $47^2 + 67^2$ = _____

(45) The point (— 2, — 6) is reflected across the line $y = x + 4$ to the point (h, k). Find h — k. _____

(46) $2 + 6 + 8 + 14 + 22 + 36 + p + q + r + 246$ = _____

(47) 553×557 = _____

(48) $42^2 + 16^2$ = _____

(49) ${}_6P_2 \div {}_5C_2$ = _____

*(50) $\sqrt[3]{62524} + 5202$ = _____

(51) $25_7 + 26_7 + 2025_7$ = _____ 7

(52) $(25_7 + 26_7 + 2025_7) \times 4$ = _____ 7

(53) $(25_7 + 26_7 + 2025_7) \div 4$ = _____ 7

(54) How many integers between 4 and 26 are relatively prime to 26? _____

(55) $35^{10} \div 19$ has a remainder of _____

(56) The first 4 digits of the decimal of $\frac{37}{60}$ is 0._____

(57) A single card is drawn from a standard deck of cards. If the card's number of pips is a prime number, find the probability it is a 7. _____%

(58) The sum of the digits of a 3-digit number is 20. How many such numbers exist? _____

(59) $42526_8 \div 7_8$ has a remainder of _____

*(60) If 10 dollars is exchanged for 207.98 pesos, then 208 dollars is exchanged for _____ pesos

(61) $\frac{4!\,5!}{6!}$ = _____

(62) Change $0.2666..._9$ to a base 9 fraction. _____9

(63) If $\frac{4}{2x-5} - \frac{2x+6}{2x+5} = \frac{ax^2+bx+c}{dx^2+ex+f}$, then $(a + b + c) - (d + e + f)$ = _____

(64) $f(x) = 5x - 2$, $g(x) = 2x + 6$, and $f(g(4))$ = _____

(65) If $x = -5$ and $y = -6$, then $(x - y)(x^2 + xy + y^2)$ = _____

(66) $(2^7 - 1)(2^6)$ = _____

(67) $26 + 13 + 6.5 + 3.25 + ... + 0.40625$ = _____

(68) If $A = \begin{bmatrix} 1 & 3 & 6 \\ 1 & 4 & 9 \\ 1 & 5 & 12 \end{bmatrix}$, then $|A|$ = _____

(69) The Greatest Integer Function is written as $f(x) = [x]$. Find $\left[\sqrt{6} + \sqrt{5} - \sqrt{2}\right]$. _____

*(70) 25 leagues of land in Texas minus 26 labors of land in Texas is _____ acres

(71) $(x^3 - 12x^2 - 42) \div (x - 3)$ has remainder _____

(72) $\lim_{x \to 5} \frac{x^2 - x - 20}{x - 5}$ = _____

(73) If $f(x) = \frac{4x+5}{2}$ and $f^{-1}(x) = ax + b$, then $f^{-1}(6)$ = _____

(74) Let $f(x) = (4x^2 + 2x + 6)^2$. Find $f'(-1)$. _____

(75) $\int_0^1 \int_0^4 (5x - 2)\, dxdy$ = _____

(76) $2^3 - 1^3 + 3^3 - 4^3 + 7^3$ = _____

(77) Using the number 8128, write the largest 3-digit even number using each digit only once. _____

(78) Let $42B - 2B6 = 13^2$. Find digit B. _____

(79) Given: {1, 1, 3, 5, 9, a, b, 41, 67, ...}. Find $a + b + 1$. _____

*(80) $33550336 \div 8128 - (496 + 28 + 6)$ = _____

DO NOT DISTRIBUTE TO STUDENTS BEFORE OR DURING THE CONTEST

University Interscholastic League - Number Sense Answer Key HS ● Regional ● 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) 501

(2) 6.5625

(3) $\frac{4}{9}$

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

(5) 18.75

(6) $\frac{2126}{3}$, $708\frac{2}{3}$

(7) — .4, — $\frac{2}{5}$

(8) 150

(9) 676

***(10) 7,863 — 8,689**

(11) $1\frac{17}{30}$

(12) 102

(13) 23.75, $\frac{95}{4}$, $23\frac{3}{4}$

(14) 71

(15) 12

(16) 288

(17) $3.75

(18) 7,800

(19) 10,282

***(20) 490 — 540**

(21) — .04, — $\frac{1}{25}$

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

(23) 3

(24) 7

(25) .8, $\frac{4}{5}$

(26) 2

(27) 104

(28) 169

(29) 31

***(30) 114 — 125**

(31) 9.30

(32) 10.54

(33) 8.06

(34) — 19

(35) 15

(36) 4,276,025

(37) 729

(38) 31

(39) — 24

***(40) 3,398 — 3,754**

(41) — 4

(42) 18,998

(43) 56

(44) 6,698

(45) — 12

(46) 638

(47) 308,021

(48) 2,020

(49) 3

***(50) 4,980 — 5,503**

(51) 2112

(52) 11451

(53) 354

(54) 10

(55) 16

(56) 6166

(57) 25

(58) 36

(59) 5

***(60) 4,110 — 4,542**

(61) 4

(62) $\frac{12}{40}$

(63) 73

(64) 68

(65) 91

(66) 8,128

(67) 51.59375, $\frac{1651}{32}$, $51\frac{19}{32}$

(68) 0

(69) 3

***(70) 100,800 — 111,409**

(71) — 123

(72) 9

(73) 1.75, $\frac{7}{4}$, $1\frac{3}{4}$

(74) — 96

(75) 32

(76) 313

(77) 882

(78) 5

(79) 41

***(80) 3,418 — 3,777**