# The University Interscholastic League
# Number Sense Test • HS District 2 • 2003

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 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) $523 - 235 + 352 =$ _____

(2) $25 \times 307 =$ _____

(3) $4\frac{7}{20} =$ _____ (percent)

(4) $1 - 6 \div 3 \times 5 + 8 =$ _____

(5) $\frac{25}{8} =$ _____ (decimal)

(6) $23 \times 23 =$ _____

(7) $.504 \div .08 =$ _____

(8) $1\frac{5}{9} - 3\frac{5}{6} =$ _____ (mixed number)

(9) CDXLIV = _____ (Arabic Numeral)

*(10) $2 - 25 + 252 - 2525 + 25252 =$ _____

(11) $\frac{2}{3} + \frac{4}{5} + \frac{1}{6} =$ _____ (mixed number)

(12) Which is larger, $\frac{6}{11}$ or .56 = _____

(13) $18 \times 112 =$ _____

(14) $13 + 21 + 35 + 49 + 57 =$ _____

(15) 3 cubic yards = _____ cubic feet

(16) The range of 23, 35, 57, 37 is = _____

(17) $37 \times 21 =$ _____

(18) 42 is _____ % of 28.

(19) The LCM of 14, 28, and 21 is _____

*(20) $\sqrt{245} \times 245 =$ _____

(21) .2313131... = _____ (fraction)

(22) The sum of the proper positive integral divisors of 30 is _____

(23) 16 pounds = _____ ounces

(24) $5.2 \times 10.2 =$ _____

(25) $72 \times 73 =$ _____

(26) If 6 widgets cost $22.05 then 2 widgets cost $_____

(27) $(33 + 23 \times 13) \div 3$ has a remainder of _____

(28) 32 is $2\frac{1}{2}\%$ of _____

(29) $36 \times 26 =$ _____

*(30) $43 \times 47 \times 51 =$ _____

(31) $420 \div 875 =$ _____

(32) $4.5^2 - 1.5^2 =$ _____

(33) $2\frac{3}{4} - 4\frac{3}{5} =$ _____(mixed number)

(34) $16^3 =$ _____

(35) If $x^2 + 2xy + y^2 = 16$ and $x = 6$ then the largest value of y is _____

(36) $29 \times 37 =$ _____

(37) The sum of the roots of $(x - 4)(x - 5)$ is ___

(38) $96 \times 89 =$ _____

(39) The product of the even composite numbers less than or equal to 11 is _____

*(40) $38 \times 382 \div \sqrt{3820} =$ _____

(41) $64 \times 61 =$ _____

(42) An acute triangle has integer side lengths of 4, 7, and x. The largest value of x is _____

(43) $1009 \times 1004 =$ _____

(44) If $7^x = 14$ then $7^{x-2} =$ _____

(45) $98 \times 715 =$ _____

(46) $\sqrt{75} \times \sqrt{48} =$ _____

(47) $55^2 + 56^2 =$ _____

(48) $321 \times 302 =$ _____

(49) The next term of 1, 4, 11, 26, 57,... is ____

*(50) $(48597 \div 138)^2 =$ _____

(51) A line with a slope of $\frac{2}{3}$ passes through ( 0 , 4 ) and ( x , 0 ). The value of x is ____

(52) ${}_8P_5 \div {}_8C_5 =$ _____

(53) $\text{Log}_2 64 \div \log_2 4 =$ _____

(54) $\text{Cos}\frac{5\pi}{4} \times \sin\frac{3\pi}{4} =$ _____

(55) The sum of the coefficients in the binomial expansion of $(5x + 7y)^3$ is _____

(56) $\frac{10!+8!}{9!} =$ _____

(57) If $(8 + 3i)(3 - 8i) = (a + bi)$, then a = _____

(58) 25% of 1 mile = _____ yards

(59) $704 \times 704 =$ _____

*(60) $56 \times 45 + 54 \times 65 =$ _____

(61) $104_8 - 47_8 =$ _____$_8$

(62) If three dice are tossed once, what is the probability of getting three fives? _____

(63) $\frac{11}{12} + \frac{1}{11} =$ _____(mixed number)

(64) $34 \times 56 + 55 \times 34 =$ _____

(65) If $x + y = -3$ and $y - x = \frac{1}{3}$, then x = _____

(66) $45^2 - (40^2 - 5^2) =$ _____

(67) $\text{Log}_4 32 + \text{Log}_4 2 - \text{Log}_4 16 =$ _____

(68) $\sin 15°\cos 45° - \sin 45°\cos 15° =$ _____

(69) The angles in a regular octagon total _____ °

*(70) $(e \times \pi)^4 =$ _____

(71) $12 \times 12 \div 13 - 12$ _____

(72) $2^6 \times 3^4 \div 5$ has a remainder of _____

(73) If $f(x) = 3 - 2x$, and $g(x) = 2x + 3$ then $g[f(-4)] =$ _____

(74) If $f(x) = 3x^3 + 3x - 3$, then $f'(-3) =$ _____

(75) Change .34 base 5 to a base 10 fraction. ____

(76) $-40$ ° Fahrenheit = _____ Celsius °

(77) $4^5 \times 5^5 =$ _____

(78) $\int_{-2}^{4} x - 1 \, dx =$ _____

(79) $1(1!) + 2(2!) + 3(3!) + 4(4!) + 5(5!) =$ _____

*(80) $16667 \times 49 =$ _____

**University Interscholastic League - Number Sense Answer Key HS • District 2 • 2003**

*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) 640

(2) 7675

(3) 435

(4) — 1

(5) 3.125

(6) 529

(7) 6.3

(8) $-2\frac{5}{18}$

(9) 444

*(10) 21809 — 24103

(11) $1\frac{19}{30}$

(12) .56

(13) 2016

(14) 175

(15) 81

(16) ~~38~~ 34

(17) 777

(18) 150

(19) 84

*(20) 3644 — 4026

(21) $\frac{229}{990}$

(22) 42

(23) 256

(24) 53.04 or $53\frac{1}{25}$

(25) 5256

(26) 7.35

(27) 2

(28) 1280

(29) 936

*(30) 97918 — 108224

(31) .48

(32) 18

(33) $-1\frac{17}{20}$

(34) 4096

(35) — 2

(36) 1073

(37) 9

(38) 8544

(39) 1920

*(40) 224 — 246

(41) 3904

(42) 8

(43) 1013036

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

(45) 70070

(46) 60

(47) 6161

(48) 96942

(49) 120

*(50) 117811 – 130211

(51) — 6

(52) 120

(53) 3

(54) $-\frac{1}{2}$ or — .5

(55) 1728

(56) $10\frac{1}{9}$ or $\frac{91}{9}$

(57) 48

(58) 440

(59) 495616

*(60) 5729 — 6331

(61) 35

(62) $\frac{1}{216}$

(63) $1\frac{1}{132}$

(64) 3774

(65) $-\frac{5}{3}$ or $-1\frac{2}{3}$

(66) 450

(67) 1

(68) $-\frac{1}{2}$ or — .5

(69) 1080

*(70) 5053 — 5584

(71) $-\frac{12}{13}$

(72) 4

(73) 25

(74) 84

(75) $\frac{19}{25}$

(76) — 40

(77) 3200000

(78) 0

(79) 719

*(80) 775849 – 857517