The University Interscholastic League
Number Sense Test • HS Invitational B • 2003

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) $4321 + 1234 =$ _____

(2) $11 - 22 + 33 - 44 =$ _____

(3) $16 \times 16 =$ _____

(4) $\frac{7}{15} + \frac{5}{11} =$ _____

(5) $197 \div 6 =$ _____(mixed number)

(6) MMIII = _____(Arabic Numeral)

(7) $48 \times 75 =$ _____

(8) $1\frac{7}{8}\% =$ _____(decimal)

(9) $2003 \times 111 =$ _____

*(10) $83 + 145 + 607 - 92 =$ _____

(11) $\frac{5}{6} - \frac{5}{12} - \frac{5}{24} =$ _____

(12) Which is smaller, $\frac{7}{17}$ or $\frac{9}{19}$ = _____

(13) $3.5 \div 0.07 =$ _____

(14) $12 \div (5 - 1) + 3 \times 4 =$ _____

(15) 1 cubic foot = _____cubic inches

(16) The mode of 2, 3, 5, 7, 3, 5, 3, 7 is = _____

(17) $14 \times 203 =$ _____

(18) What is $2\frac{1}{4}\%$ of 28? _____

(19) The sum of the prime factors of 42 is _____

*(20) $85858 \div 585 =$ _____

(21) What number divided by 5 and subtracted from 60, gives the same results? _____

(22) $61 \times 64 =$ _____

(23) $11 \times \frac{11}{14} =$ _____(mixed number)

(24) $45^2 + 46^2 =$ _____

(25) $\frac{2}{3}$ of a gallon = _____cubic inches

(26) 108 = _____ 4

(27) The slope of the line $6x + y = 2$ is _____

(28) 64 is what % percent more than 48? _____

(29) $63 \times 429 =$ _____

*(30) $146 \times 5 \times 154 =$ _____

(31) 48 inches per second is _____ feet per minute

(32) If 6 pears cost $1.32 then 9 pears cost $____

(33) $14^2 - 28^2 =$ _____

(34) $625 \times 320 =$ _____

(35) If x and y are positive integers and $x^2 - y^2 = 53$ then y is _____

(36) $1073 \div 37 =$ _____

(37) If $x = 7$ then $(x + 3)(x^2 - 3x + 9) =$ _____

(38) $91 \times 98 =$ _____

(39) $33.75 = 1.5 \times$ _____

*(40) $24 \times 34 \times 44 =$ _____

(41) $35 \times 65 =$ _____

(42) $\sqrt{9} \times \sqrt{20} \times \sqrt{5} =$ _____

(43) If the sides of an equilateral triangle are $2\sqrt{3}$ cm, then its height is _____ cm.

(44) If $9^x = 27^{x+2}$ then x = _____

(45) Find the units digit of 17^6. _____

(46) $2.3 + 0.23 + 0.023 + 0.0023 =$ _____

(47) If $|2x - 1| = 5$ and $x < 0$, then x = _____

(48) The next term of 48, 32, 24, 20, 18, ... is _____

(49) $26 \times 36 =$ _____

*(50) $\sqrt{6543210} =$ _____

(51) $6! \div 4! =$ _____

(52) The total surface area of a cube with an edge of 4 inches is _____ sq. inches.

(53) The modulus of $(5 + 12i)^2$ is _____

(54) If 300 degrees $= k\pi$ radians, then k = _____

(55) $2553 \div 111 =$ _____

(56) The vertex of the parabola $y = 2x^2 + 8x - 1$ is (h,k) and k = _____

(57) $\text{Tan}^2 60° =$ _____

(58) If $\log_x 343 = 3$, the x = _____

(59) The third term of the expansion of $(x - y)^5$ is $kx^a y^b$ and b = _____

*(60) $34 \times 45 + 54 \times 43 =$ _____

(61) If $3x - 1 = 8$, then $1 - 3x =$ _____

(62) An interior angle of a regular pentagon has measure of _____ degrees

(63) $(11 + 10)^2 - (11^2 - 10^2) =$ _____

(64) The odds of losing are 4 to 9. The probability of winning is = _____

(65) $2 \sin 15° \cos 15° =$ _____

(66) $72^2 + 13^2 =$ _____

(67) If $\log_3 x = -3$ then $x^{-1} =$ _____

(68) $1111 \times 123 =$ _____

(69) $37_8 + 56_8 =$ _____ 8

*(70) $\pi^5 =$ _____

(71) The vertical asymptote for $f(x) = \frac{7-8x}{8+7x}$ is ___

(72) If $g(x) = 2x^2 - 3x + 1$, then $g'(2) =$ _____

(73) 6253718 ÷ 9 has a remainder of _____

(74) If $x + 6 \equiv 9 \pmod 7$, $0 \leq x \leq 6$, then x = ___

(75) The minimum value of $\sin 2x - 3$ is _____

(76) The next term of 1, 8, 21, 40, ... is _____

(77) 25 ° Celsius = _____ ° Fahrenheit

(78) $\int_0^4 \frac{x}{2}\, dx =$ _____

(79) An icosahedron has _____ congruent faces

*(80) $428571 \times 22 =$ _____

University Interscholastic League - Number Sense Answer Key HS • Invitation B • 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) 5555

(2) – 22

(3) 256

(4) $\frac{152}{165}$

(5) $32\frac{5}{6}$

(6) 2003

(7) 3600

(8) .01875

(9) 222333

*(10) 706 – 780

(11) $\frac{5}{24}$

(12) $\frac{7}{17}$

(13) 50

(14) 15

(15) 1728

(16) 3

(17) 2842

(18) .63 or $\frac{63}{100}$

(19) 12

*(20) 140 – 154

(21) 50

(22) 3904

(23) $8\frac{9}{14}$

(24) 4141

(25) 154

(26) 1230

(27) – 6

(28) $33\frac{1}{3}$

(29) 27027

*(30) 106799 – 118041

(31) 240

(32) 1.98

(33) – 588

(34) 200,000

(35) 26

(36) 29

(37) 370

(38) 8918

(39) 22.5

*(40) 34109 – 37699

(41) 2275

(42) 30

(43) 3

(44) – 6

(45) 9

(46) 2.5553

(47) – 2

(48) 17

(49) 936

*(50) 2431 – 2685

(51) 30

(52) 96

(53) 169

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

(55) 23

(56) – 9

(57) 3

(58) 7

(59) 2

*(60) 3660 – 4044

(61) – 8

(62) 108

(63) 420

(64) $\frac{9}{13}$

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

(66) 5353

(67) 27

(68) 136653

(69) 115

*(70) 291 – 321

(71) $-\frac{8}{7}$ or $-1\frac{1}{7}$

(72) 5

(73) 5

(74) 3

(75) – 4

(76) 65

(77) 77

(78) 4

(79) 20

*(80) 8957134 – 9899990