The University Interscholastic League
Number Sense Test • HS Regional • 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!

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(1) $864 + 579 =$ _____

(2) $16\frac{2}{3}\% \times 482 =$_____ (mixed number)

(3) $19^2 =$ _____

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

(5) $102\frac{2}{5}\% =$ _____ (decimal)

(6) $1\frac{3}{7} - 3 =$ _____

(7) $1.1 \times .25 =$ _____

(8) CCLXXVII =_____ (Arabic Numeral)

(9) $48 \div 75 =$_____(decimal)

*(10) $314 + 272 - 31 - 27 =$ _____

(11) $\frac{1}{2} - \frac{3}{4} + \frac{5}{8} =$ _____ (fraction)

(12) The GCF of 28, 42, and 56 is _____

(13) The median of 2, 3, 5, 7, 5, 3, 2, 5 is = _____

(14) $14 \times 235 =$ _____

(15) 72 is 48% of _____

(16) $43 - 12 + 80 - 68 + 37 =$ _____

(17) $27 \times 37 =$ _____

(18) $31 \times 44 + 44 \times 44 =$ _____

(19) 432 square inches = _____ square feet

*(20) $\sqrt{1030} \times 2^5 =$ _____

(21) $84 \times 81 =$ _____

(22) $8^4 =$ _____

(23) If 3 dozen eggs cost $3.24 then a half dozen eggs cost $_____

(24) .303303303... = _____(fraction)

(25) The number of positive integral divisors of 64 is _____

(26) $6\frac{2}{3} \times 9\frac{2}{3} =$ _____(mixed number)

(27) $(23 + 33 \times 43) \div 4$ has a remainder of _____

(28) 81 is what % less than 108? _____

(29) $\frac{1}{3}$ of a mile = _____ feet

*(30) $89 \times 90 \times 91 =$ _____

(31) The product of the roots of $5x^3 + 4x - 3$ is _____

(32) If $x = 3$ and $y = 5$ then $(x - y)(x^2 + xy + y^2) =$_____

(33) $3 \times 5 \times 7 \times 11 \times 13 =$ _____

(34) $8^2 + 24^2 =$ _____

(35) $49 \times 375 =$ _____

(36) $3\frac{3}{5} \div 4\frac{1}{2} =$ _____

(37) If $6 + 5x = 3x - 4$ then $2x + 1 =$ _____

(38) $97 \times 107 =$ _____

(39) What number times 11 and subtracted from 132 gives the same results ? _____

*(40) $\sqrt{627} \times \sqrt{623} \times 24 =$ _____

(41) $112 \times 88 =$ _____

(42) The sides of a right triangle are x, 7, and 11. If $x < 7$ and $x = a\sqrt{b}$ then b = _____

(43) The next term of 0, 1, 5, 14, 30, 55,... is ____

(44) $715 \times 77 =$ _____

(45) $141 \times 141 =$ _____

(46) $123_4 =$ _____ $_2$

(47) The slope of the line containing the points $(3, -1)$ and $(-3, 1)$ is _____

(48) The units digit of 8^8 is _____

(49) If $8^x = 17$ then $8^{2x} =$ _____

*(50) $6311 \times 1241 =$ _____

(51) ${}_6P_3 \div {}_6C_3 =$ _____

(52) $803 \times 803 =$ _____

(53) $\frac{7! - 5!}{6!} =$ _____

(54) The coefficient of the 4th term of the expansion of $(2x + y)^4$ is _____

(55) $\cos^2 30° - \sin^2 30° =$ _____

(56) If $(2 + 3i) \div (3 - 2i) = a + bi$, then b =____

(57) $\log_5 625 \times \log_5 25 \div \log_5 125 =$ _____

(58) $\frac{3}{4}$ of 3 yards = _____ inches

(59) If the total surface area of a cube is 384 cm^2 then the volume of the cube is _____ cm^3

*(60) $78 \times 89 + 98 \times 87 =$ _____

(61) $\frac{14}{15} + \frac{1}{14} =$ _____(mixed number)

(62) $31^2 - (29^2 - 2^2) =$ _____

(63) $143_5 \div 4_5 =$ _____ $_5$

(64) The measure of an interior angle in a regular nonagon is _____ degrees

(65) If $\sin 30° + \cos 60° = \tan x$ and $0° \leq x \leq 90°$, then x = _____ degrees

(66) If all of the letters of the words " NUMBER SENSE " are put in a bag, what are the odds of drawing out an " E " ? _____

(67) $\log_4 8 \times \log_8 4 =$ _____

(68) If 280 degrees = $k\pi$ radians, then k = ____

(69) If $x - 2y = 3$ and $2x + y = -3$, then y = ____

*(70) $\pi^5 + e^4 =$ _____

(71) Change $\frac{30}{49}$ to a base 7 decimal. _____

(72) The remainder when 123456 in base 7 is divided by 6 is _____

(73) $(\frac{5}{7} + \frac{7}{5}) \div 2 =$ _____(mixed number)

(74) If $f(x) = 4x^3 + 2x^2$, then $f''(-.5) =$ _____

(75) $14 \times \frac{14}{17} - 3 =$ _____

(76) 98.6 ° Fahrenheit = _____ ° Celsius

(77) $8^3 \times 5^3 =$ _____

(78) $\int_0^{\pi} \sin x \, dx =$ _____

(79) $1(1!) + 2(2!) + 3(3!) + ... + 6(6!) =$ _____

*(80) $8333 \times 23 =$ _____

University Interscholastic League - Number Sense Answer Key HS • Regional • 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) 1443

(2) $80\frac{1}{3}$

(3) 361

(4) $7\frac{1}{2}$ or $\frac{15}{2}$ or 7.5

(5) 1.024

(6) $-1\frac{4}{7}$

(7) .275 or $\frac{11}{40}$

(8) 277

(9) .64

*(10) 502 – 554

(11) $\frac{3}{8}$

(12) 14

(13) 4

(14) 3290

(15) 150

(16) 80

(17) 999

(18) 3300

(19) 3

*(20) 976 – 1078

(21) 6804

(22) 4096

(23) .54

(24) $\frac{101}{333}$

(25) 7

(26) $64\frac{4}{9}$

(27) 2

(28) 25

(29) 1760

*(30) 692465 – 765355

(31) $\frac{3}{5}$ or .6

(32) – 98

(33) 15015

(34) 640

(35) 18375

(36) $\frac{4}{5}$ or .8

(37) – 9

(38) 10379

(39) 11

*(40) 14250 – 15749

(41) 9856

(42) 2

(43) 91

(44) 55055

(45) 19881

(46) 11011

(47) $-\frac{1}{3}$

(48) 6

(49) 289

*(50) 7440354 – 8223548

(51) 6

(52) 644809

(53) $6\frac{5}{6}$ or $\frac{41}{6}$

(54) 8

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

(56) 1

(57) $2\frac{2}{3}$ or $\frac{8}{3}$

(58) 81

(59) 512

*(60) 14695 – 16241

(61) $1\frac{1}{210}$

(62) 124

(63) 22

(64) 140

(65) 45

(66) $\frac{3}{8}$ or .375

(67) 1

(68) $\frac{14}{9}$ or $1\frac{5}{9}$

(69) $-\frac{9}{5}$ or $-1\frac{4}{5}$ or – 1.8

*(70) 343 – 378

(71) .42

(72) 3

(73) $1\frac{2}{35}$

(74) – 8

(75) $8\frac{9}{17}$ or $\frac{145}{17}$

(76) 37

(77) 64000

(78) 2

(79) 5039

*(80) 182077 – 201241