The University Interscholastic League
Number Sense Test • HS Regional • 2005

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) $975 + 318 - 642 =$ _____

(2) $66 \times 11 =$ _____

(3) $7 - 7 \times 7 + 7 \div 7 =$ _____

(4) $418 \times 25 =$ _____

(5) 38% = _____ **(proper fraction)**

(6) $33^2 =$ _____

(7) $\frac{4}{5} \div \frac{15}{16} =$ _____

(8) $1234 \div 9 =$ _____ **(mixed number)**

(9) $2.005 - 20.05 =$ _____ **(decimal)**

***(10)** $753 + 2468 - 901 + 2005 =$ _____

(11) $345 \times 12 =$ _____

(12) $13 + 26 + 39 + 52 + 65 + 78 =$ _____

(13) 1728 cubic inches = _____ cubic feet

(14) The negative reciprocal of $3\frac{1}{5}$ is _____

(15) 90% of 90 minus 90 is _____

(16) MMV — DCXLI = _____(Arabic Numeral)

(17) $\frac{1}{5} - \frac{1}{25} + \frac{1}{125} =$ _____

(18) $72 \div 7\frac{1}{5} =$ _____

(19) The LCM of 8, 18, and 32 is _____

***(20)** $397 \times 498 \div 599 =$ _____

(21) $62 \times 58 =$ _____

(22) The number of positive integral divisors of 96 is _____

(23) 13579248 ÷ 6 has a remainder of _____

(24) $8 + 10 + 12 + \ldots + 20 =$ _____

(25) $\frac{3}{8}$ is what % less than $\frac{1}{2}$? _____%

(26) $\sqrt{72 \times 18} =$ _____

(27) $55^2 - 50^2 =$ _____

(28) 234 base 10 equals _____ base 5

(29) $121 \times 124 =$ _____

***(30)** $95634 \div 278 =$ _____

(31) The product of k and 7 has the same value as the sum of 14 and k. Find k. _____

(32) If $f(x) = x^2 - 6x + 9$ then $f(4.7) =$ _____

(33) 3 quarts and 2 pints equals _____ ounces

(34) $\frac{17}{14}$ = _____% (mixed number)

(35) .2313131... = _____ (fraction)

(36) $1728 + 288 + 36 + 4$ = _____ base 12

(37) $22\frac{1}{11} \times 11\frac{1}{11}$ = _____ (mixed number)

(38) $8^3 - 9^3$ = _____

(39) The smaller root of $x^2 + 2x - 15 = 0$ is____

*(40) $53 \times 107 + 47 \times 93$ = _____

(41) (909)(909) = _____

~~(42) If $4^{3x} = 36$ then $4^{2x} =$ _____~~

(43) The slope of the line parallel to the line containing points (2, — 3) and (3,2) is _____

(44) Find x, if $8^x = 256$. _____

(45) The next term in the sequence of 1, 5, 6, 11, 17, 28, ... is _____

(46) 16% of $233\frac{1}{3}$ is _____

(47) $73 \times 77 + 4$ = _____

(48) $\frac{1}{4} + \frac{3}{4} + 1\frac{1}{4} + 1\frac{3}{4} ... + 3\frac{3}{4}$ = _____

(49) 87×111 = _____

*(50) $33^2 \times 31^2$ = _____

(51) $(\sqrt{-196})(\sqrt{-256})$ = _____

(52) The area of a 45° - 45° - 90° triangle with a hypotenuse of $\sqrt{18}$ is _____sq. units

(53) $99^2 + 99$ = _____

(54) A septagon has _____ distinct diagonals.

(55) cos 240 ° — sin 150 ° = _____

(56) $\frac{8}{9} - \frac{87}{100}$ = _____

(57) A pair of dice are rolled. What are the odds that the same number is shown? _____

(58) $3^7 \div 7$ has a remainder of _____

(59) 33 feet per second = _____ miles per hour

*(60) 1428.57×62 = _____

(61) The sum of the coefficients in the expansion of $(x^2 - 6x + 9)^2$ is _____

(62) $58^2 - 59^2 + 60^2 - 61^2$ = _____

(63) $88 \times 12.5 \times .11$ = _____

(64) $\cos 22° = \sin\theta$, $0° < \theta < 90°$, and θ = _____°

(65) $12_5 + 23_5 + 34_5$ = _____$_5$

(66) If $\log_x 64 = 1.5$ then x = _____

(67) $(3 - 5i)(2 + i) = a + bi$, and $a + b$ = _____

(68) The 5th pentagonal number is _____

(69) 234×211 = _____

*(70) $(3\pi + 2e)^4$ = _____

(71) $3\frac{4}{5} \div 2\frac{5}{7}$ = _____ (mixed number)

(72) $\lim_{x \to 3} \frac{x^3 - 27}{x^2 - 9}$ = _____

(73) 2.375×2.4 = _____ (decimal)

(74) Change .14 base 5 to a base 10 decimal. _____

(75) If $\det \begin{vmatrix} 3 & x \\ 2 & 1 \end{vmatrix} = 4$, then x = _____

(76) f(x) = 5 — 3x, find f[f(2)]. _____

(77) $\log_8(\log_4 16)$ = _____

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

(79) $3 + 6 + 9 + 15 + 24 + ... + 267$ = _____

*(80) $32 \times 64 \times 16 \div 48$ = _____

University Interscholastic League - Number Sense Answer Key HS • Regional • 2005

*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) 651

(2) 726

(3) – 41

(4) 10450

(5) $\frac{19}{50}$

(6) 1089

(7) $\frac{64}{75}$

(8) $137\frac{1}{9}$

(9) – 18.045

*(10) 4109 – 4541

(11) 4140

(12) 273

(13) 1

(14) $-\frac{5}{16}$ or $-.3125$

(15) – 9

(16) 1364

(17) $\frac{21}{125}$ or .168

(18) 10

(19) 288

*(20) 314 – 346

(21) 3596

(22) 12

(23) 0

(24) 98

(25) 25

(26) 36

(27) 525

(28) 1414

(29) 15004

*(30) 327 – 361

(31) $2\frac{1}{3}$ or $\frac{7}{3}$

(32) 2.89, $2\frac{89}{100}$, or $\frac{289}{100}$

(33) 128

(34) $121\frac{3}{7}$

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

(36) 1234

(37) $245\frac{1}{121}$

(38) – 217

(39) – 5

*(40) 9540 – 10544

(41) 826281

(42) 9

(43) 5

(44) $2\frac{2}{3}$ or $\frac{8}{3}$

(45) 45

(46) $37\frac{1}{3}$

(47) 5625

(48) 16

(49) 9657

*(50) 994203 – 1098855

(51) – 224

(52) 4.5 or $4\frac{1}{2}$ or $\frac{9}{2}$

(53) 9900

(54) 14

(55) – 1

(56) $\frac{17}{900}$

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

(58) 3

(59) 22.5, $22\frac{1}{2}$, or $\frac{45}{2}$

*(60) 84143 – 92999

(61) 16

(62) – 238

(63) 121

(64) 68

(65) 124

(66) 16

(67) 4

(68) 35

(69) 49374

*(70) 46340 – 51217

(71) $1\frac{2}{5}$

(72) $4\frac{1}{2}$ or $\frac{9}{2}$ or 4.5

(73) 5.7

(74) .36

(75) $-\frac{1}{2}$ or – .5

(76) 8

(77) $\frac{1}{3}$

(78) 2

(79) 693

*(80) 649 – 716