The University Interscholastic League
Number Sense Test • HS Regional • 2004

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) $2468 - 9753 =$ _____

(2) $.125 \times 482 =$ _____ (decimal)

(3) $8^3 =$ _____

(4) $9 \times 2 + 8 - 3 \div 6 =$ _____

(5) $2\frac{3}{5} =$ _____ %

(6) $1\frac{1}{4} + 3\frac{3}{8} =$ _____ (decimal)

(7) $1.1 \div 2.5 =$ _____

(8) DC — LX — VI = _____ (Arabic Numeral)

(9) $\frac{4}{5}$ % = _____ (fraction)

*(10) $9876 + 1234 - 50 =$ _____

(11) The GCF of 84 and 70 is _____

(12) $\frac{3}{4}$ of 24% of 1.8 is _____

(13) $\frac{15}{19} + \frac{19}{15} =$ _____ (mixed number)

(14) $43 \times 34 =$ _____

(15) $\frac{1}{3} - \frac{1}{6} + \frac{1}{12} =$ _____ (fraction)

(16) $21 \times 38 - 17 \times 21 =$ _____

(17) Which is larger, $\frac{5}{9}$ or .555 or 55% ? _____

(18) $72 \times 73 =$ _____

(19) $4.848 \div .24 =$ _____ (decimal)

*(20) $\sqrt{8844} \times \sqrt{6633} =$ _____

(21) What number added to 40 and divided by 5 gives the same results? _____

(22) 24 base 10 equals _____ base 2

(23) $(34 \times 56 - 12) \div 9$ has a remainder of ____

(24) .2717171... = _____ (fraction)

(25) If five red roses cost $1.79 then two and a half dozen red roses cost $ _____

(26) 48 is _____ % greater than 40?

(27) 243 cubic feet equals _____ cubic yards

(28) $33.67 \times 27 =$ _____ (decimal)

(29) $59^2 - 71^2 =$ _____

*(30) $41 \times 44 \times 47 =$ _____

(31) $\frac{7}{15} - \frac{15}{29} =$ _____

(32) If $f(x) = x^2 + 14x + 49$, then $f(-9) =$ _____

(33) $3\frac{7}{9} \times 9\frac{2}{3} =$ _____ (mixed number)

(34) The sum of the roots of $5x^3 + 4x - 3 = 0$ is _____

(35) A square has a diagonal of $4\sqrt{3}$ units. Its area is _____ sq. units.

(36) $3^3 + 3 =$ _____ base 3

(37) 11% of 22% is _____ % (decimal)

(38) If $4x + 8 = 2x + 4$ then $x + 2 =$ _____

(39) How many integers are between -1 and 72? _____

*(40) $105 \times \frac{3}{7} \times \frac{1}{8} \times 728 =$ _____

(41) $707 \times 715 =$ _____

(42) The 9th term of 1, 2, 4, 8,... is _____

(43) $429 \times 21 =$ _____

(44) If $3x + y = 2$ and $2x - y = 3$ then $xy =$ _____

(45) $606^2 =$ _____

(46) $51 \times 59 + 16 =$ _____

(47) The slope of the line containing the points (3,1) and (1, k) is -2. Find k. _____

(48) The units digit of 13^{13} is _____

(49) $\sqrt{39} \times \sqrt{156} =$ _____

*(50) $48 \times \sqrt{2704} \times \sqrt[3]{123} =$ _____

(51) The sides of a right triangle are x, 7, and 11. If $x < 7$, and $x = a\sqrt{2}$ then $a =$ _____

(52) Find $k > 0$ so that the five digit number 8475k is divisible by 6. _____

(53) 40% of 3 meters = _____ centimeters

(54) ${}_5P_3 \times {}_4P_2 =$ _____

(55) $\cos 330° \times \sin 300° =$ _____

(56) $27972 \div 111 =$ _____

(57) $-\frac{3}{2} + \frac{1}{2} - \frac{1}{6} + \frac{1}{18} - \ldots =$ _____

(58) $(24 - 32i)(24 + 32i) =$ _____

(59) The coefficient of the 7th term of the expansion of $(x + y)^9$ is _____

*(60) $71984 \times 1.371 =$ _____

(61) $\frac{5}{8} - \frac{24}{41} =$ _____

(62) $714^2 =$ _____

(63) $42_5 - 34_5 + 23_5 =$ _____ 5

(64) The surface area of a cube is 384 sq. cm. The volume of the cube is _____ cu. cm.

(65) If $\sin(A) = \frac{3}{5}$ then $\cos(2A) =$ _____

(66) If $\log_9 3 = W$ then $3W =$ _____

(67) $311 \times 113 =$ _____

(68) 75 is 3.125% of _____

(69) The sum of the coefficients of $(a - b)^4$ is ___

*(70) $[(\pi - 0.2)(e + 0.3)]^3 =$ _____

(71) $8^4 \times 5^4 =$ _____

(72) The 8th octagonal number is _____

(73) Change $\frac{15}{16}$ to a base 8 decimal. _____

(74) $2(1!) + 3(2!) + 4(3!) + 5(4!) =$ _____

(75) $1.6 + .625 =$ _____ (mixed number)

(76) If $g(x) = 2x^3 - 3x^4$, then $g''(-1) =$ _____

(77) $\int_1^3 x^{-2}\, dx =$ _____

(78) $2.444... \div 2.777... =$ _____

(79) $\sqrt{a^5} \times \sqrt[5]{a^2} = \sqrt[n]{a^{29}}$ and $n =$ _____

*(80) $428.571 \times 87.5 =$ _____

University Interscholastic League - Number Sense Answer Key HS • Regional • 2004

*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) – 7285

(2) 60.25

(3) 512

(4) $25\frac{1}{2}$ or $\frac{51}{2}$ or 25.5

(5) 260

(6) 4.625

(7) .44 or $\frac{11}{25}$

(8) 534

(9) $\frac{1}{125}$

*(10) 10507 – 11613

(11) 14

(12) .324 or $\frac{81}{250}$

(13) $2\frac{16}{285}$

(14) 1462

(15) $\frac{1}{4}$

(16) 441

(17) $\frac{5}{9}$

(18) 5256

(19) 20.2

*(20) 7277 – 8042

(21) – 50

(22) 11000

(23) 2

(24) $\frac{269}{990}$

(25) 10.74

(26) 20

(27) 9

(28) 909.09

(29) – 1560

*(30) 80549 – 89027

(31) $-\frac{22}{435}$

(32) 4

(33) $36\frac{14}{27}$

(34) 0

(35) 24

(36) 1010

(37) 2.42

(38) 0

(39) 72

*(40) 3891 – 4299

(41) 505505

(42) 256

(43) 9009

(44) – 1

(45) 367236

(46) 3025

(47) 5

(48) 3

(49) 78

*(50) 11793 – 13033

(51) 6

(52) 6

(53) 120

(54) 720

(55) $-\frac{3}{4}$ or – .75

(56) 252

(57) $-1\frac{1}{8}$ or $-\frac{9}{8}$ or – 1.125

(58) 1600

(59) 84

*(60) 93756 – 103624

(61) $\frac{13}{328}$

(62) 509796

(63) 31

(64) 512

(65) $\frac{7}{25}$ or .28

(66) $1\frac{1}{2}$ or $\frac{3}{2}$ or 1.5

(67) 35143

(68) 2400

(69) 0

*(70) 665 – 734

(71) 2560000

(72) 176

(73) .74

(74) 152

(75) $2\frac{9}{40}$

(76) – 48

(77) $\frac{2}{3}$

(78) $\frac{22}{25}$ or .88

(79) 10

*(80) 35625 – 39374