The University Interscholastic League
Number Sense Test • HS Invitational A • 2006

Contestant's Number _____

Final _____ _____
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) $2006 - 6002 =$ _____

(2) $2006 \times 6 =$ _____

(3) $\$20.06 + \$60.02 = \$$ _____

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

(5) $4 - 6 \times 8 + 10 =$ _____

(6) $\frac{1}{16} =$ _____ % (decimal)

(7) $26^2 =$ _____

(8) $2006 \div 25 =$ _____ (decimal)

(9) $2468 \div 9$ has a remainder of _____

*(10) $88 - 222 + 99 - 333 =$ _____

(11) $2006 - 2006 \times 6 =$ _____

(12) $2 + 4 + 6 + \ldots + 22 =$ _____

(13) $6 \times 6 \times 6 =$ _____

(14) The GCF of 48 and 54 is _____

(15) Which is larger, $\frac{11}{15}$ or $\frac{15}{19}$? = _____

(16) $\frac{5}{(2^3)(5^2)} =$ _____ (decimal)

(17) $26 \times 62 =$ _____

(18) $.2111\ldots =$ _____ (proper fraction)

(19) $2\frac{3}{4} + 6\frac{7}{8} =$ _____ (mixed number)

*(20) $\sqrt{265278} =$ _____

(21) $MMVI \times XI =$ _____ (Arabic Numeral)

(22) $4\frac{4}{5} \div 4 =$ _____

(23) The number of positive integral divisors of $6^5 \times 4^3 \times 2^1$ is _____

(24) 30 minus 40% of 50 is _____

(25) $.125 - .375 - .625 =$ _____ (proper fraction)

(26) $200_6 =$ _____ $_{10}$

(27) $(7^3 + 8^2 - 9^1) \div 6$ has a remainder of ___

(28) $19 \times \frac{19}{23} =$ _____ (mixed number)

(29) 3.5 pints = _____ quarts

*(30) $234678 \div 911 =$ _____

(31) $16 \times 66 - 16 \times 50 =$ _____

(32) The set {T, W, O} has _____ proper subsets

(33) $9 - 7 \times (5 + 3) \div 1 =$ _____

(34) $\sqrt[3]{1728} \div \sqrt{36} =$ _____

(35) The mean of 33, 21, and 27 is _____

(36) If a bag of 30 oranges cost \$4.75, then the cost of 6 oranges is \$ _____

(37) $4^4 + 4^2 + 4^0 =$ _____ base 4

(38) If $x = 6$ and $y = 9$ then $x^2 + 2xy + y^2 =$ ____

(39) $63 \times 143 =$ _____

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

(41) $5! \times 3! =$ _____

(42) A hexahedron has _____ faces

(43) If the area of an equilateral triangle is $9\sqrt{3}$ cm^2 then its side length is _____ cm

(44) $77 \div 1.75 =$ _____

(45) If $x + 4y = 5$ and $x - 3y = 4$, then $y =$ _____

(46) $14 \times 25 + 12.5 \times 28 =$ _____

(47) $21\frac{3}{7}\% =$ _____ (proper fraction)

(48) $102 \times 103 =$ _____

(49) $231_4 =$ _____ 2

*(50) $719 \times 875 =$ _____

(51) $51^2 + 51 \times 49 =$ _____

(52) If $(3 + 4i)^2 = a + bi$, then $a =$ _____

(53) $221 \times 141 =$ _____

(54) $61 \times 69 + 16 =$ _____

(55) $4 + 1 + \frac{1}{4} + \frac{1}{16} + \frac{1}{64} + \ldots =$ _____

(56) $\frac{4 \times 5! + 5 \times 4!}{4!} =$ _____

(57) $433\frac{1}{3}\%$ of 15 is _____

(58) $\text{Sin}\left(\frac{11\pi}{6}\right) =$ _____

(59) The largest integer such that $4x + 3 < 2$ is _____

*(60) The area of $14x^2 + 16y^2 = 224$ is _____

(61) $555 \times \frac{6}{37} =$ _____

(62) If $\text{Log}_4 X = 3$, then $\sqrt{X} =$ _____

(63) $431_5 \div 4_5 =$ _____ 5

(64) $1 - 2\sin^2 30° =$ _____

(65) $2^4 \times 3^3 \times 5^2 =$ _____

(66) $21^2 - 20^2 + 19^2 - 18^2 =$ _____

(67) $208^2 =$ _____

(68) $79^2 + 79 =$ _____

(69) The slope of the line parallel to the line $5x - 4y + 3 = 0$ is _____

*(70) $5.1^3 \times 7.9^3 =$ _____

(71) $444 \times \frac{1}{27} =$ _____ (mixed number)

(72) $\frac{1}{3} + \frac{1}{6} + \frac{1}{10} + \frac{1}{15} =$ _____

(73) The sum of the first nine terms of the Fibonacci sequence 1, 5, 6, 11, 17, ... is _____

(74) $17 \times \frac{17}{18} - 17 =$ _____

(75) A pair of dice is thrown. The probability that the sum is 7 is _____

(76) If $h(x) = 2x - 3$, then $h^{-1}(-1) =$ _____

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

(78) If $f(x) = 4 - 3x - 2x^2$ then $f'(-1) =$ ____

(79) $\int_0^1 \sqrt[3]{x}\, dx =$ _____

*(80) $(4e)^3 =$ _____

University Interscholastic League - Number Sense Answer Key HS • Invitation A • 2006

*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) — 3996

(2) 12036

(3) 80.08

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

(5) — 34

(6) 6.25

(7) 676

(8) 80.24

(9) 2

*(10) (— 386) • (— 349)

(11) — 10030

(12) 132

(13) 216

(14) 6

(15) $\frac{15}{19}$

(16) .025

(17) 1612

(18) $\frac{19}{90}$

(19) $9\frac{5}{8}$

*(20) 490 — 540

(21) 22066

(22) $\frac{6}{5}$, $1\frac{1}{5}$, 1.2

(23) 78

(24) 10

(25) $-\frac{7}{8}$

(26) 72

(27) 2

(28) $15\frac{16}{23}$

(29) 1.75, $1\frac{3}{4}$, $\frac{7}{4}$

*(30) 245 — 270

(31) 256

(32) 7

(33) — 47

(34) 2

(35) 27

(36) $ .95

(37) 10101

(38) 225

(39) 9009

*(40) 34109 — 37699

(41) 720

(42) 6

(43) 6

(44) 44

(45) $\frac{1}{7}$

(46) 700

(47) $\frac{3}{14}$

(48) 10506

(49) 101101

*(50) 597669 — 660581

(51) 5100

(52) — 7

(53) 31161

(54) 4225

(55) $5\frac{1}{3}$, $\frac{16}{3}$

(56) 25

(57) 65

(58) $-\frac{1}{2}$, — .5

(59) — 1

*(60) 45 — 49

(61) 90

(62) 8

(63) 104

(64) $\frac{1}{2}$, .5

(65) 10800

(66) 78

(67) 43264

(68) 6320

(69) $\frac{5}{4}$, $1\frac{1}{4}$, 1.25

*(70) 62133 — 68672

(71) $16\frac{4}{9}$

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

(73) 304

(74) $-\frac{17}{18}$

(75) $\frac{1}{6}$

(76) 1

(77) — 4

(78) 1

(79) $\frac{3}{4}$, .75

*(80) 1222 — 1349