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

(1) $321 - 123 =$ _____

(2) $63 \times 11 =$ _____

(3) $31 \times 13 =$ _____

(4) $\frac{2}{3} - \frac{5}{6} =$ _____

(5) $1212 \div 9 =$ _____ (mixed number)

(6) Which is smaller, $\frac{7}{8}$ or $\frac{9}{11}$? = _____

(7) 44% = _____ (fraction)

(8) $350 \div 25 =$ _____

(9) $2004 - 4002 =$ _____

***(10)** $819 + 198 + 981 + 189 =$ _____

(11) $3\frac{3}{4} + 3\frac{7}{8} =$ _____ (mixed number)

(12) The multiplicative inverse of $-\frac{1}{5}$ is _____

(13) $18^2 =$ _____

(14) 16 is what % of 40 ? _____

(15) $20 \times \frac{20}{23} =$ _____ (mixed number)

(16) LXXIV = _____ (Arabic Numeral)

(17) $\frac{17}{8} =$ _____ % (decimal)

(18) The LCM of 35 and 49 is _____

(19) $3 - 8 \times 5 + 3 =$ _____

***(20)** $807 \times 708 =$ _____

(21) If two dozen doughnuts cost $1.44 then three doughnuts will cost $_____

(22) $35 \times 35 =$ _____

(23) $(24 \times 7 - 6) \div 5$ has a remainder of _____

(24) $27 + 26 + 25 + ... + 2 + 1 =$ _____

(25) $\frac{3}{80} =$ _____ (decimal)

(26) The number of positive integral divisors of 45 is _____

(27) $41 \times 44 =$ _____

(28) 48 ounces = _____ pints

(29) $421_5 =$ _____ 10

***(30)** $19701 \div 141 =$ _____

(31) 51% of _____ is 17% of 26

(32) How many positive integers less than 20 are relatively prime to 20? _____

(33) $34 \times 21 =$ _____

(34) If $f(x) = x^4 - 2x^2 + 1$ then $f(3)$ is _____

(35) $53 \times 47 =$ _____

(36) If $x < 0$ and $|3x + 4| = 14$ then x is _____

(37) $(64 \times 8)^{\frac{1}{3}} =$ _____

(38) $7 - 6 \times 5 + 4 \div 2 =$ _____

(39) $5\frac{1}{5} \times 15\frac{1}{5} =$ _____ (mixed number)

*(40) $\sqrt{36485} =$ _____

(41) $97 \times 104 =$ _____

(42) .242424... = _____ (fraction)

(43) A tin can 4 inches high holds 4 ounces. A similar tin can 8 inches high holds _____ oz.

(44) $29 \times 31 + 1 =$ _____

(45) If $5 - 4x = 8$ then $3 + 4x =$ _____

(46) If $3^x = 1.8$ then $9^x =$ _____

(47) $505^2 =$ _____

(48) The 10th term of 1, 3, 7, 15, 31, ... is _____

(49) The diagonal of a square is $\sqrt{18}$ units. Find the lenth of the side of the square. _____

*(50) $39 \times 41 \times 19 \times 21 =$ _____

(51) An obtuse triangle has integer sides of 3, x, and 7. The smallest value of x is _____

(52) $42^2 + (40^2 - 2^2) =$ _____

(53) $(2i - 3)(2i + 3) =$ _____

(54) $\frac{1}{5} + \frac{1}{25} + \frac{1}{125} + ... =$ _____ (fraction)

(55) If $\log_4 k = -1$ then $k =$ _____ (decimal)

(56) $\cos(-\pi) =$ _____

(57) 12.5% of a mile = _____ yards

(58) If ${}_4P_3 = k \times ({}_4C_3)$ then $k =$ _____

(59) The simplified coefficient of the 5th term in the expansion of $(x - y)^5$ is _____

*(60) $8333 \div 1666 \times 555 =$ _____

(61) The product of the coefficients of $(a + b)^2$ is _____

(62) $204^2 =$ _____

(63) 3.25% of 24 is _____

(64) On the graph of $y = 4 - 3 \sin 2x$, the amplitude is _____

(65) $\ln(e^4) =$ _____

(66) $2 \sin 165° \cos 165° =$ _____

(67) A right triangle with integer sides has one leg of 17 units and a hypotenuse of _____

(68) $43_5 \times 2_5 =$ _____$_5$

(69) $\frac{2}{9} - \frac{13}{64} =$ _____

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

(71) Change .44 base 5 to a base 10 fraction. ___

(72) $\sin^{-1}(.6) + \sin^{-1}(.8) =$ _____ (degrees)

(73) If $f(x) = x + 2$, then $f^{-1}(-2) =$ _____

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

(75) $\int_0^5 (2 - x)\,dx =$ _____

(76) The 12th triangular number is _____

(77) $\frac{1}{12} + \frac{1}{20} + \frac{1}{30} =$ _____

(78) $\lim_{x \to -2} (4 - 2x) =$ _____

(79) A pair of dice is thrown. The probability that the sum is divisible by 10 is _____

*(80) $26 \times 52 \times 13 \div 39 =$ _____

University Interscholastic League - Number Sense Answer Key HS • SAC • Fall 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) 198

(2) 693

(3) 403

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

(5) $134\frac{2}{3}$

(6) $\frac{9}{11}$

(7) $\frac{11}{25}$

(8) 14

(9) — 1998

*(10) 2078 — 2296

(11) $7\frac{5}{8}$

(12) — 5

(13) 324

(14) 40

(15) $17\frac{9}{23}$

(16) 74

(17) 212.5

(18) 245

(19) — 34

*(20) 542789 — 599923

(21) .18

(22) 1225

(23) 2

(24) 378

(25) .0375

(26) 6

(27) 1804

(28) 3

(29) 111

*(30) 133 — 146

(31) $8\frac{2}{3}$ or $\frac{26}{3}$

(32) 8

(33) 714

(34) 64

(35) 2491

(36) — 6

(37) 8

(38) — 21

(39) $79\frac{1}{25}$

*(40) 182 — 200

(41) 10088

(42) $\frac{8}{33}$

(43) 32

(44) 900

(45) 0

(46) 3.24 or $3\frac{6}{25}$ or $\frac{81}{25}$

(47) 255025

(48) 1023

(49) 3

*(50) 606101 – 669901

(51) 5

(52) 3360

(53) — 13

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

(55) .25

(56) — 1

(57) 220

(58) 6

(59) 5

*(60) 2638 — 2914

(61) 2

(62) 41616

(63) .78 or $\frac{39}{50}$

(64) 3

(65) 4

(66) — .5 or $-\frac{1}{2}$

(67) 145

(68) 141

(69) $\frac{11}{576}$

*(70) 471 — 520

(71) $\frac{24}{25}$

(72) 90

(73) — 4

(74) — 6

(75) $-2\frac{1}{2}$ or $-\frac{5}{2}$ or — 2.5

(76) 78

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

(78) 8

(79) $\frac{1}{12}$

*(80) 429 — 473