The University Interscholastic League
Number Sense Test • HS District 1 • 2003

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) $314 + 143 - 431 =$ _____

(2) $17 \times 17 =$ _____

(3) $545\% =$ _____ (mixed fraction)

(4) $2.04 \div .5 =$ _____

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

(6) $209 \times 25 =$ _____

(7) $3 + 6 \times 5 - 8 \div 4 =$ _____

(8) MDCLXVI = _____ (Arabic Numeral)

(9) $3\frac{4}{9} - 1\frac{1}{6} =$ _____ (mixed number)

*(10) $14141 - 1414 + 141 - 14 + 1 =$ _____

(11) $13 \times 121 =$ _____

(12) Which is smaller, $\frac{7}{11}$ or .63 = _____

(13) 1.4 is _____ % of 28.

(14) $\frac{3}{4} + \frac{4}{5} + \frac{5}{6} =$ _____ (mixed number)

(15) 9 square yards = _____ square feet

(16) The LCM of 16, 32, and 48 is _____

(17) $29 \times 37 =$ _____

(18) $18 + 24 + 38 + 46 + 52 =$ _____

(19) The average of 23, 35, 57, 37 is = _____

*(20) $\sqrt{451} \times 451 =$ _____

(21) $27 \times 37 =$ _____

(22) If 9 ducats cost $25.35 then 3 ducats cost $_____

(23) 256 ounces = _____ pounds

(24) $15.2 \times 5.2 =$ _____

(25) $(44 \times 34 - 24) \div 4$ has a remainder of _____

(26) The sum of the proper positive integral divisors of 24 is _____

(27) $62 \times 63 =$ _____

(28) 3.6 is _____ % of $2\frac{1}{2}$

(29) .231231231... = _____ (fraction)

*(30) $83 \times 87 \times 91 =$ _____

(31) $14^3 =$ _____

(32) The sum of the composite numbers less than or equal to 11 is _____

(33) $240 \times 875 =$ _____

(34) $4\frac{2}{3} - 6\frac{3}{5} =$ _____(mixed number)

(35) The sum of the roots of $4x^3 + 3x^2 - 2x - 1$ is _____

(36) $89 \times 97 =$ _____

(37) If $x^2 - 2xy + y^2 = 16$ and $x = 6$ then the largest value of y is _____

(38) $38 \times 28 =$ _____

(39) $1.3^2 - 2.6^2 =$ _____(decimal)

*(40) $\sqrt{2830} \times 283 \div 28.3 =$ _____

(41) $1003 \times 1008 =$ _____

(42) $41 \times 44 =$ _____

(43) An acute triangle has integer side lengths of 4, 7, and x. The smallest value of x is _____

(44) $\sqrt{75} \times \sqrt{27} =$ _____

(45) $35^2 + 36^2 =$ _____

(46) If $6^x = 72$ then $6^{x-2} =$ _____

(47) $42 \times 715 =$ _____

(48) The next term of 1, 4, 11, 26, 57,... is _____

(49) $203 \times 123 =$ _____

*(50) $(51597 \div 147)^2 =$ _____

(51) The sum of the coefficients in the binomial expansion of $(5x - 9y)^3$ is _____

(52) $(607)^2 =$ _____

(53) $\text{Log}_3 216 \div \log_3 6 =$ _____

(54) If $(9 - 3i)(3 + 9i) = (a + bi)$, then $a =$ _____

(55) A line with a slope of $-\frac{3}{2}$ passes through $(0, -6)$ and $(x, 0)$. The value of x is _____

(56) $\frac{8!+6!}{7!} =$ _____

(57) $\text{Cos}\ \frac{5\pi}{6} \times \sin\ \frac{2\pi}{3} =$ _____

(58) $12\frac{1}{2}\%$ of 1 mile = _____ yards

(59) ${}_7P_4 \div {}_7C_4 =$ _____

*(60) $67 \times 56 + 65 \times 76 =$ _____

(61) $100_6 - 44_6 =$ _____$_6$

(62) The supplement of an interior angle of a regular octagon measures_____ degrees

(63) $42 \times 48 + 63 \times 42 =$ _____

(64) $\frac{11}{13} + \frac{2}{11} =$ _____(mixed number)

(65) $55^2 - (50^2 - 5^2) =$ _____

(66) If $x - y = 4$ and $y + x = -\frac{1}{4}$, then $8y =$ _____

(67) $\cos 15°\cos 45° - \sin 45°\sin 15° =$ _____

(68) $\text{Log}_3 32 - \text{Log}_3 16 + \text{Log}_3 1.5 =$ _____

(69) If three dice are tossed once, what is the probability of getting three threes? _____

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

(71) $11 \times \frac{11}{12} - 11$ _____

(72) $2^5 \times 3^5 \div 5$ has a remainder of _____

(73) If $f(x) = 3x - 2$, and $g(x) = 2x + 3$ then $g[f(4)] =$ _____

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

(75) Change .23 base 6 to a base 10 fraction. _____

(76) -40 ° Celsius = _____ ° Fahrenheit

(77) $4^4 \times 5^4 =$ _____

(78) $\int_{-2}^{4} x + 1\ dx =$ _____

(79) $1(1!) + 2(2!) + 3(3!) + 4(4!) + 5(5!) =$ _____

*(80) $16667 \times 35 =$ _____

University Interscholastic League - Number Sense Answer Key HS • District 1 • 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) 26

(2) 289

(3) $5\frac{9}{20}$

(4) 4.08 or $4\frac{2}{25}$ or $\frac{102}{25}$

(5) ~~2.215~~ 2.125

(6) 5225

(7) 31

(8) 1666

(9) $2\frac{5}{18}$

*(10) 12213 — 13497

(11) 1573

(12) .63

(13) 5

(14) $2\frac{23}{60}$

(15) 81

(16) 96

(17) 1073

(18) 178

(19) 38

*(20) 9099 — 10056

(21) 999

(22) 8.45

(23) 16

(24) 79.04

(25) 0

(26) 36

(27) 3906

(28) 144

(29) $\frac{77}{333}$

*(30) 624256 — 689966

(31) 2744

(32) 37

(33) 210000

(34) $-1\frac{14}{15}$

(35) $-\frac{3}{4}$ or $-.75$

(36) 8633

(37) 10

(38) 1064

(39) -5.07

*(40) 506 — 558

(41) 1011024

(42) 1804

(43) 6

(44) 45

(45) 2521

(46) 2

(47) 30030

(48) 120

(49) 24969

*(50) 117041 – 129361

(51) -64

(52) 368449

(53) 3

(54) 54

(55) -4

(56) $8\frac{1}{7}$ or $\frac{57}{7}$

(57) $-\frac{3}{4}$ or $-.75$

(58) 220

(59) 24

*(60) 8258 — 9126

(61) 12

(62) 45

(63) 4662

(64) $1\frac{4}{143}$

(65) 550

(66) -17

(67) .5 or $\frac{1}{2}$

(68) 1

(69) $\frac{1}{216}$

*(70) 5053 — 5584

(71) $-\frac{11}{12}$

(72) 1

(73) 23

(74) 78

(75) $\frac{5}{12}$

(76) -40

(77) 160000

(78) 12

(79) 719

*(80) 554178 – 612512