The University Interscholastic League
Number Sense Test • HS District 2 • 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) $678 - 876 =$ _____

(2) $198 \times 11 =$ _____

(3) $11^3 =$ _____

(4) $203 \times 14 =$ _____

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

(6) $\frac{3}{4} \times \frac{5}{6} =$ _____ (decimal)

(7) $303 \div 25 =$ _____ (decimal)

(8) $14 - 16 + 18 + 4 - 6 + 8 =$ _____

(9) $CM + XC + IX =$ _____ (Arabic Numeral)

*(10) $123 - 1234 + 12345 =$ _____

(11) The GCF of 48 and 72 is _____

(12) $\frac{12}{13} + \frac{13}{12} =$ _____ (mixed number)

(13) $54 \times 9 \div (27 - 45) =$ _____

(14) 30% of 30 divided by 30 is _____

(15) $71 \times 74 =$ _____

(16) $60 \times 32 - 32 \times 28 =$ _____

(17) $3.451 \div 1.7 =$ _____ (decimal)

(18) $22^2 =$ _____

(19) Which is larger, $\frac{7}{9}$ or .78 = _____

*(20) $\sqrt{291} \times 23 =$ _____

(21) $38 \times 28 =$ _____

(22) 2004 base 5 = _____ base 10

(23) $3\frac{1}{5}\%$ of 80 is _____ (decimal)

(24) .099099099... = _____ (fraction)

(25) If thirteen pens cost $1.69 then one dozen pens cost $ _____

(26) $93 \times 89 =$ _____

(27) $.222... \times 81 =$ _____

(28) 3 cubic yards = _____ cubic feet

(29) $(65 \times 4 - 3^2) \div 10$ has a remainder of _____

*(30) $97531 \div 246 =$ _____

(31) $(-729)^{\frac{1}{3}} =$ _____

(32) $12\frac{1}{4} \times 4\frac{3}{4} =$ _____ (mixed number)

(33) $336.7 \times 3.6 =$ _____ (decimal)

(34) If $f(x) = x^2 + 6x + 9$, then $f(12) =$ _____

(35) What number added to 33 and multiplied by 4 gives the same results?_____

(36) 30% of 15% is _____ %

(37) $16 \times \frac{16}{19} =$ _____ (mixed number)

(38) How many natural numbers are between 7 and 49? _____

(39) $2^4 + 2 =$ _____ base 4

*(40) $14.75 \times 29700 \div 98 =$ _____

(41) $303 \times 303 =$ _____

(42) 125% of a gallon is _____ quarts

(43) $429 \times 49 =$ _____

(44) The next term of 0, 3, 15, 63, ... is _____

(45) $\sqrt{44} \div \sqrt{99} =$ _____

(46) $132 \times 101 =$ _____

(47) If the diagonal of a square is $\sqrt{32}$ cm, then the perimeter of the square is _____ cm.

(48) If $9^x \div 3^x = 27^{-2}$ then $x =$ _____

(49) $79 \times 81 + 1 =$ _____

*(50) $\sqrt[3]{28028} \times \sqrt{840} \times 31 =$ _____

(51) $15 \times 36 - 45 \times 18 =$ _____

(52) If $2x + 3 = 4x - 5$ then $6x =$ _____

(53) $\sin 135° \div \cos 135° =$ _____

(54) ${}_3C_2 \div {}_4C_3 =$ _____

(55) $60^2 + 29^2 - 31^2 =$ _____

(56) An acute triangle has integer sides of 3, x, and 7 units. The largest value of x is _____

(57) $\frac{4}{5} + \frac{4}{10} + \frac{4}{20} + \frac{4}{40} + \ldots =$ _____

(58) The sum of the coefficients of the terms in the expansion of $(a - b)^4$ is _____

(59) $(5 - 12i)(5 + 12i) =$ _____

*(60) $714285 \div 142857 \times 777 =$ _____

(61) $(612)^2 =$ _____

(62) The product of the coefficients of $(2a + 3b)^2$ is _____

(63) $33_4 \times 22_4 =$ _____ 4

(64) $122 \times 221 =$ _____

(65) $e^{\ln 5} =$ _____

(66) 39 is 3.25% of _____

(67) $321 \times 1111 =$ _____

(68) The probability of winning is 48%. The odds of winning is _____ (fraction)

(69) $\frac{2}{11} - \frac{5}{34} =$ _____

*(70) $(\pi + 1.8)^5 =$ _____

(71) $2^{-5} \times 5^{-4} =$ _____

(72) The 6th hexagonal number is _____

(73) $\frac{11}{30} + \frac{11}{42} + \frac{11}{56} =$ _____

(74) If $f(x) = 4 + 4x - x^4$, then $f''(4) =$ _____

(75) Change .101 base 4 to a base 10 fraction. ___

(76) If $\sin^{-1}(\frac{5}{13}) + \sin^{-1}(\frac{12}{13}) =$ _____ (degrees)

(77) $11 \times \frac{11}{14} - 11 =$ _____ (mixed number)

(78) $\int_1^3 (\frac{2x}{3})\, dx =$ _____

(79) $2^3 + 3^3 + 5^3 + 7^3 =$ _____

*(80) $83333.3 \div 666.6 =$ _____

University Interscholastic League - Number Sense Answer Key HS • District 2 • 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) — 198

(2) 2178

(3) 1331

(4) 2842

(5) $\frac{1}{250}$

(6) .625

(7) 12.12

(8) 22

(9) 999

*(10) 10673 — 11795

(11) 24

(12) $2\frac{1}{156}$

(13) — 27

(14) .3 or $\frac{3}{10}$

(15) 5254

(16) 1024

(17) 2.03

(18) 484

(19) .78

*(20) 373 — 411

(21) 1064

(22) 254

(23) 2.56

(24) $\frac{11}{111}$

(25) 1.56

(26) 8277

(27) 18

(28) 81

(29) 1

*(30) 377 — 416

(31) — 9

(32) $58\frac{3}{16}$

(33) 1212.12

(34) 225

(35) 11

(36) 4.5

(37) $13\frac{9}{19}$

(38) 41

(39) 102

*(40) 4247 – 4693

(41) 91809

(42) 5

(43) 21021

(44) 255

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

(46) 13332

(47) 16

(48) — 6

(49) 6400

*(50) 25928 – 28656

(51) — 270

(52) 24

(53) — 1

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

(55) 3480

(56) 7

(57) $\frac{8}{5}$ or $1\frac{3}{5}$ or 1.6

(58) 0

(59) 169

*(60) 3691 — 4079

(61) 374544

(62) 432

(63) 2112

(64) 26962

(65) 5

(66) 1200

(67) 356631

(68) $\frac{12}{13}$

(69) $\frac{13}{374}$

*(70) 2800 — 3094

(71) $\frac{1}{20000}$ or .00005

(72) 66

(73) $\frac{33}{40}$ or .825

(74) — 192

(75) $\frac{17}{64}$

(76) 90

(77) $-2\frac{5}{14}$

(78) $2\frac{2}{3}$ or $\frac{8}{3}$

(79) 503

*(80) 119 – 131