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

Final _____ _____

Contestant's Number _____ 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) $2357 + 4608 =$ _____

(2) $14 \times 14 =$ _____

(3) $2004 \div 4 =$ _____

(4) $369 - 246 - 158 =$ _____

(5) $6\frac{7}{8}\% =$ _____ (decimal)

(6) $4\frac{5}{9} + 1\frac{2}{3} =$ _____ (mixed number)

(7) $\frac{3}{7} =$ _____% (mixed number)

(8) $1.1 \times 2.3 =$ _____(decimal)

(9) $19 + 21 - 23 - 12 + 14 + 16 =$ _____

*(10) $888 + 666 + 444 + 222 =$ _____

(11) $\frac{6}{7} - \frac{11}{12} =$ _____ (fraction)

(12) XIII + MMIV = _____ (Arabic Numeral)

(13) $39.39 \div 1.3 =$ _____ (decimal)

(14) The average of 42, 27, and 15 is _____

(15) $23 \times 32 =$ _____

(16) The product of the GCF and the LCM of 24 and 30 is _____

(17) 30% of $\frac{3}{10}$ of 3 is _____ (decimal)

(18) Which is the smaller, $\frac{9}{11}$ or .81? _____

(19) $15^3 =$ _____

*(20) $\sqrt{1294} \times \sqrt{627} \times \sqrt{256} =$ _____

(21) $51 \times 54 =$ _____

(22) If 4 cards cost $.88 then 18 cards cost $_____

(23) $48 =$ _____ base 3

(24) $3\frac{1}{8}\%$ of 32 is _____

(25) .01222... = _____ (fraction)

(26) $104 \times 97 =$ _____

(27) $336.7 \times 3.3 =$ _____ (decimal)

(28) $48^2 - 62^2 =$ _____

(29) 3 cubic feet = _____ cubic inches

*(30) $31 \times 42 \times 53 =$ _____

(31) $10\frac{5}{6} \times 12\frac{4}{5} =$ _____ (mixed number)

(32) $4^3 + 2^3 =$ _____ base 8

(33) 10% of 20% is _____%

(34) What number subtracted from 42 and multiplied by 2 gives the same results?_____

(35) If $x = -8$ and $y = 6$ then $(x - y)(x^2 + xy + y^2) =$ _____

(36) $(-1331)^{\frac{1}{3}} =$ _____

(37) $123_5 \times 4_5 =$ _____$_5$

(38) How many integers are between -67 and 76? _____

(39) $3.9^2 + 1.3^2 =$ _____ (decimal)

*(40) $\sqrt{872143} =$ _____

(41) $118 \times 122 + 4 =$ _____

(42) $122 \times 31 =$ _____

(43) $909^2 =$ _____

(44) The 10th term of 2, 6, 12, 20, 30,... is _____

(45) If the diagonal of a square is $7\sqrt{2}$ dm, then the perimeter of the square is _____ dm

(46) $\sqrt{28} \div \sqrt{63} =$ _____

(47) The product of the slopes of the lines $y = 2x - 5$ and $x = 5 - 2y$ is _____

(48) $707 \times 429 =$ _____

(49) The equation $2x^3 - bx^2 + cx = d$ has roots r, s, and t. If $r + s + t = -2$ then $b =$ _____

*(50) $\sqrt[3]{217777} \times \sqrt{3777} \times 57 =$ _____

(51) The sum of the positive integral divisors of 48 is _____

(52) If $(5 + 12i)^2 = a + bi$ then $a + b =$ _____

(53) $12\frac{1}{2}\%$ of a pint is _____ ounces

(54) $\tan \frac{5\pi}{4} =$ _____

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

(56) $45 \times 22 - 44 \times 15 =$ _____

(57) The coefficient of the 6th term of the expansion of $(x - y)^8$ is _____

(58) ${}_6C_3 \div {}_6P_3 =$ _____

(59) $\frac{10! - 11!}{9!} =$ _____

*(60) $34 \times 36 \times 34 \times 36 =$ _____

(61) $\frac{15}{22} + \frac{7}{15} - 1 =$ _____

(62) $1 - 2\sin^2 \frac{\pi}{6} =$ _____

(63) $404 \times 1111 =$ _____

(64) The odds of winning the game is 3 to 5. The probability of losing the game is _____ %

(65) $\frac{4}{13} - \frac{11}{40} =$ _____

(66) $33_4 \times 3_4 - 21_4 =$ _____$_4$

(67) The product of the coefficients of $(a + b)^5$ is _____

(68) $918^2 =$ _____

(69) $8^7 \div 6$ has a remainder of _____

*(70) $(\pi + 1.9)^3 \times (e + 2.3)^3 =$ _____

(71) The 12th hexagonal number is _____

(72) $\sqrt[3]{a^4} \times \sqrt[4]{a^3} = \sqrt[12]{a^n}$ and $n =$ _____

(73) $\frac{7}{30} + \frac{7}{20} + \frac{7}{12} =$ _____

(74) If $f(x) = \frac{1 - 3x}{x + 3}$ then $f^{-1}(-2) =$ _____

(75) Change .234 base 5 to a base 10 fraction. ___

(76) If N is a positive integer and $4N \div 5$ has a remainder of 2, then $N \div 5$ has a remainder of _____

(77) $2^5 \times 3^3 \times 5^2 =$ _____

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

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

*(80) $8333 \div 6666 \times 4444 =$ _____

University Interscholastic League - Number Sense Answer Key HS • State • 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) 6965

(2) 196

(3) 501

(4) – 35

(5) .06875

(6) $6\frac{2}{9}$

(7) $42\frac{6}{7}$

(8) 2.53

(9) 35

*(10) 2109 – 2331

(11) $-\frac{5}{84}$

(12) 2017

(13) 30.3

(14) 28

(15) 736

(16) 720

(17) .27

(18) .81

(19) 3375

*(20) 13692 – 15132

(21) 2754

(22) 3.96

(23) 1210

(24) 1

(25) $\frac{11}{900}$

(26) 10088

(27) 1111.11

(28) – 1540

(29) 5184

*(30) 65556 – 72456

(31) $138\frac{2}{3}$

(32) 110

(33) 2

(34) 14

(35) – 728

(36) – 11

(37) 1102

(38) 142

(39) 16.9

*(40) 888 – 980

(41) 14400

(42) 3782

(43) 826281

(44) 110

(45) 28

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

(47) – 1

(48) 303303

(49) – 4

*(50) 200221 – 221296

(51) 124

(52) 1

(53) 2

(54) 1

(55) – 7

(56) 330

(57) – 56

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

(59) – 100

*(60) 1,423,268 – 1,573,084

(61) $\frac{49}{330}$

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

(63) 448844

(64) 62.5 or $62\frac{1}{2}$ or $\frac{125}{2}$

(65) $\frac{17}{520}$

(66) 210

(67) 2500

(68) 842724

(69) 2

*(70) 15385 – 17004

(71) 276

(72) 25

(73) $\frac{7}{6}$ or $1\frac{1}{6}$

(74) 7

(75) $\frac{69}{125}$

(76) 3

(77) 21600

(78) $\frac{1}{3}$

(79) 152

*(80) 5278 – 5833