The University Interscholastic League
Number Sense Test • HS Invitational A • 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) $256 - 652 =$ _____

(2) $25 \times 432 =$ _____

(3) $2002 \times 12 - 4 =$ _____

(4) $\frac{5}{7} - \frac{7}{11} =$ _____

(5) $3\frac{3}{4}\% =$ _____ **(fraction)**

(6) $29 \times 29 =$ _____

(7) $48 + 4 \times 3 - 8 =$ _____

(8) XLIV = _____ **(Arabic Numeral)**

(9) $2\frac{2}{5} \times 5\frac{1}{6} =$ _____ **(improper fraction)**

***(10)** $564 \times 64 =$ _____

(11) $12 \times 16 + 8 \times 24 =$ _____

(12) $26 \times 16 =$ _____

(13) $1.5 \times 5.2 =$ _____

(14) $1\frac{7}{8} =$ _____ **% (mixed number)**

(15) $\frac{5}{6} + \frac{6}{5} =$ _____ **(mixed number)**

(16) $6 + 12 + 18 + 24 + 30 + 36 =$ _____

(17) The LCM of 28 and 35 is _____

(18) $48 \times 28 + 27 \times 28 =$ _____

(19) The mean of 37, 31, and 43 is _____

***(20)** $\sqrt{32905} =$ _____

(21) $52 \times 53 =$ _____

(22) 36 is 24% of _____

(23) $(31 \times 6 - 17) \div 8$ has a remainder of _____

(24) $4\frac{7}{12} \times 2\frac{2}{5} =$ _____

(25) 9 is to 11 as 12 is to _____

(26) .2333... = _____ **(fraction)**

(27) 3.5 yards = _____ **(inches)**

(28) How many even integers are between 8 and 42? _____

(29) $3367 \times 21 =$ _____

***(30)** $14 \times 16 \times 28 =$ _____

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

(32) A CD sells for $20 plus 8.25% sales tax. The total cost of the CD is $ _____

(33) $(6\frac{2}{3})^2$ = _____(mixed number)

(34) 375×408 = _____

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

(36) 109×107 = _____

(37) If $x = 5$ and $y = -2$ then $x^2 + 2xy + y^2$ = ___

(38) $1073 \div 29$ = _____

(39) If $3^4 + 4^3 = 5x$ then x = _____

*(40) $12.75 \times 28300 \div 102$ = _____

(41) 715×28 = _____

(42) 32×22 = _____

(43) The sides of a right triangle are integers. If one leg is 9 then the other leg is _____

(44) If $3^x = 70.1$ then 3^{x+2} = _____

(45) $12^2 + 19^2$ = _____

(46) For $3x^2 - x - 2k = 0$ to have equal roots, k has to have a value of _____

(47) 92×97 = _____

(48) The number of subsets of {1,3,5,7,9} is _____

(49) 1011011_2 = _____$_8$

*(50) $57381 \div 128$ = _____

(51) ${}_5C_3$ = _____

(52) $(4 - i)^2 = a + bi$ and a = _____

(53) $2 + \frac{2}{5} + \frac{2}{25} + \frac{2}{125} + \ldots$ = _____

(54) $\log_8 16$ = _____

(55) Find the slope of the line perpendicular to the line $3x + 2y = 4$. _____

(56) .375 of a foot = _____ inches

(57) The next term of .0324, .054, .09, .15 is _____

(58) $4^{-1} \div 4^2$ = _____

(59) The expansion of $(2x - y)^5$ has _____ terms

*(60) 62.5×3248 = _____

(61) Three coins are tossed. Find the odds of getting 3 tails. _____

(62) $\cos^2 30° + \sin^2 30°$ = _____

(63) $(30^2 - 2^2) + (30 + 2)^2$ = _____

(64) If $\log_3 x = 4$ then $\sqrt{x}$ = _____

(65) 321×111 = _____

(66) 429×35 = _____

(67) $\cos(\sin^{-1} 1)$ = _____

(68) $\frac{\pi}{5}$ radians = _____ degrees

(69) $26_9 \div 6_9$ = _____

*(70) $(1 + 2 + 3 + \ldots + 29)^2$ = _____

(71) The sum of the 3rd triangular number and the 3rd pentagonal number is _____

(72) $6^8 \div 8$ has a remainder of _____

(73) If $f(x) = 2x - 3$, then $f[f(-1)]$ = _____

(74) If $f(x) = x^3 - 3x + 3$, then $f''(2)$ = _____

(75) $5^6 \times 2^4$ = _____

(76) $(115)^2$ = _____

(77) $13 \times \frac{13}{17} + 4$ = _____(mixed number)

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

(79) The y-intercept of $y = 2x^2 + 3x - 4$ is (a,b) and b = _____

*(80) 19^3 = _____

University Interscholastic League - Number Sense Answer Key HS • Invitation A • 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) – 396

(2) 10800

(3) 24020

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

(5) $\frac{3}{80}$

(6) 841

(7) 52

(8) 44

(9) $\frac{62}{5}$

*(10) 34292 – 37900

(11) 384

(12) 416

(13) 7.8

(14) $187\frac{1}{2}$

(15) $2\frac{1}{30}$

(16) 126

(17) 140

(18) 2100

(19) 37

*(20) 173 – 190

(21) 2756

(22) 150

(23) 1

(24) 11

(25) $14\frac{2}{3}$ or $\frac{44}{3}$

(26) $\frac{7}{30}$

(27) 126

(28) 16

(29) 70707

*(30) 5959 – 6585

(31) – 4

(32) 21.65

(33) $44\frac{4}{9}$

(34) 153000

(35) $\frac{1}{4}$ or .25

(36) 11663

(37) 9

(38) 37

(39) 29

*(40) 3361 – 3714

(41) 20020

(42) 704

(43) 40

(44) 630.9 or $630\frac{9}{10}$

(45) 505

(46) $-\frac{1}{24}$

(47) 8924

(48) 32

(49) 133

*(50) 426 – 470

(51) 10

(52) 15

(53) $2\frac{1}{2}$ or $\frac{5}{2}$ or 2.5

(54) $\frac{4}{3}$ or $1\frac{1}{3}$

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

(56) $4\frac{1}{2}$ or $\frac{9}{2}$ or 4.5

(57) $\frac{1}{4}$ or .25

(58) $\frac{1}{64}$

(59) 6

*(60) 192,850 – 213,150

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

(62) 1

(63) 1920

(64) 9

(65) 35631

(66) 15015

(67) 0

(68) 36

(69) 4

*(70) 192,375 – 212,625

(71) 18

(72) 0

(73) – 13

(74) 12

(75) 250,000

(76) 13225

(77) $13\frac{16}{17}$

(78) 18

(79) – 4

*(80) 6517 – 7201