The University Interscholastic League
Number Sense Test • HS District 1 • 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) $654 - 456 =$ _____

(2) $303 \times 25 =$ _____

(3) $302 \times 16 =$ _____

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

(5) $.0125 =$ _____ **% (fraction)**

(6) $32^2 =$ _____

(7) $198 \div 11 =$ _____

(8) $7 - 9 + 11 + 11 - 13 + 15 =$ _____

(9) $28 \div (56 - 14) \times 7 =$ _____

***(10)** $556 - 667 + 778 - 889 =$ _____

(11) 40 times 40% of 40 is _____

(12) $\frac{12}{13} - \frac{13}{12} =$ _____

(13) CMXCIX = _____ **(Arabic Numeral)**

(14) The LCM of 48 and 72 is _____

(15) $1\frac{3}{8}\% =$ _____ **(fraction)**

(16) $24 \times 13 + 24 \times 11 =$ _____

(17) $3.926 \div 1.3 =$ _____ **(decimal)**

(18) $12^3 =$ _____

(19) $27 \times 31 =$ _____

***(20)** $\sqrt{362} \times \sqrt{440} =$ _____

(21) What number subtracted from 35 and multiplied by 4 gives the same results? _____

(22) $36 \times 3.367 =$ _____ **(decimal)**

(23) $83 \times 82 =$ _____

(24) $.3141414... =$ _____ **(fraction)**

(25) $82 =$ _____ **base 5**

(26) 3 square yards = _____ square feet

(27) $(12 \times 9 - 2^3) \div 8$ has a remainder of _____

(28) $2\frac{1}{2}\%$ of 64 is _____

(29) If nine pens cost $1.56 then one dozen pens cost $_____

***(30)** $17304 \div 118 =$ _____

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

(32) If $f(x) = x^2 - 8x + 16$, then $f(11) =$ _____

(33) $375 \times 24.8 =$ _____

(34) $4^3 + 4 =$ _____ base 4

(35) $103 \times 109 =$ _____

(36) $9\frac{1}{3} \times 3\frac{2}{3} =$ _____ (mixed number)

(37) $3.5^2 - 6.5^2 =$ _____

(38) The product of the roots of $4x^3 - 3x^2 + 2x + 1 = 0$ is _____

(39) 40% of 12% is _____ %

*(40) $44 \times 55 \times 66 =$ _____

(41) $\sqrt{44} \times \sqrt{99} =$ _____

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

(43) $715 \times 49 =$ _____

(44) $33 \times 27 + 9 =$ _____

(45) $202^2 =$ _____

(46) The units digit of 7^7 is _____

(47) If the area of an equilateral triangle is $3\sqrt{3}$ sq. ft, then its height is _____ ft.

(48) $15 \times 36 + 12 \times 45 =$ _____

(49) If $4^x \div 16^x = 4^{-2}$ then $x =$ _____

*(50) $\sqrt[3]{63989} \times \sqrt{1611} \times 41 =$ _____

(51) The next term of 2, 4, 10, 28, 82,... is _____

(52) 75% of a gallon is _____ pints

(53) $\tan(315°) =$ _____

(54) The slope of the line perpendicular to the line $2x - \frac{2}{5}y = 0$ is _____

(55) $(3 - 4i)(3 + 4i) =$ _____

(56) $\frac{3}{5} - \frac{3}{10} + \frac{3}{20} - \frac{3}{40} + \ldots =$ _____

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

(58) ${}_4C_3 \times {}_3C_2 =$ _____

(59) $40^2 - 28^2 + 12^2 =$ _____

*(60) $21^4 =$ _____

(61) $510 \times 510 =$ _____

(62) $132_4 - 33_4 =$ _____ 4

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

(64) If $\text{Log}_4 8 = N$ then $2N =$ _____

(65) If $a^2 + b^2 = (113)^2$, where $0 < a < b$ and a, b are integers then a equals _____

(66) $\frac{3}{8} - \frac{14}{41} =$ _____

(67) $2\cos^2 \frac{\pi}{6} - 1 =$ _____

(68) The graph of $y = 2 - 3\cos 2(x - 5)$ has a vertical shift of _____ units

(69) $488 \times 375 =$ _____

*(70) $(e + 1.3)^5 =$ _____

(71) $\frac{11}{30} - \frac{11}{20} - \frac{11}{12} =$ _____

(72) If $N \div 5$ has a remainder of 2, the $3N \div 5$ has a remainder of _____

(73) If $f(x) = 3x^2 + 4x - 5$, then $f'(-6) =$ _____

(74) $3\frac{3}{4} \div 3\frac{1}{8} =$ _____ (mixed number)

(75) If $\sin^{-1}(.8) + \cos^{-1}(.8) =$ _____ (degrees)

(76) Change $\frac{15}{16}$ to a base 4 decimal. _____ 4

(77) The 5th pentagonal number is _____

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

(79) $1(1!) - 2(2!) - 3(3!) - 4(4!) =$ _____

*(80) $714285 \times .875 =$ _____

University Interscholastic League - Number Sense Answer Key HS • District 1 • 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) 7575

(3) 4832

(4) .9 or $\frac{9}{10}$

(5) $1\frac{1}{4}$ or $\frac{5}{4}$

(6) 1024

(7) 18

(8) 22

(9) $4\frac{2}{3}$ or $\frac{14}{3}$

*(10) — 211 – — 233

(11) 640

(12) $-\frac{25}{156}$

(13) 999

(14) 144

(15) $\frac{11}{800}$

(16) 576

(17) 3.02

(18) 1728

(19) 837

*(20) 380 — 419

(21) 7

(22) 121.212

(23) 6806

(24) $\frac{311}{990}$

(25) 312

(26) 27

(27) 4

(28) 1.6 or $\frac{8}{5}$ or $1\frac{3}{5}$

(29) 2.08

*(30) 140 — 153

(31) — 7

(32) 49

(33) 9300

(34) 1010

(35) 11227

(36) $34\frac{2}{9}$

(37) — 30

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

(39) 4.8

*(40) 151734 – 167706

(41) 66

(42) — 12

(43) 35035

(44) 900

(45) 40804

(46) 3

(47) 3

(48) 1080

(49) 2

*(50) 62531 – 69112

(51) 244

(52) 6

(53) — 1

(54) $-\frac{1}{5}$

(55) 25

(56) $\frac{2}{5}$ or .4

(57) 16

(58) 12

(59) 960

*(60) 184757 – 204205

(61) 260100

(62) 33

(63) 1458

(64) 3

(65) 15

(66) $\frac{11}{328}$

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

(68) 2

(69) 183000

*(70) 996 — 1099

(71) $-\frac{11}{10}$, $-1\frac{1}{10}$, or — 1.1

(72) 1

(73) — 32

(74) $1\frac{1}{5}$

(75) 90

(76) .33

(77) 35

(78) 6

(79) — 117

*(80) 593750 - 656249