# The University Interscholastic League
## Number Sense Test • HS District 2 • 2005

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) $2005 + 5002 =$ _____

(2) $4 + 4 \div 4 - 4 \times 4 =$ _____

(3) $16 \times 302 =$ _____

(4) $286 \div 11 =$ _____

(5) $\frac{3}{40} =$ _____ % (decimal)

(6) Which is larger, $\frac{11}{15}$ or 70% ? _____

(7) $200.5 - 20.05 =$ _____ (decimal)

(8) $33 \times 33 =$ _____

(9) $\frac{5}{9} + \frac{2}{27} =$ _____

*(10) $7531 - 2468 + 90 =$ _____

(11) The LCM of 28 and 42 is _____

(12) 98 is 14% of _____

(13) 216 square inches = _____ square feet

(14) The median of 1, 1, 2, 3, 5, 8, 13, & 21 is ____

(15) $84 \times 75 =$ _____

(16) MCXI + DLV = _____ (Arabic Numeral)

(17) $78 - 65 + 52 - 39 - 26 - 13 =$ _____

(18) $64 \div 3\frac{1}{5} =$ _____

(19) 40% of 40 minus 40 is _____

*(20) $\sqrt{97531} =$ _____

(21) The number of positive integral divisors of $2^4 \times 5$ is _____

(22) $88 \times .090909... =$ _____

(23) 124680 ÷ 8 has a remainder of _____

(24) 480 in/min. = _____ in/sec.

(25) $\sqrt[3]{0.729} =$ _____

(26) $81 \times 84 =$ _____

(27) $8 + 16 + 24 + 32 + ... + 88 =$ _____

(28) $\frac{3}{8}$ of a quart equals _____ ounces

(29) $97^2 - 96^2 =$ _____

*(30) $986421 \div 357 =$ _____

(31) $5 + 4 \div 3 - 2 \times 1 =$ _____

(32) If $\frac{x+3}{4} - \frac{x+2}{3} = \frac{x}{12}$ then x = _____

(33) $77 \times 88 =$ _____

(34) $\frac{7}{11}$ of a gallon equals _____ cubic inches

(35) 8 feet is divided into three lengths such that the ratio of the lengths is 1:2:3. The largest length is _____ ft.

(36) If $f(x) = 4x^2 - 12x + 9$ then $f(14) =$ _____

(37) The distinct prime factors of 75 total _____

(38) $\frac{13}{14} =$ _____% (mixed number)

(39) $4^3 - 5^3 =$ _____

*(40) $38 \times 108 + 42 \times 112 =$ _____

(41) $(4 + 5i)(4 - 5i) =$ _____

(42) The 8th term of 0, 7, 26, 63, 124, ... is _____

(43) The slope of the line perpendicular to the line $3x + 4y = 5$ is _____

(44) $\frac{1}{5} + \frac{2}{5} + \frac{3}{5} + \frac{4}{5} + ... + 2 =$ _____

(45) 45 miles per hour = _____ ft/sec

(46) 6% of $466\frac{2}{3}$ is _____

(47) $36963 \div 111 =$ _____

(48) The modulus of $(11 + 60i)^2$ is _____

(49) $93 \times 103 =$ _____

*(50) $\sqrt{574} \times \sqrt{577} \times \sqrt{580} =$ _____

(51) A die is rolled. What is the probability that a factor of 12 is shown? _____

(52) $3 + 1\frac{1}{2} + \frac{3}{4} + \frac{3}{8} + ... =$ _____

(53) $(0 - 3i)^5 = a + bi$ and $b =$ _____

(54) The x-intercept of $y = x^3 - 3x^2 + 3x - 1$ is (a,b). Find a. _____

(55) $\csc(-150°) =$ _____

(56) $69^2 + 69 =$ _____

(57) $({}_5C_2)({}_5P_2) =$ _____

(58) The slope of a line passing through (4,5) and (x, 9) is $\frac{1}{2}$. Find x. _____

(59) $122 \times 133 =$ _____

*(60) $443322 \div 751 =$ _____

(61) $8.8 \times 7.5 \times 1.1 =$ _____(decimal)

(62) Find x, $0 \leq x \leq 7$, if $4x \equiv 27 \pmod 7$. ____

(63) $83^2 - 82^2 + 81^2 - 80^2 =$ _____

(64) If $\log_2 k = 6$ then $\sqrt{k} =$ _____

(65) $11_4 \times 21_4 - 3_4 =$ _____$_4$

(66) 24 is _____% of 960.

(67) The determinant of $\begin{vmatrix} 2a & a \\ 2 & -1 \end{vmatrix}$ is 44. Find a. ____

(68) The product of the coefficients of $(4a - 3b)^2$ is _____

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

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

(71) The 12th triangular number is _____

(72) If $f(x) = 3x - 3$, then $f^{-1}(-3) =$ _____

(73) $3.125 \times 1.6 =$ _____

(74) $\log_4(\log_{10}100) =$ _____

(75) 6253718 ÷ 12 has a remainder of _____

(76) The probability of losing is 4 to 7. What are the odds of winning? _____

(77) $14 \times \frac{14}{17} - 14 =$ _____ (mixed number)

(78) $\int_0^3 \frac{4x}{3}\,dx =$ _____

(79) $1 + 3 + 4 + 7 + 11 + 18 + ... + 123 =$ ____

*(80) $142.857 \times 428.571 =$ _____

**University Interscholastic League - Number Sense Answer Key HS • District 2 • 2005**

*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) 7007

(2) — 11

(3) 4832

(4) 26

(5) 7.5

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

(7) 180.45

(8) 1089

(9) $\frac{17}{27}$

*(10) 4896 — 5410

(11) 84

(12) 700

(13) $1\frac{1}{2}$ or $\frac{3}{2}$ or 1.5

(14) 4

(15) 6300

(16) 1666

(17) — 13

(18) 20

(19) — 24

*(20) 297 — 327

(21) 10

(22) 8

(23) 0

(24) 8

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

(26) 6804

(27) 528

(28) 12

(29) 193

*(30) 2625 — 2901

(31) $4\frac{1}{3}$ or $\frac{13}{3}$

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

(33) 6776

(34) 147

(35) 4

(36) 625

(37) 8

(38) $92\frac{6}{7}$

(39) — 61

*(40) 8368 — 9248

(41) 41

(42) 511

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

(44) 11

(45) 66

(46) 28

(47) 333

(48) 3721

(49) 9579

*(50) 13167 — 14552

(51) $\frac{5}{6}$

(52) 6

(53) — 243

(54) 1

(55) — 2

(56) 4830

(57) 200

(58) 12

(59) 16226

*(60) 561 — 619

(61) 72.6

(62) 5

(63) 326

(64) 8

(65) 222

(66) 2.5 or $2\frac{1}{2}$ or $\frac{5}{2}$

(67) — 11

(68) — 3456

(69) 1

*(70) 494 — 545

(71) 78

(72) 0

(73) 5

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

(75) 2

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

(77) $-2\frac{8}{17}$

(78) 6

(79) 319

*(80) 58164 — 64285