

**The University Interscholastic League**  
**Number Sense Test • HS District 1 • 2007**

Contestant's Number \_\_\_\_\_

Final \_\_\_\_\_  
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)  $2700 - 720 =$  \_\_\_\_\_
- (2)  $\frac{4}{5} \times \frac{5}{6} =$  \_\_\_\_\_
- (3)  $200 \div 7 =$  \_\_\_\_\_ (mixed number)
- (4)  $\$17.97 + \$12.48 = \$$  \_\_\_\_\_
- (5)  $1.125 =$  \_\_\_\_\_ % (mixed number)
- (6)  $\frac{7}{9} =$  \_\_\_\_\_ % (mixed number)
- (7)  $24^2 =$  \_\_\_\_\_
- (8)  $1 + 2 \times 3 \div 4 - 5 =$  \_\_\_\_\_
- (9)  $61 \times 16 =$  \_\_\_\_\_
- \* (10)  $951 - 246 - 837 =$  \_\_\_\_\_
- (11)  $11^5 \div 121 =$  \_\_\_\_\_
- (12) The GCD of 54 and 36 is \_\_\_\_\_
- (13) 31% of 31 is \_\_\_\_\_ (decimal)
- (14)  $22 + 20 + 18 + \dots + 2 =$  \_\_\_\_\_
- (15)  $5\frac{6}{7} - 12\frac{13}{14} =$  \_\_\_\_\_ (mixed number)
- (16) The reciprocal of .24 is \_\_\_\_\_
- (17)  $.727272\dots =$  \_\_\_\_\_ (proper fraction)
- (18)  $96 \times 97 =$  \_\_\_\_\_
- (19)  $CCLXXX \div XIV =$  \_\_\_\_\_ (Arabic Numeral)
- \* (20)  $\sqrt{1090} \times 31 =$  \_\_\_\_\_
- (21)  $8\frac{1}{8} \times 16\frac{1}{8} =$  \_\_\_\_\_ (mixed number)
- (22)  $651243 \div 6$  has a remainder of \_\_\_\_\_
- (23) If 6 pens cost \$.75 then 20 pens cost \$ \_\_\_\_\_
- (24) 9 cups is what per cent of a quart? \_\_\_\_\_ %
- (25)  $13 \times 154 =$  \_\_\_\_\_
- (26) The number of distinct elements in  $[\{f, i, v, e\} \cap \{s, i, x\}] \cup \{t, e, n\}$  is \_\_\_\_\_
- (27) The range of 2, 11, 3, 9, 14, and 5 is \_\_\_\_\_
- (28)  $15 \times 11 \times 25 =$  \_\_\_\_\_
- (29) Which of the following is a deficient number, 28, 66, or 85? \_\_\_\_\_
- \* (30) 41.6% of 1438 = \_\_\_\_\_
- (31)  $24^2 + 8^2 =$  \_\_\_\_\_
- (32) 243 cubic feet = \_\_\_\_\_ cubic yards
- (33)  $.111\dots - .1666\dots - .333\dots =$  \_\_\_\_\_

- (34) If  $x = -2$  and  $y = -1$  then  
 $(x - y)(x^2 + xy + y^2) =$  \_\_\_\_\_
- (35)  $(2 \times 3^4 + 5^6) \div 7$  has a remainder of \_\_\_\_\_
- (36)  $72 + 18 + 4 =$  \_\_\_\_\_ base 6
- (37) The sum of the roots of  
 $(3x - 2)(2x + 1) = 0$  is \_\_\_\_\_
- (38) 48% of 64 is 96% of \_\_\_\_\_
- (39)  $67^2 - 65^2 =$  \_\_\_\_\_
- \*(40)  $22 \times 44 \times 66 =$  \_\_\_\_\_
- (41) A nonagon has \_\_\_\_\_ distinct diagonals.
- (42) If  $4 - 5x > 3$  then  $x <$  \_\_\_\_\_
- (43) A is 25% more than B and B is 25% more than C. A is what % more than C? \_\_\_\_\_%
- (44)  $72 \times 11 + 99 \times 8 =$  \_\_\_\_\_
- (45) If  $5^{(x-1)} = 3125$  then  $x + 1 =$  \_\_\_\_\_
- (46)  $242 \div .181818\dots =$  \_\_\_\_\_
- (47) The area of a trapezoid with bases of 3" and 4" is 14 sq. in. Its height is \_\_\_\_\_ in.
- (48) The units digit of  $17^5$  is \_\_\_\_\_
- (49)  $2! \times 3! - 4! =$  \_\_\_\_\_
- \*(50)  $273849 \div 165 =$  \_\_\_\_\_
- (51) The product of the coefficients of  $(a + b)^5$  is \_\_\_\_\_
- (52)  $511 \times 212 =$  \_\_\_\_\_
- (53) Find  $k > 0$ , so that the five digit number 456k8 is divisible by 12. \_\_\_\_\_
- (54) If  $\log_9 k = 2.5$  then  $k =$  \_\_\_\_\_
- (55)  $44_8 \times 4_8 =$  \_\_\_\_\_ 8
- (56) 216 degrees =  $k\pi$  radians. Find k. \_\_\_\_\_
- (57) The shortest leg of a  $30^\circ - 60^\circ - 90^\circ$  is  $\frac{3}{4}$  " long. The hypotenuse is \_\_\_\_\_ inches

- (58) The Cartesian product of  $\{1,2,3\}$  and set A contains 15 ordered pairs. The number of elements in set A is \_\_\_\_\_
- (59)  $(2 - 5i)(3 - 4i) = (a + bi)$ . Find  $a - b$ . \_\_\_\_
- \*(60)  $75^2 \div 25^3 \times 50^4 =$  \_\_\_\_\_
- (61)  $79^2 - 76^2 + 73^2 - 70^2 =$  \_\_\_\_\_
- (62) If  $(4!)(3!)(2!) \cong x \pmod{8}$ , where  $0 \leq x \leq 7$ , then  $x =$  \_\_\_\_\_
- (63) The sum of the coefficients of  $(x + y)^6$  is \_\_\_\_
- (64) If  $f(x) = 3x^3 - 2x^2 + x$ , then  $f''(1) =$  \_\_\_\_\_
- (65) The sum of the first nine terms of the Fibonacci sequence 4,7,11,18,29,... is \_\_\_\_\_
- (66) Change .66 base 12 to a base 10 fraction. \_\_\_\_
- (67) How much time has past from 3:45 p.m. to 4:00 p.m. in one day? \_\_\_\_\_ seconds
- (68)  $\frac{8}{27} \times 111 =$  \_\_\_\_\_ (mixed number)
- (69)  $\log_2[\log_3(\log_2 512)] =$  \_\_\_\_\_
- \*(70)  $5^1 + 4^2 + 3^3 + 2^4 + 1^5 =$  \_\_\_\_\_
- (71) The ratio of x to y is 4 to 7. If  $x - y = -15$ , then  $x + y =$  \_\_\_\_\_
- (72)  $2(\sin 15^\circ)(\cos 15^\circ) - 1 =$  \_\_\_\_\_
- (73)  $\frac{1}{3} + \frac{1}{5} + \frac{1}{15} + \frac{1}{45} =$  \_\_\_\_\_
- (74) If  $f(x) = 5 + 3x$ , then  $f^{-1}(-2) =$  \_\_\_\_\_
- (75)  $2 \times 3 \times 11 \times 13 =$  \_\_\_\_\_
- (76)  $\frac{10}{11} - \frac{39}{45} =$  \_\_\_\_\_
- (77) The 7th septagonal number is \_\_\_\_\_
- (78)  $2^3 - 3^3 - 4^3 =$  \_\_\_\_\_
- (79)  $\int_0^3 x^2 dx =$  \_\_\_\_\_
- \*(80)  $546 \div 45 \frac{5}{11} \times 10.8 =$  \_\_\_\_\_

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\*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) 1980                                | (18) 9312              | (34) $-7$                                  | (58) 5                             |
| (2) $\frac{2}{3}$                       | (19) 20                | (35) 2                                     | (59) 9                             |
| (3) $28\frac{4}{7}$                     | *(20) 973 – 1074       | (36) 234                                   | *(60) 2,137,500 –<br>2,362,500     |
| (4) 30.45                               | (21) $131\frac{1}{64}$ | (37) $\frac{1}{6}$                         | (61) 894                           |
| (5) $112\frac{1}{2}$                    | (22) 3                 | (38) 32                                    | (62) 0                             |
| (6) $77\frac{7}{9}$                     | (23) \$2.50            | (39) 264                                   | (63) 64                            |
| (7) 576                                 | (24) 225               | *(40) 60694 – 67082                        | (64) 14                            |
| (8) $-2.5, -2\frac{1}{2}, -\frac{5}{2}$ | (25) 2002              | (41) 27                                    | (65) 514                           |
| (9) 976                                 | (26) 4                 | (42) $.2, \frac{1}{5}$                     | (66) $\frac{13}{24}$               |
| *(10) $(-138) - (-126)$                 | (27) 12                | (43) $56.25, 56\frac{1}{4}, \frac{225}{4}$ | (67) 900                           |
| (11) 1331                               | (28) 4125              | (44) 1584                                  | (68) $32\frac{8}{9}$               |
| (12) 18                                 | (29) 85                | (45) 7                                     | (69) 1                             |
| (13) 9.61                               | *(30) 569 – 628        | (46) 1331                                  | *(70) 62 – 68                      |
| (14) 132                                | (31) 640               | (47) 4                                     | (71) 55                            |
| (15) $-7\frac{1}{14}$                   | (32) 9                 | (48) 7                                     | (72) $-.5, -\frac{1}{2}$           |
| (16) $4\frac{1}{6}, \frac{25}{6}$       | (33) $-\frac{7}{18}$   | (49) $-12$                                 | (73) $\frac{28}{45}$               |
| (17) $\frac{8}{11}$                     |                        | *(50) 1577 – 1742                          | (74) $-2\frac{1}{3}, -\frac{7}{3}$ |
|   |                        | (51) 2500                                  | (75) 858                           |
|   |                        | (52) 108332                                | (76) $\frac{7}{165}$               |
|   |                        | (53) 4                                     | (77) 112                           |
|   |                        | (54) 243                                   | (78) $-83$                         |
|   |                        | (55) 220                                   | (79) 9                             |
|   |                        | (56) $1.2, 1\frac{1}{5}, \frac{6}{5}$      | *(80) 124 – 136                    |
|   |                        | (57) $1.5, 1\frac{1}{2}, \frac{3}{2}$      |                                    |