

The University Interscholastic League Number Sense Test • HS State • 2013

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!

- | | |
|--|--|
| <p>(1) $521 - 20 + 13 =$ _____</p> <p>(2) $156 \times 25 =$ _____</p> <p>(3) $3102 \div 5 =$ _____ (decimal)</p> <p>(4) $2013 - 521 =$ _____</p> <p>(5) $\frac{3}{16} =$ _____ % (decimal)</p> <p>(6) $5 - 21 \times 20 \div (1 + 3) =$ _____</p> <p>(7) $10\frac{11}{12} - 4\frac{5}{6} =$ _____ (mixed number)</p> <p>(8) $20 \times 13 + 20 \times 14 =$ _____</p> <p>(9) $17^2 =$ _____</p> <p>*(10) $3102 - 125 + 520 =$ _____</p> <p>(11) $521 \times 13 =$ _____</p> <p>(12) $23 \times \frac{23}{25} =$ _____ (mixed number)</p> <p>(13) MMCDLIX = _____ (Arabic Numeral)</p> <p>(14) 2.5 bushels = _____ pints</p> <p>(15) 72 is 18% of _____</p> <p>(16) $6\frac{2}{3} + 5\frac{9}{10} =$ _____ (mixed number)</p> <p>(17) $7 + 12 + 17 + 22 + \dots + 52 + 57 =$ _____</p> <p>(18) $521 \div 25 =$ _____ (decimal)</p> | <p>(19) $\frac{5}{11} - \frac{7}{22} - \frac{9}{44} =$ _____</p> <p>*(20) $520 \times 521 + 2013 =$ _____</p> <p>(21) The multiplicative inverse of $5\frac{6}{7}$ is _____</p> <p>(22) $-1 - 3 + 6 - 10 - -15 + 21 =$ _____</p> <p>(23) The total number of 2-element subsets and 4-element subsets of the set {e,i,g,h,t} is _____</p> <p>(24) $23^2 + 69^2 =$ _____</p> <p>(25) If $\frac{2}{x} + \frac{3}{5} = \frac{7}{10}$, then x = _____</p> <p>(26) $0.777\dots - 0.444\dots =$ _____</p> <p>(27) 55% of 60 minus 65 = _____</p> <p>(28) The 15th triangular number is _____</p> <p>(29) $3 + 6 + 9 + 12 + 15 + \dots + 36 + 39 =$ _____</p> <p>*(30) $132 \times 57 + 65 \times 129 =$ _____</p> <p>(31) If a = 6 and b = 9 then $(a + b)(a^2 + 2ab + b^2) =$ _____</p> <p>(32) $52_7 - 120_7 + 13_7 =$ _____ 7</p> <p>(33) $6! \div 5! + 4! \div 3! - 2! \div 1! =$ _____</p> <p>(34) $f(x) = 16x^2 - 24x + 9$. $f(7) =$ _____</p> <p>(35) If a dozen tees cost 84¢ then 30 tees cost \$ _____</p> |
|--|--|

- (36) How many distinct elements are in $(\{e,x,t,r,a\} \cap \{c,r,e,d,i,t\}) \cup \{p,o,i,n,t,s\}$? _____
- (37) $4\frac{2}{3} \div 2\frac{3}{4} =$ _____
- (38) The next term of the arithmetic sequence, $\dots \frac{3}{8}, \frac{31}{40}, 1\frac{7}{40}, \dots$ is _____
- (39) $1.0454545\dots =$ _____ (mixed number)
- *(40) $\sqrt{52113} =$ _____
- (41) 33% of $609\frac{1}{11} =$ _____
- (42) $\frac{31}{47} - \frac{5}{8} =$ _____
- (43) The angle supplementary to an interior angle of a regular decagon has a measure of _____ degrees
- (44) If $8^{(6)} = 4^{(3x+2)}$ then $x =$ _____
- (45) $3102_6 \times 5_6 =$ _____ ₆
- (46) If $\frac{x-16}{x+15} + \frac{x+15}{x-16}$ is written as the mixed number $A\frac{B}{C}$ then $B =$ _____
- (47) The sum of roots minus the product of the roots of $2x^3 - 3x^2 - 11x + 6 = 0$ is _____
- (48) $\frac{1}{4}(44^2 - 16^2) =$ _____
- (49) An interior angle of a regular hexagon has a measure of $k\pi$ radians. Find k . _____
- *(50) $(27\pi)(31e) =$ _____
- (51) $93^2 + 21^2 =$ _____
- (52) If two dice are rolled, the probability that the sum of the faces is less than 5 is _____%
- (53) ${}_6P_4 \div {}_6C_4 =$ _____
- (54) $(2+i)^2 = a+bi$. Find $a-b$. _____
- (55) If P varies directly with Q and $P = 15$ when $Q = 6$, find Q when $P = 20$. _____
- (56) $9\sin\left(\frac{\pi}{12}\right)\cos\left(\frac{\pi}{12}\right) =$ _____
- (57) Given the sequence 2, 6, 12, 20, ..., 110, k , 156. Find k . _____
- (58) $521 \times 213 =$ _____
- (59) 132 feet per second = _____ miles per hour
- *(60) $2013 \log 1001 =$ _____
- (61) If $\frac{3x}{8}$ has a remainder of 5 and $\frac{5y}{8}$ has a remainder of 3 then $\frac{xy}{8}$ has a remainder of _____
- (62) The first 4 digits of the decimal of $\frac{617}{990}$ is 0._____
- (63) $323 \times 111 =$ _____
- (64) A store has pens, pencils, markers, and crayons. How many different pairs of these items can be packaged? _____
- (65) If A is 40% of B and B is $\frac{3}{8}$ of C , then A is what percent of C ? _____%
- (66) $\frac{11\pi}{12}$ radians = _____ degrees
- (67) The Greatest Integer Function is written as $f(x) = [x]$. Find $[\sqrt{2} + \sqrt{3} + \sqrt{5}]$. _____
- (68) $4! \times 6! \div 8! =$ _____
- (69) $\sqrt{14641} =$ _____
- *(70) 1760 yards + 3 feet + 12 inches = _____ inches
- (71) $g(x) = 3x^2 + 1$ and $h(x) = 1 - 2x^3$. $g(h(-1)) =$ _____
- (72) $F(x) = x^3 - 3x^2 + 3x - 1$. Find $f'(2) =$ _____
- (73) If $\sqrt{72} + \sqrt{98} = \sqrt{x}$ then $x =$ _____
- (74) $\int_1^3 (x^{-2}) dx =$ _____
- (75) $97 \times \frac{98}{99} =$ _____ mixed number
- (76) The 7th term of the arithmetic sequence 5, 3.5, 2, 0.5, ... is _____
- (77) $(\frac{5}{8} + \frac{8}{5}) \div 2 =$ _____
- (78) Change $\frac{11}{16}$ to a base 4 decimal. _____ ₄
- (79) $(543_6)(123_6) \div 5$ has a remainder of _____
- *(80) $33 \times 33033 =$ _____

University Interscholastic League - Number Sense Answer Key HS • State • 2013

*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) 514 | (19) $-\frac{3}{44}$ | (36) 8 | (58) 110,973 |
| (2) 3,900 | *(20) $\frac{259,287 - 286,579}{286,579}$ | (37) $1\frac{23}{33}$ | (59) 90 |
| (3) 620.4 | (21) $\frac{7}{41}$ | (38) $1.575, \frac{63}{40}, 1\frac{23}{40}$ | *(60) $5,738 - 6,341$ |
| (4) 1,492 | (22) 2 | (39) $1\frac{1}{22}$ | (61) 1 |
| (5) 18.75 | (23) 15 | *(40) $217 - 239$ | (62) 6232 |
| (6) -100 | (24) 5,290 | (41) 201 | (63) 35,853 |
| (7) $6\frac{1}{12}$ | (25) 20 | (42) $\frac{13}{376}$ | (64) 10 |
| (8) 540 | (26) $\frac{1}{3}$ | (43) 36 | (65) 15 |
| (9) 289 | (27) -32 | (44) $\frac{7}{3}, 2\frac{1}{3}$ | (66) 165 |
| *(10) $3,323 - 3,671$ | (28) 120 | (45) 23514 | (67) 5 |
| (11) 6,773 | (29) 273 | (46) 961 | (68) $\frac{3}{7}$ |
| (12) $21\frac{4}{25}$ | *(30) $15,114 - 16,704$ | (47) $4.5, \frac{9}{2}, 4\frac{1}{2}$ | *(70) $60,238 - 66,578$ |
| (13) 2,459 | (31) 3,375 | (48) 420 | (71) 28 |
| (14) 160 | (32) -22 | (49) $\frac{2}{3}$ | (72) 3 |
| (15) 400 | (33) 8 | *(50) $6,791 - 7,505$ | (73) 338 |
| (16) $12\frac{17}{30}$ | (34) 625 | (51) 9,090 | (74) $\frac{2}{3}$ |
| (17) 352 | (35) \$2.10 | (52) $\frac{50}{3}, 16\frac{2}{3}$ | (75) $96\frac{2}{99}$ |
| (18) 20.84 | | (53) 24 | (76) -4 |
| | | (54) -1 | (77) $1.1125, \frac{89}{80}, 1\frac{9}{80}$ |
| | | (55) 8 | (78) .23 |
| | | (56) $2.25, \frac{9}{4}, 2\frac{1}{4}$ | (79) 2 |
| | | (57) 132 | *(80) $1,035,585 - 1,144,593$ |