

**The University Interscholastic League
Number Sense Test • HS SAC • 2004**

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!

- | | |
|--|---|
| <p>(1) $4002 - 2004 =$ _____</p> <p>(2) $148 \times 25 =$ _____</p> <p>(3) $2004 \div 6 =$ _____</p> <p>(4) $\frac{2}{3} + \frac{5}{6} =$ _____ (improper fraction)</p> <p>(5) $6 + 36 \div 9 \times 3 =$ _____</p> <p>(6) Which is larger, $\frac{4}{13}$ or $\frac{3}{14}$? _____</p> <p>(7) $\frac{1}{8} =$ _____ (decimal)</p> <p>(8) $374 \div 11 =$ _____</p> <p>(9) $2004 + 4 \times 2004 =$ _____</p> <p>* (10) $432 + 567 + 981 =$ _____</p> <p>(11) The GCD of 28 and 52 is _____</p> <p>(12) The additive inverse of 1.1 is _____</p> <p>(13) $19^2 =$ _____</p> <p>(14) $3\frac{4}{5}\% =$ _____ (proper fraction)</p> <p>(15) The mean of 2004 and 4002 is _____</p> <p>(16) $2 + 5 + 8 + \dots + 20 =$ _____</p> | <p>(17) $\frac{1}{3} + \frac{1}{9} + \frac{1}{27} =$ _____ (proper fraction)</p> <p>(18) $34 \times 43 =$ _____</p> <p>(19) MDCLXVI = _____ (Arabic Numeral)</p> <p>* (20) $1234 \times 567 =$ _____</p> <p>(21) The number of positive integral divisors of 24 is _____</p> <p>(22) $1\frac{4}{5} - 3\frac{2}{5} =$ _____ (mixed number)</p> <p>(23) $24680 \div 9$ has a remainder of _____</p> <p>(24) $24 \times 24 =$ _____</p> <p>(25) If 8 pencils cost 96¢ then 1 dozen cost \$ _____</p> <p>(26) $71 \times 74 =$ _____</p> <p>(27) $123_4 =$ _____₁₀</p> <p>(28) 16 ounces is what part of a gallon? _____</p> <p>(29) The largest prime number less than 35 is _____</p> <p>* (30) $97531 \div 246 =$ _____</p> <p>(31) $28 \times 75 =$ _____</p> <p>(32) $1 - 2 \times 3 + 4 \div 5 =$ _____</p> |
|--|---|

- (33) If $f(x) = x^2 + 4x + 4$ then $f(-4)$ is _____
- (34) $(125 \div 64)^{\frac{1}{3}} =$ _____
- (35) $111 \times 53 =$ _____
- (36) $.020202\dots =$ _____ (fraction)
- (37) 77 base 10 equals _____ base 7
- (38) Set $A = \{a, b, c, d\}$. How many proper subsets does set A have? _____
- (39) $77^2 - 76^2 =$ _____
- *(40) $\sqrt{765432} =$ _____
- (41) $1111_2 =$ _____ $_4$
- (42) GCD(15,28) times LCM(15,28) equals _____
- (43) $\frac{1}{14} =$ _____ % (mixed number)
- (44) If $4^x = 32$ then $x =$ _____
- (45) If $15 + 4x = 3$ then $3x - 4 =$ _____
- (46) 30 miles per hour = _____ ft/sec
- (47) ${}_6P_2 =$ _____
- (48) The 10th term of 2, 5, 10, 17, 26, ... is _____
- (49) The sum of the positive integral divisors of 28 is _____
- *(50) $42 \times 38 + 41 \times 39 =$ _____
- (51) A rectangle has _____ distinct diagonals.
- (52) $22^2 + 20^2 - 2^2 =$ _____
- (53) 9% of $833\frac{1}{3}$ is _____
- (54) If $\log_k(1728) = 3$, then $k =$ _____
- (55) Find the slope of the line containing the points (6,4) and (4, 8). _____
- (56) $\tan(-45^\circ) =$ _____
- (57) $303^2 =$ _____
- (58) A die is rolled. What is the probability that a multiple of 2 is shown? _____
- (59) ${}_5C_2 =$ _____
- *(60) $857142 \div 428571 \times 7777 =$ _____
- (61) $\frac{4}{7} - \frac{35}{64} =$ _____
- (62) If $f(x) = x^2 - 6$, find $f[f(2)]$. _____
- (63) $19^2 + 19 =$ _____
- (64) $2 \sin 120^\circ \cos 30^\circ =$ _____
- (65) $234_5 + 432_5 =$ _____ $_5$
- (66) How many 4-digit whole numbers less than 4444 are there? _____
- (67) Find x , $0 \leq x \leq 5$, if $3x \cong 17 \pmod{5}$. _____
- (68) $\frac{3}{4} + \frac{9}{16} + \frac{27}{64} + \dots =$ _____
- (69) $44 \times 25 \times 11 =$ _____
- *(70) $17^4 =$ _____
- (71) $121 \times 212 =$ _____
- (72) $56^2 - 55^2 + 54^2 - 53^2 =$ _____
- (73) $\sin(\text{Arccos } 1) =$ _____
- (74) If $f(x) = x^3 - 3x + 3$, then $f'(-3) =$ _____
- (75) The remainder when $x^3 - 3x + 3$ is divided by $x + 3$ is _____
- (76) The 11th triangular number is _____
- (77) $(2, \frac{\pi}{3})$ are polar coordinates for (x,y). $x =$ _____
- (78) If $f(x) = 2x + 2$, then $f^{-1}(-2) =$ _____
- (79) $\int_0^2 x \, dx =$ _____
- *(80) $28 \times 56 \times 14 \div 42 =$ _____

University Interscholastic League - Number Sense Answer Key HS • SAC • Fall 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) 1998 | (17) $\frac{13}{27}$ | (33) 4 | (57) 91809 |
| (2) 3700 | (18) 1462 | (34) $\frac{5}{4}$ or $1\frac{1}{4}$ or 1.25 | (58) $\frac{1}{2}$ or .5 |
| (3) 334 | (19) 1666 | (35) 5883 | (59) 10 |
| (4) $\frac{3}{2}$ | *(20) $\frac{664695}{734661}$ – | (36) $\frac{2}{99}$ | *(60) 14777 – 16331 |
| (5) 18 | (21) 8 | (37) 140 | (61) $\frac{11}{448}$ |
| (6) $\frac{4}{13}$ | (22) $-1\frac{3}{5}$ | (38) 15 | (62) – 2 |
| (7) .125 | (23) 2 | (39) 153 | (63) 380 |
| (8) 34 | (24) 576 | *(40) 832 – 918 | (64) 1.5 or $\frac{3}{2}$ or $1\frac{1}{2}$ |
| (9) 10020 | (25) 1.44 | (41) 33 | (65) 1221 |
| *(10) 1881 – 2079 | (26) 5254 | (42) 420 | (66) 3444 |
| (11) 4 | (27) 27 | (43) $7\frac{1}{7}$ | (67) 4 |
| (12) – 1.1 | (28) $\frac{1}{8}$ | (44) 2.5 or $\frac{5}{2}$ or $2\frac{1}{2}$ | (68) 3 |
| (13) 361 | (29) 31 | (45) – 13 | (69) 12100 |
| (14) $\frac{19}{500}$ | *(30) 377 – 416 | (46) 44 | *(70) 79345 – 87697 |
| (15) 3003 | (31) 2100 | (47) 30 | (71) 25652 |
| (16) 77 | (32) – 4.2, $-4\frac{1}{5}$ or $-\frac{21}{5}$ | (48) 101 | (72) 218 |
| | | (49) 56 | (73) 0 |
| | | *(50) 3036 – 3354 | (74) 24 |
| | | (51) 2 | (75) – 15 |
| | | (52) 880 | (76) 66 |
| | | (53) 75 | (77) 1 |
| | | (54) 12 | (78) – 2 |
| | | (55) – 2 | (79) 2 |
| | | (56) – 1 | *(80) 497 – 548 |