

The University Interscholastic League Number Sense Test • HS SAC • 2002

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!

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|--|---|
| <p>(1) $18 \times 13 =$ _____</p> <p>(2) $11 \times 74 =$ _____</p> <p>(3) $283 + 382 =$ _____</p> <p>(4) $\frac{1}{3} + \frac{1}{6} - \frac{1}{12} =$ _____ (fraction)</p> <p>(5) $503 \div 9 =$ _____ (mixed number)</p> <p>(6) Which is smaller, $\frac{3}{7}$ or $\frac{4}{9}$? = _____</p> <p>(7) $.045 =$ _____ (fraction)</p> <p>(8) $240 \times 25 =$ _____</p> <p>(9) $2003 - 3002 =$ _____</p> <p>*(10) $199 + 109 + 991 + 901 =$ _____</p> <p>(11) $19 \times \frac{19}{21} =$ _____ (mixed number)</p> <p>(12) The additive inverse of $-\frac{1}{3}$ is _____</p> <p>(13) $27^2 =$ _____</p> <p>(14) $\frac{7}{40} =$ _____ % (decimal)</p> <p>(15) $2\frac{2}{3} - 3\frac{5}{6} =$ _____</p> <p>(16) $3 + 5 + 7 + \dots + 31 =$ _____</p> | <p>(17) 14% of 40 = _____</p> <p>(18) The GCF of 35 and 63 is _____</p> <p>(19) The median of 12, 21, 5, 11, and 30 is _____</p> <p>*(20) $21 \times 758 =$ _____</p> <p>(21) If 2 cans of corn cost 49¢ then a half dozen cans will cost \$ _____</p> <p>(22) $95 \times 45 =$ _____</p> <p>(23) $33^2 + 11^2 =$ _____</p> <p>(24) $4\frac{1}{4} \times 8\frac{1}{4} =$ _____</p> <p>(25) $2002 \div 6$ has a remainder of _____</p> <p>(26) The number 36 has how many positive integral divisors? _____</p> <p>(27) $54 \times 51 =$ _____</p> <p>(28) $.272727\dots =$ _____ (fraction)</p> <p>(29) $212_5 =$ _____₁₀</p> <p>*(30) $13 \times 15 \times 17 =$ _____</p> <p>(31) The sum of the roots of $2x^2 - 3x + 1$ is _____</p> |
|--|---|

- (32) 42% of _____ is 84% of 26
- (33) 3 pints = _____ ounces
- (34) If $f(x) = 2x^2 - 3x + 1$ then $f(4) =$ _____
- (35) $(1728)^{\frac{1}{3}} =$ _____
- (36) $3\frac{4}{5} \times 3\frac{1}{5} =$ _____ (mixed number)
- (37) If 9 is to x as 12 is to 16 then x = _____
- (38) The product of the prime numbers less than 11 is _____
- (39) $(20 \times 44) - (18 \times 22) =$ _____
- *(40) $\sqrt{23456} =$ _____
- (41) $991 \times 991 =$ _____
- (42) $21 \times 31 =$ _____
- (43) 3 gallons = _____ cubic inches
- (44) The next term of 1, 5, 13, 25, 41, ... is _____
- (45) If $3x - 4 = 8$ then $3x + 1 =$ _____
- (46) If $5^{x-1} = 17.3$ then $5^x =$ _____
- (47) For $2x^2 - 4x - k = 0$ to have two distinct real roots the smallest value of k has to be greater than _____
- (48) 15 miles per hour = _____ ft/sec
- (49) $48_9 =$ _____₃
- *(50) $33 \times 31 + 31 \times 29 =$ _____
- (51) An obtuse triangle has integer sides of 3, x, and 7. The largest value of x is _____
- (52) Find the slope of the line containing the points (7,4) and (4, 8). _____
- (53) $(2i)^6 =$ _____
- (54) Find the 25th term of 3, 8, 13, 18, 23, ... _____
- (55) ${}_5P_3 =$ _____
- (56) $\sin 3\pi =$ _____
- (57) 3 cubic yards = _____ cubic feet
- (58) If $\log_x 216 = 3$ then x = _____
- (59) The simplified coefficient of the 4th term in the expansion of $(2x - y)^5$ is _____
- *(60) $857142 \times 427 =$ _____
- (61) Find $f(3)$ if $f(x) = \log_3 x - 4$. _____
- (62) $\cos^2 30^\circ - \sin^2 30^\circ =$ _____
- (63) The number of distinct diagonals of a 5 sided regular polygon is _____
- (64) If $h(x) = x^3 - 1$ and $g(x) = (x - 1)^3$ then $g(h(-1)) =$ _____
- (65) If $9 - x > x - 9$ then $x <$ _____
- (66) $(10 + 9)^2 + (10^2 - 9^2) =$ _____
- (67) A bag has 3 red, 6 white and 9 blue marbles. What is the probability of drawing a red marble? _____
- (68) $44_5 \times 4_5 =$ _____₅
- (69) $10^{\log 3} =$ _____
- *(70) $(e)^4 =$ _____
- (71) Change $\frac{9}{16}$ to a base 4 decimal. _____
- (72) $2^8 \div 4^3$ has a remainder of _____
- (73) If $f(x) = 3x + 2$, then $f^{-1}(-2) =$ _____
- (74) If $f(x) = x^2 - 2x + 2$, then $f'(2) =$ _____
- (75) $\int_1^4 2x \, dx =$ _____
- (76) If $g(x) = 3 - x + x^2$ then the axis of symmetry is x = _____
- (77) $\frac{3}{5} + \frac{5}{3} - 2 =$ _____
- (78) $\lim_{x \rightarrow 3} (2x - 6) =$ _____
- (79) $1^3 - 2^3 + 3^3 - 4^3 + 5^3 =$ _____
- *(80) $41 \times 43 \div 51 \times 53 =$ _____

University Interscholastic League - Number Sense Answer Key HS • SAC • Fall 2002

*number) $x - y$ means an integer between x and y inclusive

NOTE: If answer is of the type like $\frac{2}{3}$ it cannot be written as .666... or . $\overline{6}$

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|-----------------------|-------------------------------------|--|--|
| (1) 234 | (17) 5.6 or $5\frac{3}{5}$ | (32) 52 | (57) 81 |
| (2) 814 | (18) 7 | (33) 48 | (58) 6 |
| (3) 665 | (19) 12 | (34) 21 | (59) - 40 |
| (4) $\frac{5}{12}$ | *(20) 15123 —
16713 | (35) 12 | *(60) 347,699,653 -
384,299,615 |
| (5) $55\frac{8}{9}$ | (21) 1.47 | (36) $12\frac{4}{25}$ | (61) - 3 |
| (6) $\frac{3}{7}$ | (22) 4275 | (37) 12 | (62) .5 or $\frac{1}{2}$ |
| (7) $\frac{9}{200}$ | (23) 1210 | (38) 210 | (63) 5 |
| (8) 6000 | (24) $35\frac{1}{16}$ or
35.0625 | (39) 484 | (64) - 27 |
| (9) - 999 | (25) 4 | *(40) 146 - 160 | (65) 9 |
| *(10) 2090 - 2310 | (26) 9 | (41) 982,081 | (66) 380 |
| (11) $17\frac{4}{21}$ | (27) 2754 | (42) 651 | (67) $\frac{1}{6}$ |
| (12) $\frac{1}{3}$ | (28) $\frac{3}{11}$ | (43) 693 | (68) 341 |
| (13) 729 | (29) 57 | (44) 61 | (69) 3 |
| (14) 17.5 | *(30) 3150 - 3480 | (45) 13 | *(70) 52 - 57 |
| (15) - $1\frac{1}{6}$ | (31) $\frac{3}{2}$ or 1.5 | (46) 86.5 or $86\frac{1}{2}$ | (71) .21 |
| (16) 255 | | (47) - 2 | (72) 0 |
| | | (48) 22 | (73) - $\frac{4}{3}$ or - $1\frac{1}{3}$ |
| | | (49) 1122 | (74) 2 |
| | | *(50) 1826 - 2018 | (75) 15 |
| | | (51) 9 | (76) $\frac{1}{2}$ |
| | | (52) - $\frac{4}{3}$ or - $1\frac{1}{3}$ | (77) $\frac{4}{15}$ |
| | | (53) - 64 | (78) 0 |
| | | (54) 123 | (79) 81 |
| | | (55) 60 | *(80) 1741 - 1923 |
| | | (56) 0 | |