

The University Interscholastic League

Number Sense Test • HS SAC • 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!

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|---|--|
| <p>(1) $2007 + 2008 =$ _____</p> <p>(2) $8002 - 2007 =$ _____</p> <p>(3) $25 \times 2008 =$ _____</p> <p>(4) $2008 \div 9 =$ _____ (mixed number)</p> <p>(5) $2.008 + 80.02 =$ _____ (decimal)</p> <p>(6) $\frac{2}{7} \div \frac{3}{8} =$ _____</p> <p>(7) $(-3) \times 1\frac{1}{2} =$ _____ (mixed number)</p> <p>(8) $28\% =$ _____ (proper fraction)</p> <p>(9) $4 + 64 \div 16 \times 8 - 32 =$ _____</p> <p>*(10) $38 + 979 + 1176 =$ _____</p> <p>(11) $14^2 =$ _____</p> <p>(12) $33 \times 27 =$ _____</p> <p>(13) $3\frac{4}{5} \times 1\frac{2}{3} =$ _____ (mixed number)</p> <p>(14) 1.4 is what % of 20? _____ %</p> <p>(15) MMX — II = _____ (Arabic Numeral)</p> <p>(16) The LCM of 5, 6, and 15 is _____</p> | <p>(17) Which is smaller, $\frac{4}{7}$ or $\frac{5}{9}$? _____</p> <p>(18) The mean of 18 and 26 is _____</p> <p>(19) $9 \text{ ft.} \times 6 \text{ ft.} \times 3 \text{ ft.} =$ _____ cubic yards</p> <p>*(20) $20708 \div 278 =$ _____</p> <p>(21) $12345 \div 4$ has a remainder of _____</p> <p>(22) 56 has _____ positive prime divisors</p> <p>(23) $\sqrt[3]{-1331} =$ _____</p> <p>(24) If a pen cost 13¢ then 12 pens cost \$ _____</p> <p>(25) $.121212\dots + .151515\dots =$ _____</p> <p>(26) $200_8 =$ _____ $_{10}$</p> <p>(27) The set {M,A,T,H} has _____ subsets</p> <p>(28) If $\frac{x}{4} = \frac{4}{5}$, then $x =$ _____</p> <p>(29) $1.5 \times 2.5 \times 4.4 =$ _____ (decimal)</p> <p>*(30) $29 \times 33 + 29 \times 66 =$ _____</p> <p>(31) If $f(x) = x^2 - 2x - 3$ then $f(3)$ is _____</p> <p>(32) $123 \times 17 =$ _____</p> |
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- (33) 33 plus 25% of 44 is _____
- (34) $(41 + 9 \times 12) \div 7$ has a remainder of _____
- (35) $(8)^{\frac{2}{3}}$ = _____
- (36) $1 + 1 + 2 + 3 + 5 + 8 + 13 =$ _____
- (37) A regular hexagon with side length of 4" has a perimeter of _____ inches
- (38) The smallest root of $x^2 + x = 20$ is _____
- (39) $123 \times 9 + 4 =$ _____
- *(40) $\sqrt{13579} =$ _____
- (41) If $6^x = 30$ then $6^{(x-1)} =$ _____
- (42) $64 \div .25 =$ _____
- (43) The smallest leg of a right triangle with integral sides is 7". The hypotenuse is _____ "
- (44) If $2x + 3 = 4$ then $5x - 6 =$ _____
- (45) The x-intercept of the line $3x - 2y = 1$ is (h, k). Find h. _____
- (46) $202^2 =$ _____
- (47) If $x < 3$, then $x^2 + 1 <$ _____
- (48) $112 \times 401 =$ _____
- (49) $22 \times 4! + 32 \times 3! =$ _____
- *(50) $15^3 \times 9^3 \div 3^3 =$ _____
- (51) ${}_5P_3 =$ _____
- (52) $(1 - 2i)(3 + 4i) = (a + bi)$. Find b. _____
- (53) If x and y vary directly and $x = 3$ when $y = 12$, find x when $y = 8$. _____
- (54) 12% of $233\frac{1}{3}$ is _____
- (55) If $\log_x 36 = 2$ then $x =$ _____
- (56) The largest integer such that $2x - 2 \leq 2$ is _____
- (57) $9 + 3 + 1 + \frac{1}{3} + \dots =$ _____
- (58) The radius of the circle $x^2 + y^2 = 16$ is _____
- (59) $55_6 + 5_6 =$ _____ ₆
- *(60) $625 \times 888 \div 55 =$ _____
- (61) If $\sqrt{1 + \sqrt{2 + \sqrt{x}}} = 3$ then $x =$ _____
- (62) $\frac{6}{11} - \frac{16}{35} =$ _____
- (63) $67^2 =$ _____
- (64) The volume of a right circular cylinder 3" high with a radius of 1" is $k\pi$ cu. in. $k =$ _____
- (65) $\sqrt{9801} =$ _____
- (66) The slope of the line $3x - 2y = 5$ is _____
- (67) $2 \sin \frac{\pi}{12} \cos \frac{\pi}{12} =$ _____
- (68) The simplified coefficient of the x^2 term in the expansion of $(2x - 3)^3$ is _____
- (69) If $(\sqrt{a^3})(\sqrt[3]{a^4}) = (\sqrt[n]{a^k})$ then $k =$ _____
- *(70) $7e^2 \times 9\pi^2 =$ _____
- (71) If $f(x) = 2 - x$ and $g(x) = x + 2$ then $g(f(-2)) =$ _____
- (72) The smaller root of $8x^2 + 25x + 3 = 0$ is _____
- (73) Change .12 base 5 to a base 10 fraction. _____
- (74) Find k, $0 \leq k \leq 7$, if $(4!)(2!) \cong k \pmod{8}$. _____
- (75) If $f(x) = x^3 - x^2 + x$, then $f'(1) =$ _____
- (76) A vertical asymptote for $y = \frac{1}{x+1}$ is $x =$ _____
- (77) $\frac{1}{42} + \frac{1}{56} + \frac{1}{72} =$ _____
- (78) $\int_0^2 x^3 dx =$ _____
- (79) $111 \times 45 =$ _____
- *(80) $898 \div 37.5\% \times \frac{1}{8} =$ _____

University Interscholastic League - Number Sense Answer Key HS • SAC • Fall 2007

*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

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| (1) 4015 | (17) $\frac{5}{9}$ | (33) 44 | (57) $13.5, \frac{27}{2}, 13\frac{1}{2}$ |
| (2) 5995 | (18) 22 | (34) 2 | (58) 4 |
| (3) 50200 | (19) 6 | (35) 4 | (59) 104 |
| (4) $223\frac{1}{9}$ | * (20) $71 - 78$ | (36) 33 | * (60) $9587 - 10595$ |
| (5) 82.028 | (21) 1 | (37) 24 | (61) 3844 |
| (6) $\frac{16}{21}$ | (22) 2 | (38) $- 5$ | (62) $\frac{34}{385}$ |
| (7) $- 4\frac{1}{2}$ | (23) $- 11$ | (39) 1111 | (63) 4489 |
| (8) $\frac{7}{25}$ | (24) \$1.56 | * (40) $111 - 122$ | (64) 3 |
| (9) 4 | (25) $\frac{3}{11}$ | (41) 5 | (65) 99 |
| * (10) $2084 - 2302$ | (26) 128 | (42) 256 | (66) $1.5, \frac{3}{2}, 1\frac{1}{2}$ |
| (11) 196 | (27) 16 | (43) 25 | (67) .5 or $\frac{1}{2}$ |
| (12) 891 | (28) $3.2, \frac{16}{5}, 3\frac{1}{5}$ | (44) $- 3.5, - \frac{7}{2}, - 3\frac{1}{2}$ | (68) $- 36$ |
| (13) $6\frac{1}{3}$ | (29) 16.5 | (45) $\frac{1}{3}$ | (69) 17 |
| (14) 7 | * (30) $2728 - 3014$ | (46) 40804 | * (70) $4365 - 4824$ |
| (15) 2008 | (31) 0 | (47) 10 | (71) 6 |
| (16) 30 | (32) 2091 | (48) 44912 | (72) $- 3$ |
| | | (49) 720 | (73) $\frac{7}{25}$ or .28 |
| | | * (50) $86569 - 95681$ | (74) 0 |
| | | (51) 60 | (75) 2 |
| | | (52) $- 2$ | (76) $- 1$ |
| | | (53) 2 | (77) $\frac{1}{18}$ |
| | | (54) 28 | (78) 4 |
| | | (55) 6 | (79) 4995 |
| | | (56) 2 | * (80) $285 - 314$ |