

**The University Interscholastic League
Number Sense Test • HS State • 2003**

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) $2003 - 1776 =$ _____</p> <p>(2) $18 \times 18 =$ _____</p> <p>(3) $25 \times 2003 =$ _____</p> <p>(4) $9 \times (5 + 3) - 7 \div 2 =$ _____</p> <p>(5) $6\frac{3}{4}\%$ = _____ (decimal)</p> <p>(6) $2\frac{3}{8} - 3\frac{1}{4} =$ _____</p> <p>(7) $1.2 \times 1.25 =$ _____ (decimal)</p> <p>(8) MCDLIX = _____ (Arabic Numeral)</p> <p>(9) $\frac{5}{16} =$ _____ % (decimal)</p> <p>*(10) $1 - 11 + 111 - 1111 + 11111 =$ _____</p> <p>(11) $\frac{1}{3} - \frac{5}{6} + \frac{2}{9} =$ _____ (fraction)</p> <p>(12) The LCM of 28, 42, and 56 is _____</p> <p>(13) The mean of 2, 3, 5, 7, 5, 3, 2, 5 is = _____</p> <p>(14) $13 \times 245 =$ _____</p> <p>(15) $4\frac{1}{4}\%$ of 1200 = _____</p> <p>(16) $94 - 12 + 70 + 82 - 24 =$ _____</p> <p>(17) $37 \times 24 =$ _____</p> | <p>(18) Which is larger, $\frac{9}{11}$ or 81%? _____</p> <p>(19) $\frac{21}{40} =$ _____ %</p> <p>*(20) $\sqrt[3]{1730} \times 145 =$ _____</p> <p>(21) If 8 slats cost \$1.20 then 14 slats cost \$ _____</p> <p>(22) $65 \times 45 =$ _____</p> <p>(23) 2122 in base 3 = _____ in base 9</p> <p>(24) 108 is what % more than 81? _____</p> <p>(25) The sum of the proper positive integral divisors of 36 is _____</p> <p>(26) $-164 \times -161 =$ _____</p> <p>(27) $\frac{2}{3}$ of a mile = _____ feet</p> <p>(28) .3050505... = _____ (fraction)</p> <p>(29) $(24 \times 34 - 44) \div 7$ has a remainder of _____</p> <p>*(30) $27 \times 29 \times 31 \times 33 =$ _____</p> <p>(31) The equation $2x^3 - bx^2 + cx = d$ has roots r, s, and t. If $rst = 3.5$ then $d =$ _____</p> <p>(32) If $x = -4$ and $y = -5$ then $(x + y)(x^2 - xy + y^2) =$ _____</p> <p>(33) $222_9 - 66_9 =$ _____ ₉</p> |
|--|--|

- (34) $1.2^2 + 3.6^2 =$ _____
- (35) $65 \times 625 =$ _____
- (36) $12 \frac{1}{4} \times 8 \frac{1}{4} =$ _____ (mixed number)
- (37) If $x^2 - y^2 = -67$ then x is _____
- (38) $89 \times 84 =$ _____
- (39) $(2197)^{\frac{1}{3}} =$ _____
- *(40) $\sqrt{6123457} =$ _____
- (41) $991 \times 989 =$ _____
- (42) An obtuse triangle has integer side lengths of x , 7, and 11. The smallest value of x is _____
- (43) The next term of 2, 9, 28, 65, 126,... is _____
- (44) $105 \times 715 =$ _____
- (45) $133 \times 311 =$ _____
- (46) If $8^{x+1} = -24$ then $2^{3x} =$ _____
- (47) The slope of the line perpendicular to the line containing the points (3, -1) and (-3, 1) is _____
- (48) $214 \times 314 =$ _____
- (49) For $3x^2 - 2x + 1 - k = 0$ to have equal roots, k has to have a value of _____
- *(50) $6388 \times 3.75 =$ _____
- (51) $509 \times 509 =$ _____
- (52) $25553 \div 1111 =$ _____
- (53) If $(2 - 3i) \div (3 - 2i) = a + bi$, then $a =$ _____
- (54) The coefficient of the 2nd term of the expansion of $(x - 2y)^5$ is _____
- (55) $\frac{11! - 9!}{10!} =$ _____
- (56) The probability of success is $\frac{8}{17}$. The odds of failure is _____
- (57) $\log_4 256 \div \log_4 16 \times \log_4 64 =$ _____
- (58) ${}^9P_3 \div {}^9C_6 =$ _____
- (59) $\cos 95^\circ \cos 25^\circ - \sin 95^\circ \sin 25^\circ =$ _____
- *(60) $112 \times 123 + 132 \times 121 =$ _____
- (61) $429 \times 357 =$ _____
- (62) If all of the letters of the words "STATE MEET" are put in a bag, what is the probability of drawing out an "E"? _____
- (63) If $x - y = \frac{3}{5}$ and $y + x = -\frac{5}{3}$, then $x =$ _____
- (64) The sum of the measures of the angles in a regular decagon is _____ degrees
- (65) Find $f(-\frac{29}{10})$ if $f(x) = [x]$. _____
- (66) $42^2 + (40^2 - 2^2) =$ _____
- (67) $\frac{11}{14} + \frac{3}{11} - 2 =$ _____ (mixed number)
- (68) $25 \times 77 + 25 \times 34 =$ _____
- (69) $135_7 \times 4_7 =$ _____₇
- *(70) $\pi^3 \times e^4 =$ _____
- (71) Change $.111_7$ to a base 10 fraction. _____
- (72) $1001 \times 25 = 143 \times$ _____
- (73) $\frac{5}{7} + \frac{7}{5} - 3 =$ _____
- (74) If $f(x) = \frac{2x+1}{x-2}$ then $f^{-1}(3) =$ _____
- (75) $7 \times \frac{7}{15} - 7 =$ _____ (mixed number)
- (76) In QI, $\sin \frac{\pi}{6} + \cos \frac{2\pi}{6} = \tan \frac{\pi}{k}$ and $k =$ _____
- (77) $2^3 \times 8^3 \times 5^3 =$ _____
- (78) $\int_0^\pi \cos x \, dx =$ _____
- (79) $7(7!) + 6(6!) + \dots + 2(2!) + 1(1!) =$ _____
- *(80) $16667 \div 8333 \times 555 =$ _____

University Interscholastic League - Number Sense Answer Key HS • State • 2003

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

NOTE: If an answer is of the type like $\frac{1}{3}$ it cannot be written as a repeating decimal

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|--|---|---|------------------------------|
| (1) 227 | (18) $\frac{9}{11}$ | (34) 14.4 | (58) 6 |
| (2) 324 | (19) 52.5 or $52\frac{1}{2}$ or $\frac{105}{2}$ | (35) 40625 | (59) $-\frac{1}{2}$ or $-.5$ |
| (3) 50075 | * (20) 1654 - 1827 | (36) $101\frac{1}{16}$ | * (60) 28261 - 31235 |
| (4) 68.5 or $68\frac{1}{2}$ or $\frac{137}{2}$ | (21) 2.10 | (37) 33 | (61) 153153 |
| (5) .0675 | (22) 2925 | (38) 7476 | (62) $\frac{1}{3}$ |
| (6) $-\frac{7}{8}$ or $-.875$ | (23) 78 | (39) 13 | (63) $-\frac{8}{15}$ |
| (7) 1.5 | (24) $33\frac{1}{3}$ or $\frac{100}{3}$ | * (40) 2351 - 2598 | (64) 1440 |
| (8) 1459 | (25) 55 | (41) 980099 | (65) - 3 |
| (9) 31.25 | (26) 26404 | (42) 5 | (66) 3360 |
| * (10) 9596 - 10606 | (27) 3520 | (43) 217 | (67) $-\frac{145}{154}$ |
| (11) $-\frac{5}{18}$ | (28) $\frac{151}{495}$ | (44) 75075 | (68) 2775 |
| (12) 168 | (29) 2 | (45) 41363 | (69) 606 |
| (13) 4 | * (30) 760959 - 841059 | (46) - 3 | * (70) 1609 - 1777 |
| (14) 3185 | (31) 7 | (47) 3 | (71) $\frac{57}{343}$ |
| (15) 51 | (32) - 189 | (48) 67196 | (72) 175 |
| (16) 210 | (33) 145 | (49) $\frac{2}{3}$ | (73) $-\frac{31}{35}$ |
| (17) 888 | | * (50) 22758 - 25152 | (74) 7 |
| | | (51) 259081 | (75) $-3\frac{11}{15}$ |
| | | (52) 23 | (76) 4 |
| | | (53) $\frac{12}{13}$ | (77) 512000 |
| | | (54) - 10 | (78) 0 |
| | | (55) $10\frac{9}{10}$ or $\frac{109}{10}$ or 10.9 | (79) 40319 |
| | | (56) $\frac{9}{8}$ or $1\frac{1}{8}$ or 1.125 | * (80) 1055 - 1165 |
| | | (57) 6 | |