The University Interscholastic League
Number Sense Test ● HS SAC ● 2015

Final _____ _____

Contestant's Number _____ 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!

(1) $915 + 519 =$ _____

(2) $337 - 245 =$ _____

(3) $231 \times 4 =$ _____

(4) $2418 \div 6 =$ _____

(5) 44% = _____ (proper fraction)

(6) $3\frac{4}{5} =$ _____ (decimal)

(7) 0.125 = _____ (proper fraction)

(8) $8 + 12 \times 4 \div 6 =$ _____

(9) $16^2 =$ _____

***(10)** $2016 + 201 + 216 + 26 =$ _____

(11) $1\frac{1}{2} + 2\frac{2}{3} =$ _____ (mixed number)

(12) $64 \times 25 =$ _____

(13) 345 ÷ 9 has a remainder of _____

(14) 15% of 38 = _____

(15) Which is smaller, $\frac{4}{9}$ or $\frac{6}{11}$? _____

(16) $2\frac{2}{3} - 1\frac{1}{2} =$ _____ (mixed number)

(17) The GCD of 28, 56, and 63 is _____

(18) CCLVIII = _____ (Arabic Numeral)

(19) 2 yards + 1 foot = _____ inches

***(20)** $92015 \div 498 =$ _____

(21) $3^2 + 9^2 =$ _____

(22) $9 + |15 - 10| - |1 - 5| =$ _____

(23) If 6 eggs cost 78¢ then 9 eggs cost $ _____

(24) $2 + 4 + 6 + 8 + ... + 18 + 20 =$ _____

(25) The sum of the prime numbers less than 10 is ____

(26) $\sqrt[3]{729} =$ _____

(27) 15% of $233\frac{1}{3} =$ _____

(28) Let x = − 5. Find 4 + 3x. _____

(29) Set m = {m,e,n,t,a,l} and M = {m,a,t,h}. $M \cup m$ contains how many distinct elements? _____

***(30)** $2\frac{1}{4} \times 92015 \div 9 =$ _____

(31) 44 base 5 in base 10 is _____

(32) If 5 − 2x = 3, then 2 + 3x = _____

(33) 0.151515... = _____ (proper fraction)

(34) $2\frac{2}{3} \times 1\frac{1}{2}$ = _____

(35) $(17 \times 22 + 35) \div 4$ has a remainder of _____

(36) 37×43 = _____

(37) $12 \times \frac{13}{14}$ = _____ (mixed number)

(38) The perimeter of a rectangle with a of length of 4.25" and a width of 3.25" is _____ inches

(39) If a = 13 and b = 8, then $a^2 + 2ab + b^2$ = _____

*(40) $\sqrt{91015}$ = _____

(41) 20% of 30 — 40% of 50 is _____

(42) Let $12^3 \times 12^{-5} = 12^k$. Find k. _____

(43) $13 \times 15 + 1$ = _____

(44) The midpoint of the segment with endpoints (1, 3) and (5, 7) is (x, y). Find x + y. _____

(45) $234_7 + 56_7$ = _____$_7$

(46) The leg opposite the 30° angle in a right triangle is 6 inches. The hypotenuse is _____ inches

(47) If $5^{-1} + x^{-1} = 2^{-1}$ then x = _____

(48) The product of the roots of $(x + 3)^2 = 0$ is _____

(49) The least value of x such that $|x - 1| \leq 3$ is _____

*(50) $15^2 \times 11^3$ = _____

(51) $(5 + 6i)(5 - 6i) = (a + bi)$. Find (a + b). _____

(52) The number of Platonic solids is _____

(53) Find the 8th term of the arithmetic sequence, 11, 8, 5, 2, ... _____

(54) $\frac{3!}{4!}$ = _____

(55) ${}_8C_6 - {}_8P_2$ = _____

(56) How many subsets containing only 4 elements does the set {p,r,e,c,a,l} have? _____

(57) The sum of the terms in the 4th row of Pascal's triangle is _____

(58) 151×212 = _____

(59) The probability of selecting a prime number from the set of digits is _____%

*(60) $69875 \div 142.857$ = _____

(61) The sum of the positive integral divisors of 20 is __

(62) $(x^3 - 6x - 10) \div (x - 2)$ has a remainder of ____

(63) Find k if $\begin{vmatrix} k & 3 \\ 2 & -5 \end{vmatrix} = 7$. k = _____

(64) If $\log_5(2x + 1) = 3$ then x = _____

(65) The volume of a cone with a diameter of 8" and a height of 12" is _____π cu. in

(66) Change 0.22 base 4 to a base 8 decimal. _____$_8$

(67) The Greatest Integer Function is written as $f(x) = [x]$. Find $[\sin 30° + \cos 30°]$. _____

(68) $F(x) = 3x^2 - 1$. $G(x) = 3 + 2x$. F(G(—1)) = _____

(69) $\sin^2(\frac{2\pi}{3}) + \cos^2(\frac{2\pi}{3})$ = _____

*(70) $(2 + 4 + 6 + 8 + 10 + 12 + 14)^2$ = _____

(71) The sum of the first 3 pentagonal numbers is _____

(72) The first four digits of the decimal for $\frac{16}{90}$ is 0.___

(73) $11^{10} \div 9$ has a remainder of _____

(74) The domain of the function $\sqrt{2 - 3t}$ is $t \leq$ _____

(75) If $f(x) = 1 + \frac{2x-3}{4}$, then $f^{-1}(5)$ = _____

(76) Let $f(x) = x^3 - 5x^2 + 2x + 4$. Find $f'(3)$ = _____

(77) $\int_1^2 (2x - 1)\,dx$ = _____

(78) Round $3\sqrt{2}$ to the nearest tenth. _____

(79) The minimum value of $f(x) = 3(x - 2)^2 + 5$ is ____

*(80) The interest on $5000 for 5 years at 5.5% compounded annually is _____ dollars

2014-2015 HSNS SAC Answer Key

(1) 1434

(2) 92

(3) 924

(4) 403

(5) $\frac{11}{25}$

(6) 3.8

(7) $\frac{1}{8}$

(8) 16

(9) 256

***(10) 2336-2581**

(11) $4\frac{1}{6}$

(12) 1600

(13) 3

(14) 5.7, $\frac{57}{10}$**,** $5\frac{7}{10}$

(15) $\frac{4}{9}$

(16) $1\frac{1}{6}$

(17) 7

(18) 258

(19) 84

***(20) 175-194**

(21) 90

(22) 10

(23) 1.17

(24) 110

(25) 17

(26) 9

(27) 35

(28) -11

(29) 7

***(30) 21853-24153**

(31) 24

(32) 5

(33) $\frac{5}{33}$

(34) 4

(35) 1

(36) 1591

(37) $11\frac{1}{7}$

(38) 15

(39) 441

***(40) 286-316**

(41) -14

(42) -2

(43) 196

(44) 8

(45) 323

(46) 12

(47) $\frac{10}{3}$**,** $3\frac{1}{3}$

(48) 9

(49) -2

***(50) 284501-314448**

(51) 61

(52) 5

(53) -10

(54) .25, $\frac{1}{4}$

(55) -28

(56) 15

(57) 8

(58) 32012

(59) 40

***(60) 464-513**

(61) 42

(62) -14

(63) $-2\frac{3}{5}$**,** $\frac{-13}{5}$

(64) 62

(65) 64

(66) .5

(67) 1

(68) 2

(69) 1

***(70) 2979-3292**

(71) 18

(72) 1777

(73) 7

(74) $\frac{2}{3}$

(75) $\frac{19}{2}$**,** $9\frac{1}{2}$**, 9.5**

(76) -1

(77) 2

(78) 4.2

(79) 5

***(80) 1458-1611**