1st Score: __________	2nd Score: __________	3rd Score: __________	
Grader: ____________	Grader: ____________	Grader: ____________	**Final Score**

Name: ___________________________________ School: ___________________________________

SS/ID Number: ____________________________ City: _____________________________________

Grade: 9 10 11 12 Classification: 1A 2A 3A 4A 5A

TMSCA HIGH SCHOOL
NUMBER SENSE
STATE MEET ©
MARCH 15, 2014

GENERAL DIRECTIONS

1. Write only the requested information on this cover sheet. Do not make any additional marks on this cover sheet.
2. You will be given 10 minutes to take this test.
3. There are 80 problems on the test.
4. Write in ink only! It would be advantageous to use non-black ink.
5. Solve as many problems as you can in the order that they appear.
6. Problems that are skipped are considered wrong.
7. Problems that appear after the last attempted problem do not count either for or against you.
8. ALL PROBLEMS ARE TO BE SOLVED MENTALLY! [No scratch work!]
9. Only the answer may be written in the answer blank.
10. Starred [*] problems require approximate INTEGRAL answers that are within 5% of the exact answers. All other problems require exact answers.
11. All problems answered correctly are worth FIVE points. FOUR points will be deducted for all problems answered incorrectly or skipped before the last problem attempted.

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(35) Let $3x - 5 = 2$ then $2x + 7 =$ ________________

(36) 25% of $(48^2 - 2^2) =$ ________________

(37) $111001_2 =$ ______________________________ $_8$

(38) $\sqrt{48} + \sqrt{75} = \sqrt{x}$. Find x. ________________

(39) A rectangle's perimeter is 50". If its width is 5" less than its length, then the area is ________ sq. in

*(40) $17 \times 51 + 24 \times 72 =$ ______________________

(41) $0.6875 \times 16 =$ ______________________

(42) What percent of $333\frac{1}{3}$ is 60? ________________%

(43) The x-intercept of the line $3x - 1 = 2y$ is (h, k). Find h + k. ______________________

(44) $\left(\frac{x^2 + 10x + 25}{x - 5}\right)\left(\frac{x^2 - 10x + 25}{x^2 - 25}\right) = x +$ ____________

(45) $85 \times 125 =$ ______________________

(46) If $6^x = 72$ then $6^{(x-3)} =$ __________________

(47) If 85, 13, and b are the integral sides of a right triangle then b = ______________________

(48) ${}_9P_2 =$ ______________________

(49) The measure of an interior angle of a regular nonagon is ________________________ degrees

*(50) $333 \times 16\frac{2}{3} \div 0.222... =$ ____________________

(51) $(3 + 4i)(4 - 3i) = a + bi$. Find a + b. ___________

(52) The next term of the geometric series $\frac{4}{9}, -\frac{2}{3}, 1, ...$ is ______________________

(53) The sum of the coefficients of $(3x - 5y)^5$ is ______

(54) $315 \times 224 =$ ______________________

(55) $\frac{4}{7} - \frac{43}{78} =$ ______________________

(56) The first 4 digits of the decimal of $\frac{417}{999}$ is 0.______

(57) The probability of losing is 24%. The odds of winning is ______________________

(58) If $\frac{2x}{7}$ has a remainder of 4 and $\frac{4y}{7}$ has a remainder of 6 then $\frac{3xy}{7}$ has a remainder of ______________

(59) If y varies directly with x and y = 4 when x = 12, find x when y = 9. ______________________

*(60) $(33)^2 + (22)^3 =$ ______________________

(61) $89^2 + 89 =$ ______________________

(62) Change $0.\overline{32}$ base 4 to a base 4 fraction. ________ $_4$

(63) $g(x) = 2x^2 + 1$ and $h(x) = 2 - x^2$. $g(h(3)) =$ _______

(64) $777 \times \frac{21}{37} =$ ______________________

(65) $54^2 - 57^2 + 60^2 - 63^2 =$ __________________

(66) The slope of the line $3x - 5y = 7$ is _____________

(67) If $x^3 - 9x^2 + 23x - 15 = 0$, then the harmonic mean of the roots is ______________________

(68) $\frac{1}{10} + \frac{1}{15} + \frac{1}{21} + \frac{1}{28} =$ ______________________

(69) If $\log_5 625 = x$ then $3^{-x} =$ ______________________

*(70) $(2.3e)^2(2.9\pi)^2 =$ ______________________

(71) If $\cos\theta = \frac{\sqrt{2}}{2}$, where $\frac{3\pi}{2} < \theta < 2\pi$, then $\sin^2\theta =$ ______________________

(72) $f(x) = 2x^3 + 6x^2 + 6x + 2$. Find $f'(3) =$ __________

(73) A bank has \$1, \$5, \$10, \$20, \$50, and \$100 bills. How many packets of 4 bills can be made? _______

(74) The sum of the first eleven terms of the Fibonacci type sequence 1, 4, 5, 9, 14, 23, 37, ... is __________

(75) $\int_1^4 (2x + 1)\,dx =$ ______________________

(76) If GCD(14, x) = 2 and LCM(14, x) = 56 then x = __

(77) If $\det\begin{bmatrix} -1 & 6 \\ 3 & x \end{bmatrix} = -16$, then x = ______________

(78) The frequency of $y = 3\sin(5\pi x + 1) - 2$ is ______

(79) $14 \times 72 = 56 \times$ ______________________

*(80) 1 mile + 1 yard + 1 foot = ________________ feet

2013-14 TMSCA High School State Meet

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!

(1) $31514 + 4102 - 513 =$ ________________

(2) $2014 \times 11 =$ ________________

(3) $315 \div 8 =$ ________________ (decimal)

(4) $31 \times 15 + 15 \times 19 =$ ________________

(5) $\frac{21}{25} \times \frac{5}{6} =$ ________________

(6) $\frac{1}{16} =$ ________________% (decimal)

(7) $246 \times 3 - 5 =$ ________________

(8) $(27)^2 =$ ________________

(9) $8 + 11 \times 10 - 15 \div 3 =$ ________________

*(10) $32214 + 32914 + 50314 + 51914 =$ ________________

(11) 35% of 35 = ________________

(12) $\frac{3}{4} - \frac{5}{16} + \frac{7}{32} =$ ________________

(13) $24 \times 31 =$ ________________

(14) $6 + 11 + 16 + 21 + ... + 56 =$ ________________

(15) Which is smaller $\frac{17}{18}$ or $\frac{7}{8}$? ________________

(16) MCXI = ________________ (Arabic Numeral)

(17) $\left(\frac{11}{12}\right)^3 =$ ________________

(18) The sum of the prime factors of 315 is ________________

(19) 2.375 tons = ________________ pounds

*(20) $4102531 \div 315 =$ ________________

(21) $5\frac{4}{9} \times 5\frac{5}{9} =$ ________________ (mixed number)

(22) $3152014 \div 11$ has a remainder of ________________

(23) $44 \times 101 =$ ________________

(24) $2^5 + 3^3 - 4 = 5k$. k = ________________

(25) If $f(x) = 9x^2 - 12x + 4$ then f(8) is ________________

(26) $\left|1 - 2\right| - 3\left|5 - 8\right| + \left|13 - 21\right| =$ ________________

(27) If 24★'s cost \$8.88 then a half dozen ★'s cost \$____

(28) The sum of three consecutive integers is 948.
The smallest of the three is ________________

(29) 4.5666... = ________________ (mixed number)

*(30) $\sqrt{531} \times 315 =$ ________________

(31) $(15 \times 25 - 35) \div 4$ has a remainder of ________________

(32) If $x + 2y = 3$ and $2x - y = 3$ then x = ________________

(33) How many positive integral divisors does 57 have?
____

(34) $\frac{8!\,5!}{7!\,6!} =$ ________________

2013-14 TMSCA High School State Meet Number Sense - Answer Key

***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) 35,103
(2) 22,154
(3) 39.375
(4) 750
(5) .7, $\frac{7}{10}$
(6) 6.25
(7) 733
(8) 729
(9) 113
*(10) 158,989 — 175,723
(11) 12.25, $\frac{49}{4}$, $12\frac{1}{4}$
(12) $\frac{21}{32}$
(13) 744
(14) 341
(15) $\frac{7}{8}$
(16) 1,111
(17) $\frac{1331}{1728}$
(18) 15
(19) 4,750
*(20) 12,373 — 13,675
(21) $30\frac{20}{81}$
(22) 8
(23) 4,444
(24) 11
(25) 484
(26) 0
(27) $2.22
(28) 315
(29) $4\frac{17}{30}$
*(30) 6,896 — 7,621
(31) 0
(32) 1.8, $\frac{9}{5}$, $1\frac{4}{5}$
(33) 4
(34) $\frac{4}{3}$, $1\frac{1}{3}$
(35) $\frac{35}{3}$, $11\frac{2}{3}$
(36) 575
(37) 71
(38) 243
(39) 150
*(40) 2,466 — 2,724
(41) 11
(42) 18
(43) $\frac{1}{3}$
(44) 5
(45) 10,625
(46) $\frac{1}{3}$
(47) 84
(48) 72
(49) 140
*(50) 23,727 — 26,223
(51) 31
(52) -1.5, $-\frac{3}{2}$, $-1\frac{1}{2}$
(53) -32
(54) 70,560
(55) $\frac{11}{546}$
(56) 4,174
(57) $\frac{19}{6}$, $3\frac{1}{6}$
(58) 2
(59) 27
*(60) 11,151 — 12,323
(61) 8,010
(62) $\frac{32}{33}$
(63) 99
(64) 441
(65) -702
(66) .6, $\frac{3}{5}$
(67) $\frac{45}{23}$, $1\frac{22}{23}$
(68) .25, $\frac{1}{4}$
(69) $\frac{1}{81}$
*(70) 3,083 — 3,406
(71) .5, $\frac{1}{2}$
(72) 96
(73) 126
(74) 661
(75) 18
(76) 8
(77) -2
(78) 2.5, $\frac{5}{2}$, $2\frac{1}{2}$
(79) 18
*(80) 5,020 — 5,548