1st Score: _____ Grader: _____	2nd Score: _____ Grader: _____	3rd Score: _____ Grader: _____	**Final Score**

Name:_____ School:_____

SS/ID Number:_____ City:_____

Grade: 9 10 11 12 Classification: 1A 2A 3A 4A 5A 6A

TMSCA HIGH SCHOOL NUMBER SENSE STATE MEET ©

MARCH 19, 2016

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.

© *TMSCA* **2015**

TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA

TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA

TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA

TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA

TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA

TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA

TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA

TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA

TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA

TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA

TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA

TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA

TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA

TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA

TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA

TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA

TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA

TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA

TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA

TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA

TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA

TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA

TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA

TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA

TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA

2015-16 TMSCA High School State Meet

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) $319 + 2016 - 513 =$ _____

(2) $\frac{5}{8} - 0.625 =$ _____

(3) $3.14 \times 5 =$ _____ **(decimal)**

(4) $2016 \div 8 =$ _____

(5) $22\frac{2}{9}\% =$ _____ **(proper fraction)**

(6) $0.315 =$ _____ **%**

(7) $33^2 =$ _____

(8) **3192016 ÷ 9 has a remainder of** _____

(9) $1 - 1 + 2 \times 3 \div (5 - 8) + 13 =$ _____

***(10)** $32016 + 3201 + 320 + 2016 =$ _____

(11) $20.16 \times 75 =$ _____

(12) **The arithmetic mean of 24, 21, and _____ is 18**

(13) $5\frac{2}{3} - 2\frac{3}{5} =$ _____ **(mixed number)**

(14) **1 rod + 2 yards =** _____ **feet**

(15) **18% of 22 =** _____ **(decimal)**

(16) **CCCXIX =** _____ **(Arabic numeral)**

(17) $22 \times 16 + 16 \times 38 =$ _____

(18) $2\frac{3}{5} + 5\frac{2}{3} =$ _____ **(mixed number)**

(19) **If 11♦'s cost $13.31 then 5♦'s cost $** _____

***(20)** $319 \times 315 =$ _____

(21) $51^2 + 17^2 =$ _____

(22) $2 - |1 - 3| - |4 - 7| =$ _____

(23) **What number times five gives the same result as that number added to four?** _____

(24) $\sqrt[3]{2197} =$ _____

(25) **The sum of three consecutive integers is 108. The largest of the three is integers is** _____

(26) $\left(\frac{16}{25}\right)^{\frac{3}{2}} =$ _____

(27) $108\frac{1}{3}\%$ **of 12 =** _____

(28) $1\frac{3}{4} \times 2\frac{3}{5} =$ _____ **(mixed number)**

(29) **Set E = {e,v,i,l}, L = {l,u,c,k,y} and P = {p,r,i,m,e}. $(E \cup P) \cap L$ contains _____ distinct element(s).**

***(30)** $4\frac{2}{3} \times 32016 \div 7 =$ _____

(31) $111 \times 136 =$ _____

(32) **112 base 3 in base 10 is** _____

(33) **0.272727... =** _____ **(proper fraction)**

(34) $44 \times \frac{47}{50} =$ _____

(35) $(3 \times 19 + 20 \times 16) \div 6$ has a remainder of _____

(36) If a = 14 and b = 2, then $4a^2 + 4ab + b^2$ = _____

(37) $72 \times 0.58333...$ = _____

(38) The circumference of circle O is 3π inches. The area of circle O is $k\pi$ square inches. k = _____

(39) Which of the following is an evil number, 4, 6, or 8? _____

*(40) $\sqrt{6102913}$ = _____

(41) $888 \times \frac{8}{37}$ = _____

(42) If $3^{-2} + x^{-1} = 2^{-3}$ then x = _____

(43) 404^2 = _____

(44) $24 \times 36 + 36$ = _____

(45) Find the slope of the line perpendicular to the line thru the points (— 2, 3) and (5, 7). _____

(46) $2016_9 \div 3_9$ = _____ 9

(47) A regular octahedron has _____ edges

(48) The x-intercept of the line through the points (6, 3) and (— 2, — 5) is (x, y). Find x. _____

(49) The product of the roots $(x + 5)^2 - 3 = 0$ is _____

*(50) $81^2 + 64^2 + 49^2$ = _____

(51) $\left(\frac{1}{2}\right)^2 \div \left(\frac{1}{4}\right)^2 \times \left(\frac{1}{8}\right)^2$ = _____

(52) Let $a^3b^2 \times ab^{-1} \div \left(\frac{a}{b}\right)^2 = a^m b^n$. Find m + n. ___

(53) The area of an isosceles right triangle with a hypotenuse length of $12\sqrt{2}$ cm is _____ cm^2

(54) Let $\frac{7!}{5!} = \frac{(x-1)!}{(x-2)!}$. Find x. _____

(55) ${}_5P_2 - {}_5C_3$ = _____

(56) How many subsets containing only 4 elements does the set {a,u,s,t,i,n} have? _____

(57) The largest integral value of x such that $|2x + 5| \leq 3$ is _____

(58) 414×325 = _____

(59) $15 + 18 + 33 + 51 + 84 + 135 + 219 + 354$ = ___

*(60) $3192016 \div 765$ = _____

(61) The sum of the reciprocals of all of the positive divisors of 8 is _____

(62) Let $f(x) = x^2 - 5$ and $g(x) = 3x + 2$. g(f(—1)) = ___

(63) Find k if $\begin{vmatrix} k & -k \\ 3 & -4 \end{vmatrix} = 2$. k = _____

(64) $(314_7)(22_7) \div 6$ has a remainder of _____

(65) Round $(\sqrt{5} + 6\sqrt{7})$ to the nearest whole. _____

(66) $\sec^2\left(\frac{\pi}{3}\right) - 1$ = _____

(67) How many positive integers less than 63 are relatively prime to 63? _____

(68) Change 0.234 base 5 to a base 10 fraction. _____

(69) The first four digits of the decimal for $\frac{71}{330}$ is 0._____

*(70) $1^2 + 2^2 + 3^2 + 4^2 + ... 10^2 + 11^2$ = _____

(71) A number is randomly selected from the set of digits. What is the probability that the number is a perfect number? _____ (proper fraction)

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

(73) The Greatest Integer Function is written as $f(x) = [x]$. Find $\left[\frac{\sqrt{5}+1}{2} - 3.14\right]$. _____

(74) If $5x - 3 \equiv 2 \pmod 6$, $0 \leq x \leq 5$, then x = _____

(75) $y = \frac{x^3+1}{x^2-1}$ has a how many asymptotes? _____

(76) $9^{10} \div 11$ has a remainder of _____

(77) $\int_0^1 (3x - 2)\,dx$ = _____

(78) The sum of the first 5 triangular numbers is _____

(79) Given the sequence 1, 0, 2, 3, 6, 10, ..., 46, k, 122, ... find k. _____

*(80) The compound interest on $3000 for 2 years at 6% compounded annually is _____ dollars (integer)

2015-16 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) 1,822

(2) 0

(3) 15.7

(4) 252

(5) $\frac{2}{9}$

(6) 31.5, $\frac{63}{2}$, $31\frac{1}{2}$

(7) 1,089

(8) 4

(9) 11

***(10) 35,676 — 39,430**

(11) 1,512

(12) 9

(13) $3\frac{1}{15}$

(14) 22.5, $\frac{45}{2}$, $22\frac{1}{2}$

(15) 3.96

(16) 319

(17) 960

(18) $8\frac{4}{15}$

(19) $6.05

***(20) 95,461 — 105,509**

(21) 2,890

(22) — 3

(23) 1

(24) 13

(25) 37

(26) .512, $\frac{64}{125}$

(27) 13

(28) $4\frac{11}{20}$

(29) 1

***(30) 20,277 — 22,411**

(31) 15,096

(32) 14

(33) $\frac{3}{11}$

(34) $41\frac{9}{25}$

(35) 5

(36) 900

(37) 42

(38) 2.25, $\frac{9}{4}$, $2\frac{1}{4}$

(39) 6

***(40) 2,347 — 2,593**

(41) 192

(42) 72

(43) 163,216

(44) 900

(45) — 1.75, — $\frac{7}{4}$, — $1\frac{3}{4}$

(46) 605

(47) 12

(48) 3

(49) 22

***(50) 12,406 — 13,710**

(51) .0625, $\frac{1}{16}$

(52) 5

(53) 72

(54) 43

(55) 10

(56) 15

(57) — 1

(58) 134,550

(58) 909

***(60) 3,964 — 4,381**

(61) 1.875, $\frac{15}{8}$, $1\frac{7}{8}$

(62) — 10

(63) — 2

(64) 2

(65) 18

(66) 3

(67) 36

(68) $\frac{69}{125}$

(69) 2151

***(70) 481 — 531**

(71) $\frac{1}{10}$

(72) — 8

(73) — 2

(74) 1

(75) 2

(76) 1

(77) — .5, — $\frac{1}{2}$

(78) 35

(79) 75

***(80) 353 — 389**