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 18, 2017

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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2016-17 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) $2017 - 317 + 324 =$ _____

(2) $317 \div 3 =$ _____ **(mixed number)**

(3) $71.02 \times 9 =$ _____ **(decimal)**

(4) $22.222...\% =$ _____ **(proper fraction)**

(5) $\frac{4}{7} + \frac{7}{11} =$ _____ **(mixed number)**

(6) $44 \times 75 =$ _____

(7) $34^2 =$ _____

(8) $(1 + 4) \times (7 - 10) \div (13 - 16) =$ _____

(9) CDXLIV = _____ **(Arabic Numeral)**

***(10)** $31717 + 3171 + 317 + 31 + 3 =$ _____

(11) $1994 \times 3 + 18 =$ _____

(12) $27^2 \div 5$ **has a remainder of** _____

(13) $187 \div 9 - 79 \div 9 =$ _____

(14) **If 15 apps cost \$48.30 then 10 apps cost \$** _____

(15) **3 quarts + 2 pint — 1 cup =** _____ **cups**

(16) **GCD(47, 53) × LCM(47, 53) is** _____

(17) **Which is greater,** $-1\frac{4}{7}$ **or** -1.55**?** _____

(18) $\frac{8}{11} + \frac{11}{8} =$ _____ **(mixed number)**

(19) **132 is 44% of** _____

***(20)** $14 \times 15 + 1415 =$ _____

(21) $3 - |1 - 7| + 20 - |1 + 7| =$ _____

(22) **Let** $3x - 1 = -7$**. Find x.** _____

(23) **Given the set {1,5,12,22,...,51,k,92,... }. k =** _____

(24) **The sum of the positive prime divisors of 96 is** ____

(25) **The area of an isosceles trapezoid with a height of 5" and base lengths of 4" and 7" is** _____ in^2

(26) $2\frac{3}{5} - \frac{3}{4} =$ _____

(27) $\{w,o,r,d\} \cap (\{p,r,o,b,l,e,m\} \cap \{s,o,l,v,e,r\})$ **has** _____ **distinct elements**

(28) $(3 \times 17)^4 \div 6$ **has a remainder of** _____

(29) **15% of \$36.00 = \$** _____

***(30)** $675 \times 37.5 \div \frac{5}{8} =$ _____

(31) $\sqrt{2025} =$ _____

(32) $0.575757... =$ _____ **(proper fraction)**

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

(34) $3x - 2y = 5$ **and** $x + 2y = 3$**. x =** _____

(35) **11011 base 2 is** _____ **in base 4**

(36) 8 is to 12 as 10 is to _____

(37) If a = 5 and b = 6, then $a^2 + 2ab + b^2$ = _____

(38) The median of 8, 2, 5, 2, 7, 1, & 9 is _____

(39) $\frac{1}{4} - \frac{3}{8} + \frac{5}{12}$ = _____

*(40) $\sqrt{7102713}$ = _____

(41) Let $(4a^2b^{-2}) \times (8a^{-4}b^4) \div (2ab) = 2^p a^q b^r$. Find p + q + r. _____

(42) The center of the circle $x^2 + y^2 - 8x + 4y = 8$ is (h,k). Find h + k. _____

(43) Let $(2i^3)(i^2) = a\sqrt{b}$. Find a + b. _____

(44) The number of real roots in $2x^2 + x + 1 = 0$ is ____

(45) The sum of the integral values of x such that $3|x - 2| \leq 5$ is _____

(46) If log (4) = $\frac{3}{5}$, then log (0.25) = _____

(47) $532_9 + 253_9 + 325_9$ = _____ 9

(48) $\frac{4!}{6!} = \frac{x!}{(x+1)!}$. x = _____

(49) $24^2 - 16^2$ = _____

*(50) $22 \times 33 \times 44 \times 55$ = _____

(51) The sixth triangular number is _____

(52) The number of triangles formed from a given vertex in a regular octagon _____

(53) The sum of the radii of the circumscribed circle and inscribed circle of a A", B", 17", right triangle is 11.5". Find A + B. _____ inches

(54) If (x, y) bisects the segment (1, 7) to (5, 9), then x + y = _____

(55) 317×712 = _____

(56) $1 + 2 + 2^2 + 2^3 + 2^4 + ... + 2^7$ = _____

(57) If the odds of getting 60 problems of this test correct is $\frac{5}{12}$, then the probability of not getting 60 correct is _____ (proper fraction)

(58) $4\frac{3}{4} \times 4\frac{1}{4}$ = _____

(59) The area of the ellipse $9x^2 + 4y^2 = 36$ is _____π

*(60) $[(\sqrt{5} + 1) \div 2] \times 314$ = _____

(61) The first four digits of the decimal for $\frac{45}{50}$ in base 6 is 0. _____ in base 6.

(62) The Cartesian coordinate $(1, \sqrt{3})$ written in polar coordinate form is (r, θ). Find θ, where $r < 0$ and $180° \leq \theta \leq 270°$. _____°

(63) The Greatest Integer Function is written as f(x) = [x]. Find $\left[\frac{\sqrt{5}-1}{2} + 0.618\right]$. _____

(64) The area of a face of a cube is 64 cm^2. The volume of the cube is _____ cm^3

(65) $81 \times 89 + 16$ = _____

(66) f(x) = 2 − 5x and g(x) = 4x + 3. f(g(1) + 1) = ____

(67) $1357_9 \div 8_9$ has a remainder of _____ 9

(68) $\sqrt[3]{19683}$ = _____

(69) $\csc(\frac{5\pi}{6})$ = _____

*(70) $16^4 \times 32^3 \div 64^2$ = _____

(71) The domain of $y = \log_3(x - 2) + 4$ is x > _____

(72) The graph of $y = \frac{3x+1}{9x^2-1}$ has _____ asymptote(s)

(73) The sum of the critical values of $f(x) = x^3 - 3x + 5$ is _____

(74) If $f(x) = 3 - \frac{1}{x-1}$, then $f^{-1}(1)$ = _____

(75) $\int_{-2}^{0} (x+1)^2 - 1 \, dx$ = _____

(76) $f(x) = x^5 - 3x^4 + 9x - 11$. Find $f''(1)$ = _____

(77) $\lim_{x \to 9} \frac{\sqrt{x}-3}{x-9}$ = _____

(78) Find k if $\begin{vmatrix} -3 & 1 \\ -1 & 3 \end{vmatrix} = 2k + 1$. _____

(79) 54×56 = _____

*(80) $8\frac{3}{5} \times 538 \div 38.5$ = _____

2016-17 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) 2,024

(2) $105\frac{2}{3}$

(3) 639.18

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

(5) $1\frac{16}{77}$

(6) 3,300

(7) 1,156

(8) 5

(9) 444

***(10) 33,478 — 37,000**

(11) 6,000

(12) 4

(13) 12

(14) $32.20

(15) 15

(16) 2,491

(17) — 1.55

(18) $2\frac{9}{88}$

(19) 300

***(20) 1,544 — 1,706**

(21) 9

(22) — 2

(23) 70

(24) 5

(25) 27.5, $\frac{55}{2}$, $27\frac{1}{2}$

(26) 1.85, $\frac{37}{20}$, $1\frac{17}{20}$

(27) 2

(28) 3

(29) $5.40

***(30) 38,475 — 42,525**

(31) 45

(32) $\frac{19}{33}$

(33) $\frac{9}{19}$

(34) 2

(35) 123

(36) 15

(37) 121

(38) 5

(39) $\frac{7}{24}$

***(40) 2,532 — 2,798**

(41) 2

(42) 2

(43) 1

(44) 0

(45) 6

(46) — .6, $-\frac{3}{5}$

(47) 1221

(48) 29

(49) 320

***(50) 1,669,074 — 1,844,766**

(51) 21

(52) 21

(53) 23

(54) 11

(55) 225,704

(56) 255

(57) $\frac{12}{17}$

(58) 20.1875, $\frac{323}{16}$, $20\frac{3}{16}$

(59) 6

***(60) 483 — 533**

(61) 5444

(62) 240

(63) 1

(64) 512

(65) 7,225

(66) — 38

(67) 0

(68) 27

(69) 2

***(70) 498,074 — 550,502**

(71) 2

(72) 2

(73) 0

(74) 1.5, $\frac{3}{2}$, $1\frac{1}{2}$

(75) $-\frac{4}{3}$, $-1\frac{1}{3}$

(76) — 16

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

(78) — 4.5, $-\frac{9}{2}$, $-4\frac{1}{2}$

(79) 3,024

***(80) 115 — 126**