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

Name:_____ School:_____

SS/ID Number:_____ City:_____

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

TMSCA HIGH SCHOOL
NUMBER SENSE
TEST #7 ©
JANUARY 18, 2020

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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2019-2020 TMSCA High School Number Sense Test 7

(1) $651 + 732 - 246 =$ _____

(2) $44 \times 75 =$ _____

(3) $18^2 =$ _____

(4) $\frac{17}{40} =$ _____ %(decimal)

(5) $\frac{5}{6} + \frac{5}{12} =$ _____ (mixed number)

(6) The largest prime divisor of 91 is _____

(7) $7545 \div 15 =$ _____

(8) $0.1875 =$ _____ (fraction)

(9) $7654321 \div 3$ has a remainder of _____

*(10) $18 + 818 + 1818 + 81818 =$ _____

(11) $8 - (-9) - (-12) - 15 =$ _____

(12) $3\frac{2}{7} + 2\frac{1}{4} =$ _____ (mixed number)

(13) The smallest prime number greater than 89 is _____

(14) 7 is what percent less than 20?_____%

(15) 66 + 30% of 90 = _____

(16) $56^2 =$ _____

(17) $16 \times 57 - 73 \times 16 =$ _____

(18) $7\frac{1}{5} \times 7\frac{4}{5} =$ _____ (mixed number)

(19) 96% of $233\frac{1}{3} =$ _____

*(20) $923112 \div 128 =$ _____

(21) $77 \times 73 =$ _____

(22) $0.5242424... =$ _____ (fraction)

(23) $6^4 =$ _____

(24) 123 base 13 = _____ base 10

(25) $A = \{3, 6, 11, 18, m, n, 51, ...\}$. $m + n =$ _____

(26) $(24)(91)(k) = 80808$. $k =$ _____

(27) $14 + |3 - 7| - |6 - 18| + 10 =$ _____

(28)If 12 bots cost \$8.40, then 8 bots cost \$_____

(29) $18^2 + 36^2 =$ _____

*(30) One day = _____ seconds

(31) Let $x + y = 28$ and $xy = 171$. x and y are integers. $x + y =$ _____

(32) $(3x - 6)^2 = ax^2 + bx + c$. $b + c =$ _____

(33) 7 is to 11 as x is to 44. x = _____

(34) If a pen cost \$14.00 and the tax rate is 7.5%, the total cost of the pen is \$_____

(35) How many positive integers greater than 5 are relatively prime to 36? _____

(36) The sum of the 8th and 9th triangular numbers is _____

(37) $(27 \times 22 + 14) \div 6$ has a remainder of _____

(38) The smallest root of $(x - 2)^2 = \frac{4}{9}$ is _____

(39) $1\frac{3}{4}$ is what percent more than 1.25? ____ %

*(40) $\sqrt{324468} =$ _____

(41) $(16)^3 - (15)^3 =$ _____

(42) $143 \times 14 =$ _____

(43) $456_7 + 654_7 =$ _____$_7$

(44) The fifth hexagonal number is _____

(45) The product of the roots of $x^3 + 6x^2 - x - 30 = 0$ is _____

(46) $40^2 - 25^2 =$ _____

(47) The sides of a right triangle are integers. If the hypotenuse = 13, the sum of the legs = ____

(48) $462_8 \div 6_8 =$ _____$_8$

(49) If $3^{(x+y)} = 81$, then $(x+y)^4 =$ _____

***(50)** $9 \times 12 \times 15 \times 18 =$ _____

(51) $3! \times 6! =$ _____

(52) If $\log_{49} x = 1.5$, then x = _____

(53) If $x^2 + y^2 = 130$, $x > y > 3$, and x and y are positive integers, then $x - y =$ _____

(54) The length of the major axis of $25x^2 + 16y^2 = 400$ is _____

(55) $3 + 4 + 7 + 11 + 18 + 29 + ... + 123 + 199 =$ ____

(56) If $223_b = 63$, then $44_b =$ _____

(57) $\frac{7\pi}{12}$ radians = _____ °

(58) $\frac{2}{5} + \frac{3}{10} + \frac{9}{40} + \frac{27}{160} + ... =$ _____

(59) $765_8 =$ _____$_2$

***(60)** $100 \times 29^2 \div 162 =$ _____

(61) 0.5666... base 8 = _____ base 10 (fraction)

(62) $19 \times \frac{17}{21} =$ _____ (mixed number)

(63) Find the sum of all positive integers x such that $3x - 4 \le 11$ _____

(64) If $18^4 \div 6 = (2^x)(3^x)$, then $x + y =$ _____

(65) $\tan\left(\frac{5\pi}{4}\right) \times \cot\left(\frac{7\pi}{4}\right) =$ _____

(66) The area of a circle is 576π. The diameter of the circle is _____

(67) The vertex of the parabola $y = -x^2 - 6x + 4$ is (h, k). $h + k =$ _____

(68) The remainder of $(2x^3 + 2x^2 - 2x - 2) \div (x - 2)$ is _____

(69) $\sec^2\left(\frac{5\pi}{6}\right) =$ _____

***(70)** $\pi^5 \times e^4 \div 17 =$ _____

(71) The first 4 digits of the decimal for $\frac{31}{50}$ base 6 is 0._____ base 6

(72) If $3x - 2 \equiv 3 \pmod 7$, $0 \le x \le 6$, then x = ___

(73) The critical value of $f(x) = \left(\frac{\sqrt{3}}{2}\right) \cdot x - \sin(x)$, $\frac{\pi}{2} \le x \le 2\pi$, is $k\pi$. k = _____

(74) The sum of the reciprocals of the positive divisors of 24 is _____

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

(76) $f'(x) = 3x^2$. $f(1) = 7$. $f(2) =$ _____

(77) $995 \times 992 =$ _____

(78) $67^2 + 37^2 =$ _____

(79) $\sqrt{45} \times \sqrt{80} =$ _____

***(80)** $(1 + 3 + 5 + 7 + 9)^4 =$ _____

2019-2020 TMSCA HSNS Test 7 Key

(1) 1137

(2) 3300

(3) 324

(4) 42.5

(5) $1\frac{1}{4}$

(6) 13

(7) 503

(8) $\frac{3}{16}$

(9) 1

***(10)** 80249 – 88695

(11) 14

(12) $5\frac{15}{28}$

(13) 97

(14) 65

(15) 93

(16) 3136

(17) –256

(18) $56\frac{4}{25}$

(19) 224

***(20)** 6852 – 7572

(21) 5621

(22) $\frac{173}{330}$

(23) 1296

(24) 198

(25) 65

(26) 37

(27) 16

(28) 5.60

(29) 1620

***(30)** 82080 – 90720

(31) 28

(32) 0

(33) 28

(34) 15.05

(35) 10

(36) 81

(37) 2

(38) $\frac{4}{3}$ or $1\frac{1}{3}$

(39) 40

***(40)** 542 – 598

(41) 721

(42) 2002

(43) 1443

(44) 45

(45) 30

(46) 975

(47) 17

(48) 63

(49) 256

***(50)** 27702 – 30618

(51) 4320

(52) 343

(53) 2

(54) 10

(55) 517

(56) 24

(57) 105

(58) $\frac{8}{5}, 1\frac{3}{5}, 1.6$

(59) 111110101

***(60)** 494 – 545

(61) $\frac{41}{56}$

(62) $15\frac{8}{21}$

(63) 15

(64) 10

(65) –1

(66) 48

(67) 10

(68) 18

(69) $\frac{4}{3}$ or $1\frac{1}{3}$

***(70)** 934 – 1031

(71) 3444

(72) 4

(73) $\frac{11}{6}$ or $1\frac{5}{6}$

(74) $\frac{5}{2}, 2\frac{1}{2}, 2.5$

(75) 3.5

(76) 14

(77) 987040

(78) 5858

(79) 60

***(80)** 371094 – 410156