

1st Score: _____	2nd Score: _____	3rd Score: _____	<b>Final Score</b>
Grader: _____	Grader: _____	Grader: _____	
<b>PLACE LABEL BELOW</b>			
Name: _____ School: _____			
SS/ID Number: _____ City: _____			
Grade:    4    5    6    7    8                      Classification:    1A    2A    3A    4A    5A    6A			



## TMSCA MIDDLE SCHOOL NUMBER SENSE

**TEST #6 ©**

**DECEMBER 7, 2019**

### GENERAL DIRECTIONS

1. Write only the requested information on this coversheet. 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.

[illegible]

## 2019-2020 TMSCA Middle School Number Sense Test #6

- (1)  $2018 + 2019 + 2020 + 2021 + 2022 =$  \_\_\_\_\_
- (2)  $43 \times 25 =$  \_\_\_\_\_
- (3)  $0.32 =$  \_\_\_\_\_ (fraction)
- (4)  $5418 \div 6 =$  \_\_\_\_\_
- (5)  $72 \times 6 =$  \_\_\_\_\_
- (6)  $86 \times 50 =$  \_\_\_\_\_
- (7)  $3 + 4^2 \div 2 - 9 =$  \_\_\_\_\_
- (8)  $\frac{5}{12} \times 132 =$  \_\_\_\_\_
- (9)  $4\frac{1}{5}\% =$  \_\_\_\_\_ (fraction)
- \*(10)  $1528 \times 15 =$  \_\_\_\_\_
- (11)  $\frac{9}{13} - \frac{3}{5} =$  \_\_\_\_\_ (fraction)
- (12)  $14 \times 3\frac{1}{7} =$  \_\_\_\_\_
- (13)  $83 \times 77 =$  \_\_\_\_\_
- (14) The mean of 11, 13, 21, and 23 is \_\_\_\_\_
- (15)  $29^2 =$  \_\_\_\_\_
- (16)  $18 \times 13 + 18 \times 23 - 18 \times 24 =$  \_\_\_\_\_
- (17)  $99 \times 88 =$  \_\_\_\_\_
- (18)  $239 \times 11 =$  \_\_\_\_\_
- (19)  $87 \times 83 =$  \_\_\_\_\_
- \*(20)  $2037 + 4329 - 1673 =$  \_\_\_\_\_
- (21)  $85 \times 26 =$  \_\_\_\_\_
- (22) XLV + MMV = \_\_\_\_\_ (Arabic Number)
- (23)  $109 \times 91 =$  \_\_\_\_\_
- (24)  $829 \times 101 =$  \_\_\_\_\_
- (25) The multiplicative inverse of  $1\frac{7}{13}$  is \_\_\_\_\_ (decimal)
- (26)  $618 \div 9 =$  \_\_\_\_\_ (mixed number)
- (27)  $\frac{12!}{9!3!} =$  \_\_\_\_\_
- (28) The GCD of 12 and 18 is \_\_\_\_\_
- (29) The LCM of 12 and 18 is \_\_\_\_\_
- \*(30)  $\sqrt{302318} =$  \_\_\_\_\_
- (31)  $47^2 - 13^2 =$  \_\_\_\_\_
- (32) The largest prime divisor of 426 is \_\_\_\_\_
- (33)  $964 \times 111 =$  \_\_\_\_\_
- (34)  $46^2 + 44^2 =$  \_\_\_\_\_
- (35)  $83^2 - 72^2 =$  \_\_\_\_\_
- (36)  $18 \times 18 + 54 \times 54 =$  \_\_\_\_\_
- (37) 56 has how many positive integral divisors? \_\_\_\_\_
- (38)  $x + (x + 2) + (x + 4) = 84$ .  $x =$  \_\_\_\_\_
- (39) If  $f(x) = 4x^2 + 12x + 9$ , then  $f(6) =$  \_\_\_\_\_
- \*(40)  $20^2 + 21^2 + 22^2 + 23^2 + 24^2 =$  \_\_\_\_\_
- (41) The supplement of a  $53^\circ$  is \_\_\_\_\_  $^\circ$
- (42) 23% of 90 is \_\_\_\_\_ % of 10
- (43) If  $f(x) = \sqrt{x^3 - 5x}$ , then  $f(5) =$  \_\_\_\_\_
- (44) If the diagonal of a square is  $2\sqrt{13}$ , then the area of the square is \_\_\_\_\_
- (45)  $\sqrt{3844} =$  \_\_\_\_\_

- (46)  $1500 = 61 \times 25 -$  \_\_\_\_\_
- (47) How many distinct diagonals does an undecagon have? \_\_\_\_\_
- (48)  $63_{10} =$  \_\_\_\_\_<sub>7</sub>
- (49) Find the perimeter of a rectangle with diagonal 17 and width 8. \_\_\_\_\_
- \*(50)  $142857 \times 224 =$  \_\_\_\_\_
- (51)  $6\frac{3}{4} \times 8\frac{1}{3} =$  \_\_\_\_\_ (mixed number)
- (52)  $7\frac{3}{11} \times 15\frac{3}{11} =$  \_\_\_\_\_ (mixed number)
- (53) The geometric mean of 12, 15, and  $\frac{3}{20}$  is \_\_\_\_\_
- (54) The largest integer solution of  $3x - 5 \leq 47$  is \_\_\_\_\_
- (55) The 9<sup>th</sup> triangular number is \_\_\_\_\_
- (56)  $804^2 =$  \_\_\_\_\_
- (57) If  $f(3x + 2) = 4x + 8$ , then  $f(23) =$  \_\_\_\_\_
- (58) The slope of the line  $y - 3 = m(x - 5)$  with y-intercept 13 is \_\_\_\_\_
- (59)  $(4\sqrt{3} \times 2\sqrt{3})^2 =$  \_\_\_\_\_
- \*(60)  $833 \times 787 =$  \_\_\_\_\_
- (61)  $325_8 + 146_8 =$  \_\_\_\_\_<sub>8</sub>
- (62)  $0.828282... =$  \_\_\_\_\_ (fraction)
- (63) If set  $A = \{t, r, i, p\}$  and set  $B = \{m, e, t, r\}$ , then what is the sum of the number of elements in  $A \cap B$  and  $A \cup B$ ? \_\_\_\_\_
- (64) If  $\sqrt{84} + \sqrt{21} = \sqrt{x}$ , then  $x =$  \_\_\_\_\_
- (65)  $4^2 \div 0.1875 =$  \_\_\_\_\_
- (66) What's the probability of choosing a Fibonacci number from the smallest 10 natural numbers? \_\_\_\_\_
- (67) What is the x-coefficient of  $(3x + 5)(3x + 5)(3x + 5)$ ? \_\_\_\_\_
- (68) The y-intercept of  $f(x) = (2x + 4)(3x + k)$  is  $-32$ ,  $k =$  \_\_\_\_\_
- (69) P and Q are roots of  $f(x) = x^2 - 4x + 9$ .  $P^2 + 7PQ + Q^2 =$  \_\_\_\_\_
- \*(70) The 100<sup>th</sup> hexagonal number is \_\_\_\_\_
- (71) The geometric mean of  $3^8$ ,  $9^8$  and  $27^8$  is  $3^x$ ,  $x =$  \_\_\_\_\_
- (72) The vertex of  $f(x) = 3x^2 - 7x + 4$  is  $(h, k)$ .  $h =$  \_\_\_\_\_
- (73)  $2_{11} + 4_{11} + 6_{11} + ... + 15_{11} =$  \_\_\_\_\_<sub>11</sub>
- (74)  $x^2 \leq 81$  has \_\_\_\_\_ integer solutions
- (75) The probability of rolling a sum that is a multiple of 6 with a pair of 6-sided dice is \_\_\_\_\_
- (76)  $\frac{2+4+6+\dots+36}{1+3+5+\dots+17} = \frac{x}{9}$ , then  $x =$  \_\_\_\_\_
- (77)  $994 \times 993 =$  \_\_\_\_\_
- (78) The discriminant of  $5x^2 + 3x - 1 = 0$  is \_\_\_\_\_
- (79)  $81^{\frac{5}{4}} =$  \_\_\_\_\_
- \*(80) The sum of the infinite geometric series  $6300 + 4200 + 2800 + ... =$  \_\_\_\_\_

## 2019-2020 TMSCA Middle School Number Sense Test 6 Key

(1) 10100	(24) 83729	(45) 62	(64) 189
(2) 1075		(46) 25	(65) $\frac{256}{3}$
(3) $\frac{8}{25}$	(25) .65	(47) 44	(66) $\frac{1}{2}$
(4) 903	(26) $68\frac{2}{3}$	(48) 120	
(5) 432	(27) 220		
(6) 4300	(28) 6	(49) 46	(67) 225
(7) 2	(29) 36	*(50) 30399970–33599966	(68) – 8
(8) 55	*(30) 523 – 577	(51) $56\frac{1}{4}$	(69) 61
(9) $\frac{21}{500}$	(31) 2040	(52) $111\frac{9}{121}$	*(70) 18905 – 20895
*(10) 21774 – 24066	(32) 71	(53) 3	
(11) $\frac{6}{65}$	(33) 107004	(54) 17	(71) 16
(12) 44	(34) 4052	(55) 45	(72) $\frac{7}{6}$ or $1\frac{1}{6}$
(13) 6391	(35) 1705	(56) 646416	
(14) 17	(36) 3240	(57) 36	(73) 66
(15) 841	(37) 8		(74) 19
(16) 216	(38) 26	(58) – 2	
(17) 8712	(39) 225	(59) 576	(75) $\frac{1}{6}$
(18) 2629	*(40) 2309 – 2551	*(60) 622793 – 688349	(76) 38
(19) 7221	(41) 127	(61) 473	(77) 987042
*(20) 4459 – 4927	(42) 207	(62) $\frac{82}{99}$	(78) 29
(21) 2210	(43) 10		(79) 243
(22) 2050	(44) 26	(63) 8	
(23) 9919			*(80) 17955 – 19845