

**TMSCA MIDDLE SCHOOL
MATHEMATICS
TEST #6 ©
DECEMBER 5 , 2015**

GENERAL DIRECTIONS

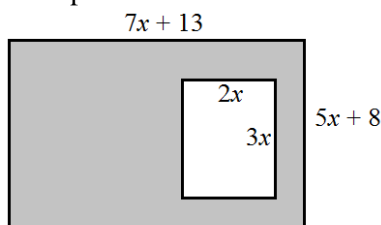
1. About this test:
 - A. You will be given 40 minutes to take this test.
 - B. There are 50 problems on this test.
2. All answers must be written on the answer sheet/Scantron form/Chatsworth card provided. If you are using an answer sheet be sure to use **BLOCK CAPITAL LETTERS**. Clean erasures are necessary for accurate grading.
3. If using a scantron answer form be sure to correctly denote the number of problems not attempted.
4. You may write anywhere on the test itself. You must write only answers on the answer sheet.
5. You may use additional scratch paper provided by the contest director.
6. All problems have **ONE** and **ONLY ONE** correct [BEST] answer. There is a penalty for all incorrect answers.
7. Calculators **MAY NOT** be used on this test.
8. All problems answered correctly are worth **FIVE** points. **TWO** points will be deducted for all problems answered incorrectly. No points will be added or subtracted for problems not answered.
9. In case of ties, percent accuracy will be used as a tie breaker.

2015 – 2016 TMSCA Middle School Mathematics Test #6

1. $1.99 + 3.42 + 7.83 =$ _____
 A. 13.24 B. 13.04 C. 13.14 D. 13.34 E. 13.16
2. $500 - 1,762 =$ _____
 A. -1,262 B. 2,262 C. -2,262 D. -862 E. -1,862
3. $1,864 \div 6 =$ _____ (nearest whole number)
 A. 310 B. 311 C. 310.7 D. 310.67 E. 300
4. Marcy has eight watches valued at \$24.00 each. What is the total value of Marcy's watches?
 A. \$32.00 B. \$176.00 C. \$30.00 D. \$192.00 E. \$224.00
5. $49 \text{ quarters} + 111 \text{ dimes} + 5 \text{ nickels} + 119 \text{ pennies} =$ _____
 A. \$24.29 B. \$29.79 C. \$24.56 D. \$16.31 E. \$24.79

6. Which expression represents “two-thirds of the product of two numbers”?
 A. $\frac{2}{3}ab$ B. $\frac{2}{3}(a + b)$ C. $\frac{2}{3}a + b$ D. $\frac{2a+b}{3}$ E. $\frac{3}{2}ba$

7. If $x = 3$, what is the area of the shaded region in the picture below?



- A. 782 units² B. 345 units² C. 797 units² D. 398 units² E. 728 units²
8. What is the LCM of the numbers 22 and 36?
 A. 252 B. 262 C. 396 D. 412 E. 424
9. What is 20% of $\frac{5}{4}$?
 A. 0.5 B. $\frac{1}{4}$ C. $\frac{1}{2}$ D. 0.75 E. 0.16
10. Simplify: $|9 - 4|$
 A. 15 B. -5 C. 5 D. 3 E. 33
11. Which value below is four more than the multiplicative inverse of $\frac{1}{5}$?
 A. 4.2 B. 9 C. 0.8 D. 1 E. -3.8
12. Which of the following is not an example of a whole number?
 A. 0 B. 900 C. 1.5 D. 19 E. 1
13. $\sqrt{541}$ lies between which pair of integers?
 A. 23 & 24 B. 22 & 23 C. 21 & 22 D. 24 & 25 E. 25 & 26
14. $LIX + CVI =$ _____ (Arabic number)
 A. 165 B. 176 C. 167 D. 567 E. 159

15. $\frac{1}{4}$ of 54,000,000 = _____ (scientific notation)
 A. 13.5×10^6 B. 2.7×10^8 C. 2.7×10^7 D. 3.15×10^7 E. 1.35×10^7

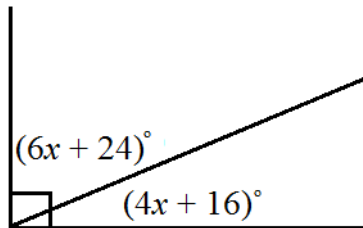
16. $m\angle B = 46^\circ$. If $\angle B$ were cut in half to create $\angle C$, what would be the measure of the supplement of $\angle C$?
 A. 44° B. 67° C. 123° D. 157° E. 134°

17. Find the next term in the sequence, 54, 37, 20, 3, -14, ...
 A. -27 B. -28 C. -29 D. -31 E. -35

18. If $3n - 17 = 4n - 8$, find the value of $\frac{2}{3}n + 5$.
 A. 11 B. 8 C. -8 D. -13 E. -1

19. What is the degree of the sum of $(5n^3 + 4n^2)$ and $(3n^4 - 7n + 3)$?
 A. 5 B. 4 C. 10 D. 11 E. 9

20. What is the measure of the larger angle in the picture below?



A. 5° B. 10° C. 68° D. 36° E. 54°

21. $0.\overline{08} =$ _____ (fraction)
 A. $\frac{1}{45}$ B. $\frac{8}{99}$ C. $\frac{4}{45}$ D. $\frac{8}{45}$ E. $\frac{4}{99}$

22. 3.25 miles = _____ yards
 A. 5,280 B. 5,720 C. 6,160 D. 17,160 E. 8,580

23. If, $x = 5$, what is the perimeter of an equilateral triangle with a side length of $9x - 7$?
 A. 38 units B. 76 units C. 152 units D. 30 units E. 114 units

24. How many perfect squares lie between 150 and 300?
 A. 5 B. 6 C. 4 D. 7 E. 8

25. Which relation below is that of a function?
 A. $\{(3, 3), (1, 8), (1, 9)\}$ B. $\{(3, 7), (9, 6), (3, 1)\}$ C. $\{(1, 3), (1, 8), (1, 7)\}$ D. $\{(3, 3), (3, 8), (3, 9)\}$ E. $\{(3, 9), (2, 1), (1, 0)\}$

26. What is the probability of rolling a pair of dice and getting a sum greater than 9 (in ratio form)?
 A. 1:9 B. 1:6 C. 1:4 D. 5:36 E. 1:5

27. $76_8 =$ _____₉
 A. 67 B. 68 C. 62 D. 65 E. 66

28. What is the sum of the coordinates of the midpoint between the points $(-14, 18)$ and $(24, -2)$?
 A. 13 B. 36 C. 26 D. 8 E. 16

29. What is the value of the upper quartile, or Q_3 , for the data represented in the stem-and-leaf plot below?

1	6		
2	2 6 7	Key: 4/1 = 41	
3	3 4		
4	1 1 8		

- A. 24 B. 33 C. 41 D. 38 E. 44

30. What is the parent function of all quadratic functions?

- A. $f(x) = Ax^2 + Bx + C$ B. $f(x) = x$ C. $f(x) = x^2$ D. $f(x) = a(x - h)^2 + k$ E. $f(x) = \frac{-B \pm \sqrt{B^2 - 4AC}}{2A}$

31. The function $f(x) = 5x - 13$ produces a range of $\{A, B, C\}$ with a domain of $\{-4, 3, 11\}$. Find the sum of $A + B + C$.

- A. 11 B. 10 C. -9 D. -14 E. 23

32. Two sides of a triangle measure 11 cm and 27 cm. What is the smallest possible integral length of the third side of the triangle?

- A. 38 cm B. 37 cm C. 16 cm D. 17 cm E. 8 cm

33. $150^\circ = \underline{\hspace{2cm}}$ (radians)

- A. $\frac{7\pi}{5}$ B. $\frac{5\pi}{7}$ C. $\frac{5\pi}{11}$ D. $\frac{4\pi}{5}$ E. $\frac{5\pi}{6}$

34. Which of the choices below are examples of linear equations?

- I. $12.4x = 6y$ II. $y = (2x - 1)^2$ III. $4x - 9y = -7$ IV. $y = \frac{3}{x}$

- A. I only B. II and IV C. II and III D. I and III E. I and IV

35. Use the examples below to find the value of m .

1	4	-5	2	-7	-2	3	6
-2	21	2	33	-3	62	9	m

- A. 124 B. 77 C. 89 D. 94 E. 126

36. Using interval notation, if $5 < x < 12$ can be expressed as $(5, 12)$ and $-3 \leq x < 6$ can be expressed as $[-3, 6)$, how can $-7 < x \leq 10$ be expressed?

- A. $(-7, 10)$ B. $(-7, 10]$ C. $[-7, 10]$ D. $[-7, 10)$ E. $(-7, 10]$

37. How many positive integral divisors does the number 135 have?

- A. 6 B. 8 C. 10 D. 14 E. 12

38. If $\begin{bmatrix} -9 & 3 \\ -10 & -4 \end{bmatrix} - \begin{bmatrix} -12 & -7 \\ 2 & 5 \end{bmatrix} = \begin{bmatrix} a & c \\ b & d \end{bmatrix}$, find the value of $ab - cd$.

- A. -126 B. 3,240 C. 93 D. 54 E. -10

39. Find the rate of decay of the exponential decay function $y = 231(0.76)^x$.

- A. 231% B. 76% C. 24% D. 176% E. 2.31%

40. Ethan deposits \$400 into a simple interest account at a 5.2% rate for 4 years. How much money will be in Ethan's bank account after the four years?

- A. \$83.20 B. \$832.00 C. \$483.00 D. \$483.20 E. \$583.20

41. What is the percent of change if the quantity 60 drops to the quantity 36?

- A. 14% decrease B. 40% increase C. 35% increase D. 24% decrease E. 40% decrease

42. What is the slope of any line parallel to the line with the equation $4x - 3y = -24$?

- A. $\frac{3}{4}$ B. $\frac{4}{3}$ C. 8 D. -6 E. $-\frac{3}{4}$

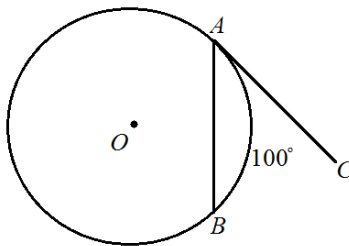
43. Addie and Ayden have the chore to clean their kitchen. If Addie does it alone, it would take her 30 minutes. If Ayden does it alone, it would taken him 45 minutes. If they work together, how long would it take them to clean the kitchen?

- A. 18 minutes B. 20 minutes C. 23 minutes D. 24 minutes E. 22 minutes

44. Simplify: $\sqrt{12}(\sqrt{6} + \sqrt{5})$

- A. $6\sqrt{2} + 2\sqrt{5}$ B. $36\sqrt{2} + 4\sqrt{15}$ C. $36\sqrt{2} + 20\sqrt{3}$ D. $6\sqrt{2} + 20\sqrt{3}$ E. $6\sqrt{2} + 2\sqrt{15}$

45. In the picture below, minor arc $AB = 100^\circ$, \overline{AC} is tangent to $\odot O$ and \overline{AB} is a chord. Find $m\angle BAC$.



- A. 100° B. 75° C. 50° D. 25° E. 150°

46. What is the x -intercept of the graph of the linear function $f(x) = \frac{3}{8}x - 48$?

- A. 18 B. 128 C. 48 D. 144 E. -48

47. In terms of π , what is the circumference of a circle with an equation of $(x - 9)^2 + (y + 7)^2 = 196$?

- A. 196π units B. 98π units C. 28π units D. 14π units E. 56π units

48. Simplify: $5 \left(\frac{2m^4n^3}{10(m^2n^{-3})^2} \right)^2$

- A. $\frac{n^{81}}{125}$ B. $\frac{n^{18}}{5}$ C. $\frac{mn^{18}}{625}$ D. $\frac{n^{81}}{625}$ E. $\frac{n^9}{5}$

49. In which quadrant does the solution to the system lie in?

$$\begin{cases} x = 15 - y \\ -3y = 40 - 2x \end{cases}$$

- A. Quadrant I B. Quadrant II C. Quadrant III D. Quadrant IV E. Quadrant V

50. What is the area of a polygon with its vertices located at $(1, -3)$, $(3, 2)$, $(-4, 2)$ and $(-6, -3)$?

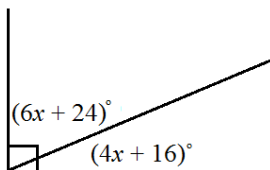
- A. 35 units² B. 70 units² C. 44 units² D. 50 units² E. 36 units²

2015 – 2016 TMSCA Middle School Mathematics Test #6 Answer Key

1. A	18. E	35. E
2. A	19. B	36. E
3. B	20. E	37. B
4. D	21. C	38. D
5. E	22. B	39. C
6. A	23. E	40. D
7. E	24. A	41. E
8. C	25. E	42. B
9. B	26. B	43. A
10. A	27. B	44. E
11. B	28. A	45. C
12. C	29. C	46. B
13. A	30. C	47. C
14. A	31. A	48. B
15. E	32. D	49. D
16. D	33. E	50. A
17. D	34. D	

2015 – 2016 TMSCA Middle School Mathematics Test #6 Selected Answers

20. We are asked to find the larger angle measure using the picture below. We see that the two angles below create a right angle, which is equal to 90° .



So, $6x + 24 + 4x + 16 = 90$, which simplifies to $10x + 40 = 90$ and we solve to get $x = 5$. Substituting into each angle and we get angle measures of 54° and 36° . Thus, our answer is 54° .

21. If $0.0\bar{8} = x$, then $100x = 8.\bar{8}$ and $10x = 0.\bar{8}$. Now we can see that $100x - 10x = 90x$ and $8.\bar{8} - 0.\bar{8} = 8$. Now we have the equation $90x = 8$. Solving our equation we get $\frac{8}{90} = \frac{4}{45}$.

22. There are 1,760 yards in one mile. Thus, $3.25 \text{ miles} \times 1760 = 5,720$ yards

28. The midpoint between the points $(-14, 18)$ and $(24, -2)$ is $\left(\frac{-14+24}{2}, \frac{18+(-2)}{2}\right) = \left(\frac{10}{2}, \frac{16}{2}\right) = (5, 8)$. The sum of the coordinates is $5 + 8 = 13$.

30. The parent function of all quadratic functions is $y = x^2$ or $f(x) = x^2$.

41. To find the percent of change, use $\frac{\text{larger \#} - \text{smaller \#}}{\text{original \#}}$. We are asked to find the percent of change of 60 to 36, so $\frac{60-36}{60} = \frac{24}{60} = \frac{2}{5} = 0.4 = 40\%$. Since 60 decrease in quantity, the answer is 40% decrease.