

2014-2015 TMSCA Middle School Mathematics Test #7

1. $15\frac{2}{3} - 9\frac{4}{5} =$ _____

- A. $5\frac{13}{15}$ B. $16\frac{2}{15}$ C. $16\frac{1}{4}$ D. $15\frac{2}{15}$ E. $15\frac{1}{8}$

2. $124 \div \frac{1}{2} =$ _____

- A. 31 B. 62 C. 284 D. 42 E. 248

3. $-345 + 1,008 =$ _____

- A. 1,353 B. 663 C. 763 D. 655 E. -655

4. $0.0082 \cdot 2.402 =$ _____ (nearest hundredth)

- A. 0.01 B. 0.02 C. 0.019 D. 0.015 E. 0.04

5. If $A @ B = 3A - 7B + AB$, then find the value $5 @ 4$.

- A. 7 B. -3 C. 15 D. 8 E. -5

6. $\frac{5}{18} =$ _____ (nearest hundredth)

- A. $0.2\bar{7}$ B. 0.278 C. 0.28 D. 0.27 E. $0.2\bar{8}$

7. $XII + IV + CD =$ _____ (Roman numeral)

- A. *CDIVXX* B. *DCXIV* C. *CDXIII* D. *CDXXVI* E. *CDXVI*

8. The point $(-7, 3)$ is reflected over the x -axis and then reflected across the y -axis. What are the new coordinates of the point after both reflections?

- A. $(7, 3)$ B. $(-7, -3)$ C. $(-3, 7)$ D. $(-3, -7)$ E. $(7, -3)$

9. $\frac{37}{50}$ meters = _____ centimeters

- A. 3.7 B. 0.74 C. 74 D. 37 E. 3.7

10. Maya wants to bake a cake using a recipe that makes six servings of 150 calories each. Maya is having more friends over than she anticipated, so she doubled her cake recipe. How many calories will be in Maya's cake?

- A. 900 B. 2,400 C. 3,600 D. 300 E. 1,800

11. Simplify: $(3|7 - 28| + 4(5 - 14))^2$

- A. 841 B. 1 C. -1 D. 207 E. 729

12. $\angle A = 41.7^\circ$ and $\angle B = 119.2^\circ$. The sum of the complement of $\angle A$ and the supplement of $\angle B =$ _____.

- A. 109.1 B. 160.9 C. 167.5 D. 77.5 E. 122.7

13. 4,480 acres = _____ square miles

- A. 5 B. 6 C. 7 D. 8 E. 9

14. What is the value of m , if $4.5 \times 10^7 + 2.23 \times 10^7 + 8.11 \times 10^7 = 1.484 \times 10^m$?

- A. 6 B. 7 C. 8 D. 21 E. 9

15. For every eight apples Lupe picks, she will make fifteen cents. How much will Lupe make in total if she picks 264 apples?

- A. \$4.95 B. \$4.80 C. \$33.00 D. \$3.90 E. \$5.10

16. Today, the probability of it raining is $\frac{3}{4}$. What are the odds of it not raining today?

- A. 1:4 B. 4:1 C. 1:3 D. 3:1 E. 1:2

17. Solve: $-7n < 64 + (-85)$

- A. $n < -3$ B. $n > 21.9$ C. $n > -3$ D. $n < 21$ E. $n > 3$

18. What is the value of the median of the set of numbers 66, 74, 24, 32, 88, 90, 44, 62?

- A. 80 B. 66 C. 70 D. 72 E. 64

19. Which of the following is not equivalent to $17^2 - 200 + 15$?

- A. $2^3 \cdot 13$ B. $26 \cdot 4$ C. $8(16 - 3)$ D. $3^3 + 78$ E. $2^8 - 152$

20. Ainsley is buying a dress that costs \$72.40. If tax is at a rate of 7%, what will be Ainsley's total with tax?

- A. \$77.50 B. \$77.44 C. \$76.18 D. \$76.98 E. \$77.47

21. What is the 21st term in the sequence 6, 13, 20, 27, ...

- A. 153 B. 146 C. 139 D. 132 E. 217

22. Let A equal the number of diagonals that can be drawn from one vertex of a regular hexagon and let B equal the number of diagonals that can be drawn from one vertex of a regular 15-sided polygon. Find $B - A$.

- A. 12 B. 15 C. 9 D. 21 E. 6

23. What is the sum of all the distinct prime factors of the number 540?

- A. 21 B. 10 C. 18 D. 13 E. 15

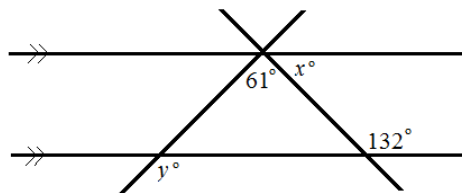
24. If the circumference of a circle is 16π inches, what is the area of the circle, in terms of π ?

- A. $16\pi \text{ in}^2$ B. $8\pi \text{ in}^2$ C. $32\pi \text{ in}^2$ D. $64\pi \text{ in}^2$ E. $256\pi \text{ in}^2$

25. What is the probability of drawing a queen from a standard deck of cards on the first pick and then, with replacement, drawing an ace on a second pick?

- A. $\frac{4}{663}$ B. $\frac{1}{169}$ C. $\frac{1}{4}$ D. $\frac{2}{13}$ E. $\frac{3}{625}$

26. Find the sum of x and y using the picture below.



- A. 109 B. 132 C. 162 D. 157 E. 218

27. $45_6 + 23_6 = \underline{\hspace{2cm}}_6$
 A. 201 B. 202 C. 68 D. 152 E. 112
28. The exterior angle measure of a regular 45-sided polygon is equal to $\underline{\hspace{2cm}}^\circ$.
 A. 15 B. 8 C. 30 D. 6 E. 20
29. What is the product of 17 and the additive inverse of -32?
 A. $-\frac{17}{32}$ B. $\frac{17}{32}$ C. 1.89 D. 544 E. -544
30. What is the area of a trapezoid with a base of 10.4 inches, a base of 24.6 inches and a height of 19 inches?
 A. 332 in^2 B. 665 in^2 C. 146.92 in^2 D. 364.5 in^2 E. 332.5 in^2
31. What is the distance between the two points (6, 15) and (11, 3)?
 A. 13 units B. 72 units C. 17 units D. 10 units E. 21 units
32. Solve for n : $\frac{2n}{3} + m = 3m$
 A. $n = 6m$ B. $n = 3m$ C. $n = 12m$ D. $n = 9m$ E. $n = 18m$
33. Maria opens a book and the two page numbers she sees sum to 117. What is the product of the two numbers?
 A. 3,428 B. 3,242 C. 3,422 D. 3,436 E. 3,306
34. What is the unit's digit of 4^{11} ?
 A. 4 B. 6 C. 2 D. 8 E. 0
35. What is the range of the function $f(x) = 5x - 87$, given the domain of $\{-14, 22, 40\}$?
 A. $\{157, 23, 113\}$ B. $\{-157, -60, -42\}$ C. $\{-157, 23, 113\}$ D. $\{-157, -104, -122\}$ E. $\{157, -104, -122\}$
36. Which of the following points below does the line with the equation $4x = -3y + 7$ pass through?
 A. (1, -1) B. (-2, 5) C. (-5, -9) D. (4, 3) E. (-7, -7)
37. What is the simple interest earned when depositing \$2,500 at 6% for 18 months?
 A. \$27.00 B. \$270.00 C. \$275.00 D. \$250.00 E. \$225.00
38. Calculate the mean absolute deviation of the data set 1.8, 2.4, 1.6, 3.4 and 9.8.
 A. 3.8 B. 1.6 C. 2.8 D. 3.2 E. 2.4
39. What is the decay factor in the exponential decay function $f(x) = 3.4(0.19)^x$?
 A. 3.4 B. 81 C. 0.19 D. 19 E. 340
40. If $g(x) = 3x^2$, find $g(x + 2)$.
 A. $3x + 6$ B. $3x^2 + 4x + 4$ C. $x^2 + 4x + 4$ D. $3x^2 + 12x + 12$ E. $9x^2 + 36x + 36$

41. Wendy played in a basketball tournament last weekend. She made a total of 39 points making 17 baskets consisting of both 2 and 3 points shots. How many 3-point shots did Wendy make?

- A. 12 B. 4 C. 6 D. 5 E. 8

42. Which system below has a solution of *all real numbers*?

- A. $\begin{cases} 3x + 8y = 19 \\ 4y = -1.5x + 9.5 \end{cases}$ B. $\begin{cases} 3x + 6y = 11 \\ x = y - 7.4 \end{cases}$ C. $\begin{cases} y = 3x - 5 \\ -6x - 2y = 9 \end{cases}$ D. $\begin{cases} y = \frac{3}{4}x + 2 \\ x = 8.1y - 4 \end{cases}$ E. $\begin{cases} x = -7.4 \\ y = 18.7 \end{cases}$

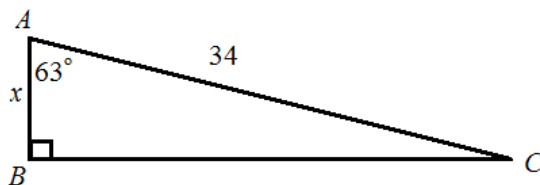
43. If $x + \frac{1}{x} = 6$, find the value of $x^2 + \frac{1}{x^2}$.

- A. 36 B. 38 C. 34 D. $\frac{1}{36}$ E. 12

44. What is the equation of the circle that has a diameter with endpoints (7, -8) and (-3, 16)?

- A. $(x - 7)^2 + (y + 8)^2 = 169$ B. $(x - 2)^2 + (y - 4)^2 = 169$ C. $(x + 8)^2 + (y - 7)^2 = 169$ D. $x^2 + y^2 = 169$ E. $(x + 3)^2 + (y - 16)^2 = 169$

45. Which trig function below could be used to find the length of x from the picture?

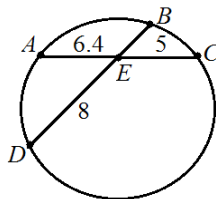


- A. $\sin(63) = \frac{x}{34}$ B. $\tan(63) = \frac{x}{34}$ C. $\tan(63) = \frac{34}{x}$ D. $\cos(63) = \frac{x}{34}$ E. $\sin(63) = \frac{34}{x}$

46. What is the new axis of symmetry for the quadratic equation $f(x) = x^2 + 10x - 3$ after it is translated to the right 7 units?

- A. $x = 2$ B. $x = -7$ C. $x = -12$ D. $x = -5$ E. $x = -23$

47. In the picture below, $\overline{AE} = 6.4$, $\overline{EC} = 5$ and $\overline{DE} = 8$ units. What is the length of \overline{BE} ?



- A. 9.4 units B. 6.6 units C. 4 units D. 3 units E. 3.4 units

48. Rationalize the denominator and simplify:

$$\frac{12}{\sqrt{24}}$$

- A. $\frac{1\sqrt{6}}{3}$ B. $\frac{1\sqrt{6}}{4}$ C. $\frac{12\sqrt{24}}{24}$ D. $2\sqrt{6}$ E. $\sqrt{6}$

49. $64^{\frac{2}{3}}$ = _____

- A. 2 B. 4 C. 8 D. 16 E. 32

50. If the points (-4, 8) and ($\frac{1}{2}$, y) each lie on the same graph of an inverse variation, what is the value of y ?

- A. 16 B. -16 C. -64 D. -4 E. 4

2014-2015 TMSCA Middle School Mathematics Test #7 Answer Key

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

2014-2015 TMSCA Middle School Mathematics Test #7 Selected Answers

15. The proportion $\frac{8}{0.15} = \frac{264}{x}$ can be used to solve this problem. Cross multiply and we get $264(0.15) = 8x$. So we have $39.6 = 8x$. Divide both sides by 8 and $x = 4.95$. For picking 264 apples, Lupe will make \$4.95.

31. The distance between two points can be found using the formula $d = \sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2}$, where we have the two points (x_1, y_1) and (x_2, y_2) . We are given the points $(6, 15)$ and $(11, 3)$. Substituting and we have $d = \sqrt{(6 - 11)^2 + (15 - 3)^2} = \sqrt{(-5)^2 + (12)^2} = \sqrt{25 + 144} = \sqrt{169} = 13$. The distance between the points $(6, 15)$ and $(11, 3)$ is equal to 13 units.

40. If $g(x) = 3x^2$, then $g(x + 2) = 3(x + 2)^2 = 3(x + 2)(x + 2) = 3(x^2 + 4x + 4) = 3x^2 + 12x + 12$.

43. We want to find $x^2 + \frac{1}{x^2}$ and are given that $x + \frac{1}{x} = 6$. So, first square both sides of the equal sign and we get $x + \frac{1}{x} = 6 \rightarrow \left(x + \frac{1}{x}\right)^2 = 6^2 \rightarrow \left(x + \frac{1}{x}\right)\left(x + \frac{1}{x}\right) = 36 \rightarrow x^2 + 2 + \frac{1}{x^2} = 36$. Subtract 2 from both sides and we have $x^2 + 2 + \frac{1}{x^2} - 2 = 36 - 2 \rightarrow x^2 + \frac{1}{x^2} = 34$. Thus, $x^2 + \frac{1}{x^2} = 34$.

49. $64^{\frac{2}{3}} = (\sqrt[3]{64})^2 = (4)^2 = 16$.

50. An inverse variation has a constant of variation, k , equal to xy . We are given the points $(-4, 8)$ and $(\frac{1}{2}, y)$. Since they are points from the same inverse variation, the constant of variation must be the same for both, thus $-4 \cdot 8 = \frac{1}{2}y \rightarrow -32 = \frac{1}{2}y$. Solving the equation we must multiply both sides by 2 and $y = -64$.