



**TMSCA MIDDLE SCHOOL
MATHEMATICS
TEST #9 ©
JANUARY 31, 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.

[illegible]

2014-2015 TMSCA Middle School Mathematics Test #9

1. $657 + 812 + 196 =$ _____

- A. 1,665 B. 1,764 C. 1,565 D. 1,643 E. 1,785

2. $10,000 - 8,267 - 968 =$ _____

- A. 725 B. 825 C. 765 D. 745 E. 815

3. $3\frac{1}{2} \cdot 2\frac{1}{5} \cdot 6 =$ _____

- A. 46.2 B. 44.8 C. 42.6 D. 45.4 E. 46.4

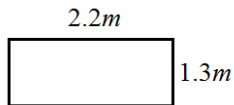
4. $450 \div 25 \div 2.4 =$ _____

- A. 6 B. $6\frac{1}{2}$ C. 7 D. $7\frac{1}{2}$ E. $8\frac{1}{4}$

5. Find the positive difference of the mean and median for the set of numbers. {2, 54, 54, 76, 84}

- A. 28 B. 0 C. 1 D. 65 E. 54

6. Letting $m = 7$, what is the perimeter of the rectangle below after doubling each side?



- A. 98 units B. 141.4 units C. 70.7 units D. 123 units E. 104 units

7. $2 \text{ yd}^3 =$ _____ ft^3

- A. 81 B. 27 C. 54 D. 108 E. 216

8. What is 18.4% of 3,000?

- A. 544 B. 552 C. 564 D. 562 E. 546

9. $MMDXLIX + CCLVII =$ _____ (Arabic number)

- A. 2,806 B. 2,896 C. 2,908 D. 2,826 E. 2,822

10. $5.1 \times 10^5 - 4.9 \times 10^5 =$ _____

- A. 2×10^5 B. 2×10^{-5} C. 0.2×10^7 D. 2×10^4 E. 2×10^0

11. What is the sum of the number of vertices and edges of an octagonal prism?

- A. 40 B. 50 C. 26 D. 34 E. 32

12. $\frac{7}{11} =$ _____ (decimal)

- A. 0.63 B. $0.6\overline{3}$ C. $0.\overline{63}$ D. $0.6\overline{63}$ E. $0.66\overline{3}$

13. 42 decimeters = _____ millimeters

- A. 0.42 B. 4.2 C. 420 D. 4,200 E. 42,000

14. The supplement to the complement of a 45.3° is equal to _____ $^\circ$.

- A. 144.7 B. 135.3 C. 134.3 D. 134.7 E. 154.3

15. Simplify: $4(2y - 5) - (3y + 6) - 8y + 11$
 A. $-5y - 3$ B. $-3y + 3$ C. $3y - 3$ D. $5y - 15$ E. $-3y - 15$

16. If 3 froglets are equal to 5 piglets and 1 piglet is equal to 8 chicklets, how many froglets is equal to 40 chicklets?
 A. 24 B. 5 C. 30 D. 18 E. 3

17. What are the new coordinates of the point (7, -2) after the point is reflected across the y-axis and then reflected across the x-axis?
 A. (7, 2) B. (-2, 7) C. (-7, -2) D. (-7, 2) E. (2, -7)

18. Which formula below can be used to find the total surface area of a sphere?
 A. $SA = 2\pi rl$ B. $SA = \frac{4}{3}\pi r^3$ C. $SA = 4\pi r^2$ D. $SA = \frac{4}{3}\pi r^2$ E. $SA = 2\pi r^2$

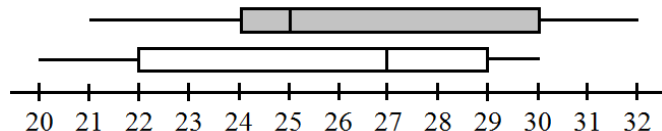
19. The radius of a circle would be _____ units if the area of the circle is $1,156\pi$ units².
 A. 32 B. 34 C. 28 D. 36 E. 46

20. What is the value of five more than the sum of all the positive integral divisors of 72?
 A. 195 B. 122 C. 123 D. 213 E. 195

21. Which of the following points is in the solution set for the linear inequality $4x - 3y > 12$?
 A. (0, 0) B. (1, 20) C. (11, -1) D. (-11, 1) E. (-0.5, 0.5)

22. $9,993 \times 9,997 =$ _____
 A. 9,990,021 B. 999,021 C. 9,900,021 D. 99,990,021 E. 99,900,021

23. What is the positive difference of the medians of the two box-and-whisker plots below?



- A. 1 B. 2 C. 3 D. 4 E. 5

24. What is the next number in the following sequence? 1, 8, 27, 64, 125, ...
 A. 326 B. 216 C. 264 D. 200 E. 289

25. If three-dozen markers cost \$21.60, how much do three markers cost?
 A. \$1.80 B. \$1.50 C. \$64.80 D. \$1.20 E. \$0.60

26. 2 gallons = _____ cubic inches
 A. 173 B. 462 C. 346 D. 578 E. 284

27. What is the percent of increase is an \$18.00 hat is marked up to \$24.00?
 A. 30% B. $66\frac{2}{3}\%$ C. 40% D. $33\frac{1}{3}\%$ E. 24%

28. In a 30-60-90 right triangle, if the measure of the long leg is $11\sqrt{3}$ inches, how long is the hypotenuse?
 A. 5.5 inches B. 22 inches C. $22\sqrt{3}$ inches D. 11 inches E. $11\sqrt{6}$ inches

29. What is the area of a pentagon with its vertices located at the points (2, -1), (2, 3), (-1, 4), (-4, 1) and (-2, -3)?
 A. 20 units² B. 24units² C. 26 units² D. 28 units² E. 32 units²

30. $612_8 - 57_8 =$ _____
 A. 347 B. 533 C. 457 D. 555 E. 473

31. How many permutations can be made from six items taken three at a time?
 A. 18 B. 720 C. 20 D. 216 E. 120

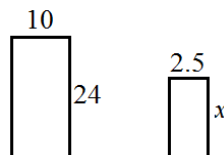
32. What is the 31st term in the sequence -5, -1, 3, 7, 11, 15, ...
 A. 115 B. 112 C. 123 D. 118 E. 113

33. Which of the following sets of numbers is not a Pythagorean triple?
 A. 7, 24, 25 B. 20, 21, 29 C. 9, 40, 41 D. 8, 15, 17 E. 12, 36, 37

34. The center of a circle with an equation of $(x - 3)^2 + y^2 = 25$ is which of the following?
 A. (3, -1) B. (-3, 0) C. (3, 0) D. (3, 5) E. (-3, 5)

35. What is the rate of decay in the exponential decay function $y = 3\left(\frac{3}{5}\right)^x$?
 A. 60% B. 30% C. 3.6% D. 36% E. 40%

36. If the two rectangles below are similar, what is the perimeter of the smaller rectangle?



A. 12 units B. 17 units C. 15 units D. 68 units E. 12.5 units

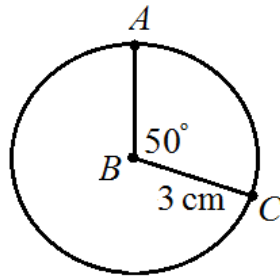
37. What is the name of the regular polygon if its exterior angle measures 72° ?
 A. quadrilateral B. pentagon C. hexagon D. octagon E. heptagon

38. What is the simple interest of depositing \$1,500 at 2.1% for 8 years?
 A. \$252.00 B. \$264.00 C. \$228.00 D. \$254.50 E. \$246.50

39. Calculate the mean absolute deviation for the data set 4.7, 11.2, 9.8 and 2.3.
 A. 4 B. 7 C. 3.5 D. 2.75 E. 4.25

40. What is the conjugate of the expression $4 + \sqrt{7}$?
 A. $\sqrt{7} + 4$ B. $\sqrt{7} - 4$ C. $4 - \sqrt{7}$ D. $4 - (-\sqrt{7})$ E. $4\sqrt{7}$

41. Using the picture below and letting $\pi = 3$, find the area of sector ABC .



- A. 7.5 cm^2 B. 3.75 cm^2 C. 2.25 cm^2 D. 9 cm^2 E. 3.25 cm^2

42. A square and a regular hexagon each have the same side length. If the perimeter of the hexagon is 60 cm, what is the length of the diagonal of the square?

- A. $6\sqrt{2} \text{ cm}$ B. 20 cm C. $40\sqrt{2} \text{ cm}$ D. 12 cm E. $10\sqrt{2} \text{ cm}$

43. What is the slope of the line that passes through the two points $(a, 6a)$ and $(4a, -9a)$?

- A. -5 B. $-\frac{3}{2}$ C. $-\frac{2}{3}$ D. $\frac{-3a}{2}$ E. -a

44. $5! - 4!$ Is equivalent to which of the following?

- A. $4!(4)$ B. $4!(5)$ C. $4! + 3!$ D. $(3!)^2$ E. $(3! + 2!)^2$

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

- A. $\frac{n^{12}}{m^6}$ B. $\frac{1}{m^6n^{12}}$ C. $\frac{m^6}{n^{12}}$ D. $\frac{n^7}{m^5}$ E. m^6n^{12}

46. If $f(x) = 3x^2$, then find $5f(a + b)$.

- A. $3a^2 + 6ab + 3b^2$ B. $25a^2 + 50ab + 25b^2$ C. $75a^2 + 150ab + 75b^2$ D. $15a^2 + 30ab + 15b^2$ E. $45a^2 + 90ab + 45b^2$

47. What is the product of the roots of the quadratic equation $y = 4x^2 - 10x - 24$?

- A. -6 B. $0.1\bar{6}$ C. -0.4 D. -2.5 E. 2.4

48. Which of the following equations is the linear equation $4x - 3y = 7$ written in slope-intercept form?

- A. $y = \frac{4}{3}x + \frac{7}{4}$ B. $y = \frac{4}{3}x - \frac{7}{3}$ C. $y = -\frac{4}{3}x - \frac{7}{3}$ D. $y = -\frac{3}{4}x - \frac{7}{4}$ E. $y = -\frac{3}{4}x + \frac{7}{4}$

49. Simplify by rationalizing the denominator: $\frac{6}{\sqrt{15}}$

- A. $\sqrt{15}$ B. $\frac{1}{2}$ C. $\frac{\sqrt{15}}{2}$ D. $\frac{\sqrt{3}}{2}$ E. $\frac{2\sqrt{15}}{15}$

50. Solve and write your answer using interval notation: $-7 \leq x + 4 \leq 20$

- A. $(-3, 24)$ B. $[-3, 16]$ C. $(-11, 24)$ D. $[-11, 16]$ E. $(-11, 16)$

2014-2015 TMSCA Middle School Mathematics Test #9 Answer Key

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

2014-2015 TMSCA Middle School Mathematics Test #9 Selected Answers

24. 1, 8, 27, 64, 125, ... = $1^3, 2^3, 3^3, 4^3, 5^3, \dots$. So, we are looking for the next term, which is $6^3 = 216$.

26. 1 gallon = 231 cubic inches, so 2 gallons = $2(231) = 462$ cubic inches.

27. $\frac{24-18}{18} = \frac{6}{18} = \frac{1}{3} = 0.\overline{3} = 33\frac{1}{3}\%$ increase.

31. The number of permutations can be found by ${}_mP_n = \frac{m!}{(m-n)!}$. We are asked how many permutations can be made from 6 items taken 3 at a time, so ${}_6P_3 = \frac{6!}{(6-3)!} = \frac{6!}{3!} = 6 \cdot 5 \cdot 4 = 120$.

40. The conjugate of $4 + \sqrt{7}$ is $4 - \sqrt{7}$.

43. The slope of the line passing through two points can be found using the formula $\frac{y_2 - y_1}{x_2 - x_1}$, when given two points (x_1, y_1) and (x_2, y_2) . We are given the points $(a, 6a)$ and $(4a, -9a)$, so we must substitute into the slope formula. $\frac{6a - (-9a)}{a - 4a} = \frac{6a + 9a}{-3a} = \frac{15a}{-3a} = -5$.

45. $\left(\left(\frac{m^3n^{-2}}{m^2n^{-4}}\right)^{-2}\right)^3 = \left(\left(\frac{mn^2}{1}\right)^{-2}\right)^3 = \left(\left(\frac{1}{mn^2}\right)^2\right)^3 = \left(\frac{1}{m^2n^4}\right)^3 = \frac{1}{m^6n^{12}}$.