



**TMSCA MIDDLE SCHOOL
MATHEMATICS
TEST #11 ©
FEBRUARY 9, 2019**

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 on Scantrons and Chatsworth cards.
3. If you are using a Chatsworth or Scantron card, please follow the specific instructions given at your particular meet.
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]

1. $187 + 757 = \underline{\hspace{2cm}} + (-119)$

- A. 1,072 B. 1,063 C. 944 D. 1,193 E. 1,107

2. $18\frac{9}{20} - 4\frac{3}{10} - 2\frac{3}{5} = \underline{\hspace{2cm}}$

- A. $11\frac{13}{20}$ B. $11\frac{7}{10}$ C. $11\frac{1}{5}$ D. $12\frac{7}{20}$ E. $11\frac{11}{20}$

3. $6.5 \div \frac{1}{3} = \underline{\hspace{2cm}}$

- A. $2.1\overline{6}$ B. 2.2 C. 19.5 D. $3\frac{1}{3}$ E. $3\frac{2}{3}$

4. $4\frac{2}{5} \times 12\frac{5}{10} = \underline{\hspace{2cm}}$

- A. 49.5 B. 49.25 C. 49 D. 55 E. 55.2

5. Point A has coordinates (9, 6) and is reflected over the x -axis and then translated by $(x, y) \rightarrow (x + 3, y - 4)$. What are the new coordinates of the point A?

- A. (-6, 9) B. (12, -2) C. (12, -10) D. (-9, -2) E. (12, -6)

6. 2,400 kg = dg

- A. 240,000 B. 2.4 C. 0.00024 D. 2,400,000 E. 24,000,000

7. Simplify: $(\frac{2}{3}(12 - (-6)))^2 + 14^0$

- A. 17 B. 158 C. 145 D. 37 E. 217

8. The sum of two numbers is 68. One of the numbers is 31. What is the product of the two numbers?

- A. 1,147 B. 2,108 C. 2,516 D. 1,258 E. 1,054

9. The perimeter of a rectangle is 90 cm. What is the value of x if the length is $x + 7$ cm and the width is $2x - 4$?

- A. 22 cm B. 31 cm C. 14 cm D. 16 cm E. 15 cm

10. $1\frac{5}{8} \neq \underline{\hspace{2cm}}$

- A. $\frac{13}{8}$ B. 1.625 C. 162.5% D. $1\frac{20}{32}$ E. 1.675

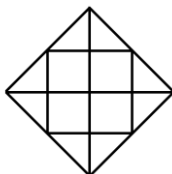
11. The product of two consecutive positive odd integers is 783. What is the smaller of the two integers?

- A. 31 B. 29 C. 27 D. 21 E. 23

12. 1 square mile = acres

- A. 1,200 B. 640 C. 1,280 D. 960 E. 450

13. How many triangles can be found in the picture below?



- A. 16 B. 24 C. 20 D. 12 E. 28

14. 19 is what percent of 47.5?

- A. 30% B. 35% C. 40% D. 45% E. 37.5%

15. How many more edges does a dodecagonal prism have than the number of faces of a triangular prism?

- A. 31 B. 9 C. 25 D. 19 E. 6

16. Let n equal the number of blocks needed to make the figure below. What is the value of $\frac{1}{2}n^2 - 17$?



- A. 27 B. 23.5 C. 15 D. 33 E. 8

17. Evaluate $\frac{ab}{c}$, if $a = \frac{2}{3}$, $b = \frac{3}{8}$ and $c = \frac{3}{4}$.

- A. 3 B. $\frac{1}{3}$ C. $\frac{5}{8}$ D. $\frac{1}{8}$ E. $\frac{1}{2}$

18. Simplify: $-\sqrt{121} + \sqrt{256} - \sqrt{441} + \sqrt{324}$

- A. 2 B. 4 C. 24 D. 13 E. 39

19. Solve for x : $\frac{3x+5}{4} \geq 11$

- A. $x > 13$ B. $x \leq 13$ C. $x \leq -13$ D. $x \geq -13$ E. $x \geq 13$

20. Brendan has 20 quarters and 30 pennies. Shanique has the same amount of money in dimes and nickels. How many nickels does Shanique have if she has 24 dimes?

- A. 58 B. 74 C. 62 D. 64 E. 66

21. A child ticket to *Runaway Races* costs \$16.00. An adult ticket costs 30% more than a child ticket. How much would it cost for two adults and six children to attend *Runaway Races*?

- A. \$129.80 B. \$137.60 C. \$133.20 D. \$129.20 E. \$124.80

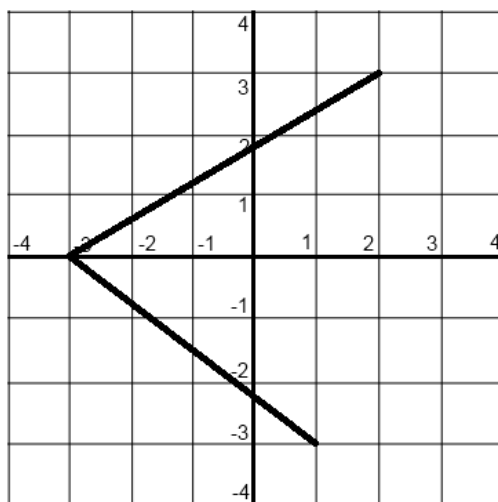
22. If 3 widgets = 4 pidgets and 5 pidgets = 9 gidgets, how many gidgets are equal to 30 widgets?

- A. 90 B. 81 C. 45 D. 72 E. 56

23. $1 + 22 + 333 =$ _____ (Roman numeral)

- A. CCCXLVI B. CCCXXVI C. CCCLXXXVI D. CCCLVI E. CCCLXVI

24. What is the domain of the graph?

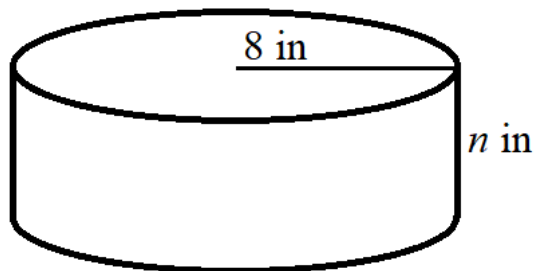


- A. $-3 \leq x \leq 3$ B. $-3 < x < 3$ C. $-3 \geq x \geq 2$ D. $-3 \geq x \geq 3$ E. $-3 \leq x \leq 2$

25. Abbey, Becky, Chrissy, Deanna, Emily, Franny and Gertrude ate at a restaurant and agreed to split the bill equally. Gertrude forgot her money, so the others all paid an extra \$3.00 to cover her portion of the total bill. What was the total bill?

- A. \$126.00 B. \$108.00 C. \$147.00 D. \$144.00 E. \$134.00

26. The surface area of the cylinder below is $192\pi \text{ in}^2$. What is the value of n ?



- A. 2 in B. 6 in C. 1 in D. 24 in E. 4 in

27. The midpoint between the points $(86, 144)$ and $(-62, -88)$ has coordinates (a, b) . What is the value of $b - a$?

- A. 42 B. 16 C. 28 D. 12 E. 20

28. It takes 54 seconds to saw through a piece of wood. How many minutes would it take to cut an 8-foot long piece of wood into 8 equal pieces?

- A. 6.3 minutes B. 5.7 minutes C. 5.4 minutes D. 6.1 minutes E. 7.2 minutes

29. A snail starts off at the bottom of a 24-foot wall. Each day the snail climbs 3 feet up the wall, but slides down 1 foot at night. How many days will it take the slug to reach the top of the wall?

- A. 10 days B. 11 days C. 12 days D. 13 days E. 14 days

30. Aaron, Bruce and Chelise have a total of 175 pieces of candy. Aaron and Bruce have a total of 99 pieces of candy. Bruce and Chelise have a total of 118 pieces of candy. How many pieces of candy does Chelise have?

- A. 57 B. 42 C. 76 D. 63 E. 29

31. If $P(x) = \frac{2x^2 - 3x - 14}{x + 2}$, which of the following is not true?

- A. $P(-6) = -19$ B. $P(-3) = -13$ C. $P(0) = -7$ D. $P(5) = 3$ E. $P(7) = 9$

32. What is the LCM of the two monomials $32m^3n^2$ and $28m^2n^5$?

- A. $224mn$ B. $224m^3n^5$ C. $224m^2n^2$ D. $4m^2n^2$ E. $4m^3n^5$

33. You are given a square with side lengths of x units. If the side lengths of the square are tripled, its new area is 324 units^2 . What is the area of the original square?

- A. 108 units^2 B. 144 units^2 C. 36 units^2 D. 216 units^2 E. 54 units^2

34. $14_6 \times 43_6 = \underline{\hspace{2cm}}_6$

- A. 1130 B. 1120 C. 1110 D. 1230 E. 1320

35. At a family picnic, the ratio of adults to children is 4:5. 16 more adults show up at the picnic, and the ratio of adults to children changes to 6:5. How many children were at the family picnic?

- A. 36 B. 48 C. 32 D. 40 E. 44

36. A line passes through the points $(-8, 11)$, $(4, 5)$ and $(24, y)$. What is the value of y ?

- A. -3 B. -5 C. -11 D. -7 E. -9

37. In the arithmetic sequence 61, 75, a , b , c , d , 145, 159, what is the sum of the digits of c ?

- A. 4 B. 9 C. 5 D. 7 E. 17

38. $(\sqrt{75} + \sqrt{48})(\sqrt{128} - \sqrt{72}) = \underline{\hspace{2cm}}$

- A. $9\sqrt{3}$ B. $76\sqrt{6}$ C. $12\sqrt{3}$ D. $12\sqrt{6}$ E. $18\sqrt{6}$

39. Karthik invests \$1,900 into an account at 4% compounded semi-annually. Which function below can be used to find the amount Karthik has in his account after 3 years, with no further deposits?

A. $y = 1900 \left(1 + \frac{0.04}{2}\right)^6$ B. $y = 1900(1.04)^3$ C. $y = 1900 \left(1 + \frac{0.04}{2}\right)^2$ D. $y = 1900 \left(1 + \frac{0.04}{2}\right)^3$ E. $y = 1900 \left(\frac{1+0.04}{2}\right)^3$

40. What is the equation of the line parallel to the x -axis that passes through the point (34, 7)?

A. $y = 34$ B. $y = 7$ C. $x = 34$ D. $x = -34$ E. $x = 7$

41. Simplify: $(2n)^6 \left(\frac{9n^{2/3}}{36n}\right)^3$

A. $\frac{n^5}{16}$ B. $\frac{n^7}{16}$ C. $2n^5$ D. $\frac{2}{n^{1/3}}$ E. n^5

42. What are the coordinates of the center of the circle with equation $x^2 - 10x + 9 = -y^2 + 6y - 9$?

A. (5, 3) B. (-5, 6) C. (5, -6) D. (6, 9) E. (3, 6)

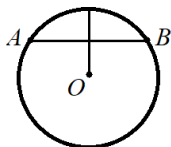
43. The equation $\frac{5|x-2|}{3} = 5$ has solutions a and b . What is the value of $\sqrt{a+b}$?

A. 6 B. 3 C. 2 D. 4 E. 5

44. What is the negative reciprocal of the sum of the solutions to the quadratic equation $8x^2 - 5x + 3 = 0$?

A. $-\frac{8}{3}$ B. $-\frac{5}{3}$ C. $\frac{8}{5}$ D. $\frac{3}{8}$ E. $-\frac{8}{5}$

45. In $\odot O$, \overline{AB} is the perpendicular bisector of the radius of $\odot O$. In terms of π , what is the area of $\odot O$, if $AB = 8\sqrt{3}$?



A. $64\sqrt{3}\pi$ units² B. $256\sqrt{3}\pi$ units² C. 64π units² D. 16π units² E. 256π units²

46. What is the surface area of a sphere with a diameter of 16 inches? Let $\pi = 3$.

A. 3,072 in² B. 256 in² C. 1,024 in² D. 768 in² E. 512 in²

47. $135^\circ =$ _____ (radians)

A. $\frac{3\pi}{5}$ B. $\frac{2\pi}{3}$ C. $\frac{3\pi}{4}$ D. $\frac{5\pi}{8}$ E. $\frac{3\pi}{2}$

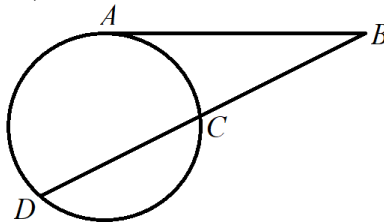
48. $\log_5 8 + \log_5 9 - \log_5 3 =$ _____.

A. $\log_5 24$ B. $\log_5 14$ C. $\log_5 20$ D. $\log_5 \left(\frac{17}{3}\right)$ E. $\log_5 (8 + 9 - 3)$

49. If $x^2 + y^2 = 308$, and $x + y = 18$, what is the value of $(xy)^2$?

A. 256 B. 16 C. 144 D. 36 E. 64

50. In the picture below \overline{AB} is tangent to the circle, $AB = 12$ inches and $CD = 7$ inches. What is the length of CB ?



A. 16 inches B. 5 inches C. 19 inches D. 9 inches E. 11 inches

2018 – 2019 TMSCA Middle School Mathematics Test #11 Answer Key

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

2018-2019 TMSCA Middle School Mathematics Test #11 Selected Answers

6. Since $1 \text{ kg} = 10,000 \text{ dg}$, $2,400 \text{ kg} = 10,000(2,400) = 24,000,000 \text{ dg}$.

8. If one number is 31 and the sum of two numbers is 68, the missing number is then $68 - 31 = 37$. Therefore, the product of the two numbers is $31(37) = 1,147$.

17. If $a = \frac{2}{3}$, $b = \frac{3}{8}$ and $c = \frac{3}{4}$, then $\frac{ab}{c} = \frac{\frac{2 \cdot 3}{3 \cdot 8}}{\frac{3}{4}} = \frac{\frac{1}{4}}{\frac{3}{4}} = \frac{1}{4} \div \frac{3}{4} = \frac{1}{4} \cdot \frac{4}{3} = \frac{1}{3}$.

25. There are a total of 7 friends. One friend forgot her money, which means 6 friends paid an extra \$3.00. This means that each friend would pay a total of $6 \cdot 3 = \$18.00$. Since there were 7 friends, the total bill was $7 \cdot 18 = \$126.00$.

28. It takes 54 seconds or $\frac{54}{60} = \frac{9}{10}$ minute to cut through a piece of wood. If an 8-foot long piece of wood is to be cut into 8 equal sections, 7 cuts are needed. Therefore, it would take $7\left(\frac{9}{10}\right) = \frac{63}{10} = 6.3$ minutes to cut an 8-foot long piece of wood into 8 equal sections.

39. The compound interest formula is $y = p\left(1 + \frac{r}{n}\right)^{nt}$, where y = amount, p = principal, r = rate, n = number of times compounded per year and t = time in years. From our problem, $p = \$1,900$, $r = 4\%$, $t = 3$ and $n = 2$, since it will be compounded semi-annually. Therefore, our function is $y = 1900\left(1 + \frac{0.04}{2}\right)^{2 \cdot 3} \rightarrow y = 1900\left(1 + \frac{0.04}{2}\right)^6$.

41. $(2n)^6 \left(\frac{9n^{2/3}}{36n}\right)^3 = (2^6 n^6) \left(\frac{1}{4n^{1/3}}\right)^3 = (64n^6) \left(\frac{1}{4^3 n^{1/3 \cdot 3}}\right) = 64n^6 \left(\frac{1}{64n}\right) = \frac{64n^6}{64n} = n^5$.

46. To find the surface area of a sphere, use the formula $SA = 4\pi r^2$. We are given a sphere with a diameter of 16 inches, so the radius is 8 inches. We are also given $\pi = 3$. Substituting into the formula, the surface area of the sphere is $SA = 4\pi r^2 = 4(3)(8^2) = 4(3)(64) = 768 \text{ in}^2$.

47. To change a degree measure into a radian measure, multiply the degree measure by $\frac{\pi}{180}$. Therefore, $135^\circ \cdot \frac{\pi}{180} = \frac{135\pi}{180} = \frac{3\pi}{4}$ radians.

49. If we square both sides of $x + y = 18$, we get $(x + y)^2 = 18^2 \rightarrow x^2 + 2xy + y^2 = 324$. Since we know $x^2 + y^2 = 308$, we can substitute this to obtain $2xy + 308 = 324$. Subtract 308 from both sides to get $2xy = 16$. Divide both sides by 2 and $xy = 8$. Therefore, $(xy)^2 = 8^2 = 64$.

50. If one secant and one tangent are drawn to a circle from one exterior point, then the square of the length of the tangent is equal to the product of the external secant segment and the total length of the secant, so from our picture $AB^2 = DC \cdot DB$. Since, $AB = 12$ and $CD = 7$, we make the equation $12^2 = x(x + 7)$. Distribute and we get $x^2 + 7x = 144$. Subtract 144 from both sides to get $x^2 + 7x - 144 = 0$. This factors to $x - 9 = 0$ and $x + 16 = 0$, which solving each equation gives us $x = 9$ and $x = -16$. A length cannot be a negative value, so $CB = 9$ inches.