

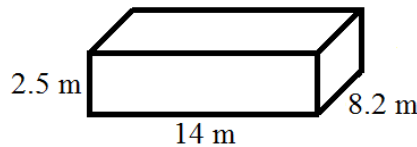


**TMSCA MIDDLE SCHOOL
MATHEMATICS
TEST # 2 ©
OCTOBER 29, 2016**

GENERAL DIRECTIONS

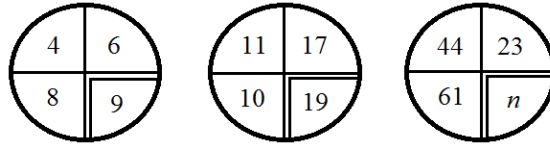
- About this test:
 - You will be given 40 minutes to take this test.
 - There are 50 problems on this test.
- All answers must be written on the answer sheet/Scantron form/Chatsworth card provided. If you are using an answer sheet be sure to use **BLOCK CAPITAL LETTERS**. Clean erasures are necessary for accurate grading on Scantrons and Chatsworth cards.
- If you are using a Chatsworth or Scantron card, please follow the specific instructions given at your particular meet.
- You may write anywhere on the test itself. You must write only answers on the answer sheet.
- You may use additional scratch paper provided by the contest director.
- All problems have **ONE** and **ONLY ONE** correct [BEST] answer. There is a penalty for all incorrect answers.
- Calculators **MAY NOT** be used on this test.
- 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.
- In case of ties, percent accuracy will be used as a tie breaker.

- What is the cost of Clinton’s clothes, before tax, if he wants to buy three shirts at \$34.27 each, a pair of shoes for \$78.39 and a pair of pants for \$32.99?
 A. \$181.20 B. \$145.65 C. \$179.92 D. \$212.59 E. \$214.19
- Joshua needs \$1,227.91 to buy the hover board he wants. If he only has \$417.11, how much more does Joshua need?
 A. \$810.80 B. \$645.02 C. \$645.80 D. \$756.79 E. \$943.80
- Which expression below produces the largest product?
 A. 45×87 B. 62×67 C. 57×77 D. 25×91 E. 100×8.4
- How many one-thirds are in the number 43?
 A. 119 B. $14.\bar{3}$ C. $14.\bar{6}$ D. 149 E. 129
- What is the number 0.00005394 written in scientific notation using only three significant digits?
 A. 5.394×10^{-5} B. 5.39×10^{-5} C. 5.39×10^{-4} D. 5.40×10^{-5} E. 539×10^{-7}
- Calculate the lateral surface area of the rectangular prism below.



- Calculate the lateral surface area of the rectangular prism below.
 A. 170.3 m^2 B. 82 m^2 C. 214 m^2 D. 340.6 m^2 E. 111 m^2
- If $a = 1, b = 2, c = 3, \dots, z = 26$, what is the sum of the letters of the word *subtraction*?
 A. 142 B. 136 C. 144 D. 128 E. 131
- A square has a side length of $6\frac{2}{5}$ inches and is dilated by a scale factor of $\frac{2}{3}$. What is the side length of the new square?
 A. $4\frac{7}{15}$ in B. $4\frac{4}{15}$ in C. $5\frac{13}{15}$ in D. $5\frac{3}{5}$ in E. $4\frac{3}{5}$ in
- $0.0\bar{8} =$ _____ (fraction)
 A. $\frac{8}{99}$ B. $\frac{8}{9}$ C. $\frac{4}{45}$ D. $\frac{22}{225}$ E. $\frac{2}{225}$
- What is the sum of the digits of the number M , if the prime factorization of M is $2^4 \cdot 3 \cdot 5 \cdot 11$?
 A. 14 B. 27 C. 12 D. 18 E. 21
- If $a \boxplus b = \frac{a}{b} + \frac{b}{a}$, then find the value of $4 \boxplus 5$.
 A. 2.05 B. 2.50 C. 1.75 D. 2.15 E. 2.25
- 1,728 has a prime factorization of $2^x \cdot 3^y$. What is the product of x and y ?
 A. 12 B. 9 C. 18 D. 21 E. 24
- Simplify: $\sqrt{64} + 3! - 2 + 3^2$
 A. 42 B. 18 C. 21 D. -11 E. 39
- Elizabeth pulled out a gallon of lemonade from her refrigerator. She then poured herself a 10-ounce glass and an 8-ounce glass of lemonade for a friend. How many ounces of lemonade are still in the gallon container?
 A. 46 ounces B. 14 ounces C. 112 ounces D. 110 ounces E. 66 ounces

15. Use the examples below to find the value of n .



- A. 76 B. 88 C. 58 D. 40 E. 64

16. John watched a movie that lasted 2.4 hours. Ashton watched a movie that lasted 134 minutes. How much longer was John's movie than Ashton's movie?

- A. $\frac{1}{2}$ hour B. $\frac{1}{3}$ hour C. $\frac{1}{4}$ hour D. $\frac{1}{5}$ hour E. $\frac{1}{6}$ hour

17. What is the sum of the next two terms in the sequence? 3, 4, 7, 11, 18, 29, ...

- A. 47 B. 65 C. 76 D. 83 E. 123

18. If a coin is flipped three times, what is the probability of getting tails exactly twice?

- A. $\frac{3}{8}$ B. $\frac{1}{2}$ C. $\frac{1}{4}$ D. $\frac{5}{8}$ E. $\frac{3}{4}$

19. What is the sum of the GCF and LCM of the numbers 240 and 384?

- A. 1,920 B. 480 C. 96 D. 1,968 E. 2,016

20. How many squares can be drawn using only dots, in the picture below of 9 evenly spaced dots, as vertices?



- A. 4 B. 5 C. 6 D. 8 E. 7

21. $1,000 - 758 + 14 =$ _____ (Roman numeral)

- A. CCLVI B. MMLXI C. DLXVI D. CCCDLVI E. CCDVI

22. A regular hexagon has a perimeter of 84 units. If the hexagon's side length is equal to that of a square, what is the area of the square?

- A. 224 units^2 B. 196 units^2 C. 225 units^2 D. 256 units^2 E. 144 units^2

23. Suzy has five different colored marbles. If she can pick only two at a time, how many total combinations of the colored marbles can Suzy pick?

- A. 10 B. 20 C. 2 D. 14 E. 8

24. Jose is 5 feet tall and casts a shadow that is 8 feet long. If a tree were next to Jose at the exact same time that is 24 feet tall, how long would the tree's shadow be?

- A. 192 feet B. 48 feet C. 48.4 feet D. 28.4 feet E. 38.4 feet

25. If $(3x^2 - 2y^2) - (x^2 - 2y^2) + y^2 = Ax^2 + By^2$, then find the value of $A^B + B^A$.

- A. 3 B. 4 C. 6 D. $-2\frac{7}{8}$ E. $2\frac{7}{8}$

26. If the area of a circle is $529\pi \text{ units}^2$, then what is the measure of the diameter of the circle?

- A. 54 units B. 28 units C. 46 units D. 68 units E. 34 units

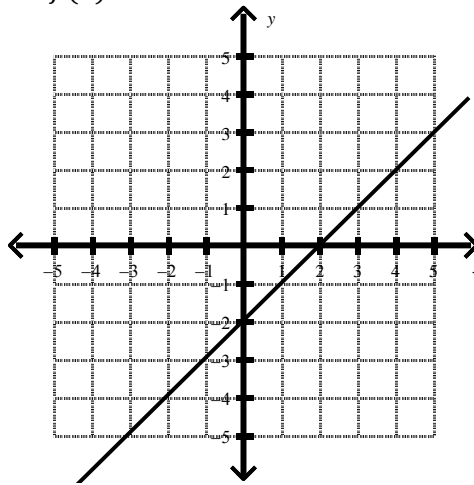
27. Robert is incorrect in stating that he calculated the total degrees of a polygon with seven sides to be $1,260^\circ$. By how many degrees off was Robert from the correct amount of total degrees of a polygon with seven sides?

- A. 180° B. 150° C. 360° D. 300° E. 320°

28. $4.5 \times 38 = \underline{\hspace{2cm}}$ (base 8)

- A. 143 B. 153 C. 271 D. 251 E. 253

29. Using the graph below, find the value of $f(7)$.



- A. 6 B. 4 C. 9 D. 5 E. 10

30. Michael opens a book and the product of the two pages he sees is 552. What is the sum of the page numbers?

- A. 131 B. 51 C. 47 D. 48 E. 276

31. -7 is part of the solution set for all but which of the following inequalities?

- A. $14 - x > 21$ B. $2x \leq -3$ C. $6 + x \leq -1$ D. $2x - 1 \geq -20$ E. $x + 2 \geq x$

32. How much larger is the mean than the median for the set of numbers? 15, 17, 18, 24, 25, 27

- A. 4 B. 0 C. 6 D. 3 E. 2

33. Point A has coordinates (-34, 75) and is reflected over the y-axis and then translated to the right eight units. What is the sum of the new coordinates of A?

- A. 117 B. 41 C. 82 D. 101 E. 33

34. 27 small cubes make up a $3 \times 3 \times 3$ larger cube. If the large cube is painted red, how many small cubes have no paint on them?

- A. 1 B. 7 C. 5 D. 3 E. 6

35. The sum of three consecutive positive integers is 264. What is the value of twice the smallest integer?

- A. 132 B. 174 C. 188 D. 178 E. 182

36. How many 2 inch \times 2 inch square tiles can fit on a floor measuring 2 feet \times 4 feet?

- A. 144 B. 576 C. 288 D. 200 E. 160

37. Calculate the slope of the line that passes through the points $(\frac{1}{2}, \frac{3}{2})$ and $(-\frac{2}{3}, 2)$.

- A. $-\frac{2}{5}$ B. $-\frac{5}{6}$ C. $-\frac{3}{7}$ D. $\frac{3}{4}$ E. $\frac{3}{8}$

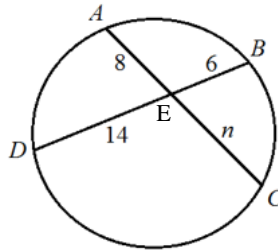
38. There are eight players on the Mighty Tykes Soccer Team. If only five players can be on the field at once, how many ways can the five players be selected?

- A. 40 B. 6,720 C. 13 D. 56 E. 48

39. Solve for n . $\frac{2}{3}(2n + 1) = \frac{8}{9}$
 A. $0.\overline{16}$ B. $0.\overline{6}$ C. $0.\overline{3}$ D. $0.8\overline{3}$ E. $0.1\overline{6}$

40. For an antique car race, cars must travel from city A to city B and back. The roundtrip is a total of 336 miles. Each car races singularly and the car with the fastest time wins. The car that won made the trip from city A to city B in 12 hours with the wind and the return trip in 14 hours against the wind. What was the speed of the car that won?
 A. 12 mph B. 13 mph C. 26 mph D. 28 mph E. 32 mph

41. Find the length of \overline{AC} using the picture below.



- A. 14 units B. 12 units C. 12.5 units D. 10.5 units E. 18.5 units

42. Brian gives Nadia the quadratic equation $y = 2x^2 - 8x + 1$ and asks her to find the discriminant. What will Nadia say if she answers correctly?

- A. 56 B. 64 C. 72 D. 8 E. 32

43. With a maximum possible score of 100, Brett has an average test score of 80 after taking four tests. What is the lowest possible score Brett could have made on any one of the tests?

- A. 40 B. 60 C. 70 D. 50 E. 20

44. When using completing the square to solve the quadratic equation $x^2 - 14x = 15$, what do you add to both sides of the equation?

- A. -7 B. 49 C. -49 D. 14 E. 196

45. It takes Bryce 30 minutes to mow his front yard. It takes his father 20 minutes to mow their front yard. If they work together, how many minutes would it take both Bryce and his father to mow their front yard?

- A. 18 minutes B. 16 minutes C. 14 minutes D. 12 minutes E. 10 minutes

46. Steve calculates the y -intercept of the linear equation $4x - y = -28$. Seth calculates the y -intercept of the linear equation $7y + x = 42$. How many units higher is Steve's y -intercept than Seth's?

- A. 26 B. 24 C. 1 D. 14 E. 22

47. Solve for n . $\frac{4n}{m} + p = w$
 A. $n = \frac{mw-p}{4}$ B. $n = \frac{p(m+w)}{4}$ C. $n = \frac{m(w-p)}{4}$ D. $n = \frac{4wm}{p}$ E. $n = \frac{pm-w}{4}$

48. Convert $\frac{\pi}{4}$ radians into degrees.

- A. 30° B. 55° C. 60° D. 45° E. 90°

49. Maria graphs a point P at $(5, 4)$ and another point Q at $(17, -1)$. If Maria wants to draw two new points, Y and Z , that have a length between them twice the length of PQ , what will be the length of YZ ?

- A. 24 units B. 26 units C. 28 units D. 30 units E. 32 units

50. If $x + y = 7$ and $xy = 10$, what is the value of $x^2 + y^2$?

- A. 14 B. 49 C. 29 D. 289 E. 39

2016 – 2017 TMSCA Middle School Mathematics Test #2 Answer Key

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

4. $43 \div \frac{1}{3} = 43 \cdot 3 = 129$.

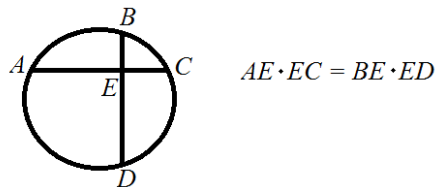
10. $2^4 \cdot 3 \cdot 5 \cdot 11 = 2,640$ and $2 + 6 + 4 + 0 = 12$.

14. There are 128 ounces in 1 gallon. Since $10 + 8 = 18$ ounces were poured out, that leaves $128 - 18 = 110$ ounces remaining.

26. The area of a circle can be found by $A = \pi r^2$. We are given an area of 529π units². So, we know that $\pi r^2 = 529\pi$. Divide both sides by π and we have $r^2 = 529$. Square root both sides and we get $r = 23$. If $r = 23$, then the diameter is $2r = 46$ units.

36. The $2 \text{ feet} \times 4 \text{ feet}$ floor must be converted into inches. Since 12 inches = 1 foot, we have $24 \times 48 = 1,152 \text{ in}^2$. The $2 \text{ inch} \times 2 \text{ inch}$ tiles have an area of 4 in^2 . Now divide 1,152 by 4 and we get 288. 288 tiles measuring $2 \text{ inch} \times 2 \text{ inch}$ can fit in the $2 \text{ feet} \times 4 \text{ feet}$ floor.

41. In a circle, if two chords intersect, then the product of the chord pieces equal each other, as in the picture below.



We can now make our equation $8n = 6 \cdot 14 \rightarrow 8n = 84$ and $n = \frac{84}{8} = 10.5 = EC$, $10.5 + 8 = 18.5$

43. Brett has taken 4 tests and has an average of 80. We want to find the lowest possible test grade Brett could have made to average an 80. Let's assume Brett made three 100's on his first three tests. We then can create an equation, such as $\frac{100+100+100+x}{4} = 80$. Solve the equation, $\frac{100+100+100+x}{4} = 80$ equals $\frac{300+x}{4} = 80 \rightarrow 300 + x = 320$, subtract 300 and $x = 20$. Brett could have made a 20 as his lowest test grade to have an average of 80.

45. If Bryce can mow his front yard in 30 minutes, then he could mow 2 yards in 60 minutes. If his father can mow his yard in 20 minutes, then he could mow 3 yards in 60 minutes. So, together they could mow 5 yards in 60 minutes, which is equal to one yard in 12 minutes if they work together.

50. We are given $x + y = 7$ and $xy = 10$. If we square the both sides of the first equation, we would see $(x + y)^2 = 7^2$ and then after multiplying them out we would get $x^2 + 2xy + y^2 = 49$. We already know that $xy = 10$, so after substituting, we get $x^2 + 20 + y^2 = 49$. Subtracting 20 from both sides and our answer is $x^2 + y^2 = 29$.