

MONTANA COUNCIL OF TEACHERS OF MATHEMATICS
2018 MATH CONTEST

DIMENSIONS AND SHAPES

DIRECTIONS: DO NOT WRITE ON THIS TEST. Place the best answer for each question on the separate answer sheet.

1. A mad cow can run 25 miles per hour. How fast can she run in feet per second?

- A) 17.04 ft/sec B) 36.67 ft/sec C) 366 ft/sec D) 2200 ft/sec E) none of these

2. Which of these 3 side lengths could form a right triangle?

- A) 9 in., 10in.,12in. B) 9 in.,10 in.,15 in. C) 9 in.,12 in.,15in. D) 10 in.,12 in.,15 in. E) none of these

For questions 3&4: John is building a garden for his wife. She wants it to be twice as long as it is wide. The garden will need to be fenced in to keep the critters out and he only has 132 feet of fence.

3. What will the dimensions of the garden be?

- A) 11.5 ft. x 23 ft. B) 22ft. x 44 ft. C) 33 ft. x 33ft. D) 44 ft. x 88 ft. E) none of these

4. What will be the plantable area if the plants can't be within 1 ft. of the fence?

- A) 231ft² B) 840 ft² C) 968 ft² D) 3741 ft² E) none of these

For questions 6 & 7: A cereal box measures 1.5"x 8"x12".

5. What is the least amount of cardboard that could be used to make the box?

- A) 96 in² B) 126 in² C) 252 in² D) 272 in² E) none of these

6. If the cereal manufacturer only fills the above box 2/3 full, how much cereal (in cubic inches) would it contain?

- A) 96 in³ B) 144 in³ C) 252 in³ D) 960 in³ E) none of these

7. A regular octagon has a side length of 1.5 ft. What is the perimeter?

- A) 6 ft B) 9 ft C) 12 ft D) 15 ft E) none of these

8. A 12 ft. ladder is propped up against the side of a house. If the ladder is 4 ft. from the base of the house, how high is the top of the ladder from the ground? Round your answer to the nearest tenth of a foot.

- A) 8.0 ft B) 11.3 ft C) 11.8 ft D) 12.6 ft E) none of these

9. If a square has an area of 196 cm². What is the perimeter?

- A) 14cm B) 28cm C) 56 cm D) 98 cm E) none of these

10. Rae is creating a scale model of her corral. If ¼ inch represents 2 feet, how long will her model be if the actual length is 25 ft?

- A) 3 1/8 inches B) 12.5 feet C) 25 inches D) 50 inches E) none of these

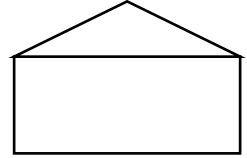
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11. A caterpillar travels $\frac{1}{2}$ cm. per minute. At this rate, how many days will it take to travel a full kilometer.

- A) less than 1 day B) between 1 & 2 days C) between 138 & 139 days D) about 720 days E) none of these

For problems 12 & 13: Farmer Brown is building a new barn. His side walls are 12 ft. high and the peak of the barn roof is 18 feet. The width of the front wall is 30 ft. The length of a side wall is 50 feet.

12. Farmer Brown can only buy whole gallons of paint. How many gallons does he need to buy to paint the front wall of his barn? (One gallon of paint covers 250 square feet.)



- A) 2 gal. B) 3 gal. C) 5 gal. D) 7 gal. E) none of these

13. Farmer Brown needs to pour concrete for the floor of his barn in the previous problem. If he pours it 4 inches thick, how many cubic feet of concrete will he need?

- A) 250 ft^3 B) 500 ft^3 C) 1500 ft^3 D) 6000 ft^3 E) none of these

14. A triangle with coordinates $J(3,7)$, $K(1,-2)$, $L(-1,5)$ is shifted 2 units left and 4 units up. What are the new coordinates?

- A) $J(5,11)$, $K(3,2)$, $L(1,9)$ B) $J(5,3)$, $K(3,-6)$, $L(1,1)$ C) $J(1,3)$, $K(-1,-6)$, $L(-3,1)$
D) $J(1,11)$, $K(-1,2)$, $L(-3,9)$ E) none of these

15. If the above triangle was reflected over the y-axis, what would the new coordinates be?

- A) $J(3,-7)$, $K(1,2)$, $L(-1,-5)$ B) $J(-3,7)$, $K(-1,-2)$, $L(1,5)$ C) $J(-3,-7)$, $K(-1,2)$, $L(1,-5)$
D) $J(-1,3)$, $K(-2,1)$, $L(5,-1)$ E) none of these

16. A circular tablecloth has an area of approximately 200ft^2 . What diameter of table is the largest that could be covered by the cloth to the nearest tenth of a foot?

- A) 8 ft B) 15.9 ft C) 16 ft D) 31.8 ft E) none of these

17. Considering the same tablecloth as in #16, you want approximately one foot hanging all the way around the table. What diameter table should you have? Round to the nearest foot.

- A) 7 ft B) 14 ft C) 15 ft D) 30 ft E) none of these

18. A regular octahedron is a Platonic solid with eight faces; each face is an equilateral triangle. What is the surface area of a regular octahedron if one side length of each face has a length of 2 feet? Round your answer to the nearest tenth of a foot.

- A) 1.7 ft B) 13.9 ft C) 16.0 ft D) 17.9 ft E) none of these

19. A bicycle tire has a diameter of 20 inches. Betty rode over a piece of gum that is stuck to the tire. How far will that piece of gum travel in 5 minutes if she is cycling at $\frac{1}{2}$ revolution per second?

- A) 262 yd B) 524 yd C) 785 yd D) 1047 yd E) none of these

20. The geometric transformation $(x,y) \rightarrow (x - 5, y + 2)$ shifts the original graph:

- A) left 5, up 2 B) left 5, down 2 C) right 5, up 2 D) right 5, down 2 E) none of these

Dimensions & Shapes 2018 Answer Key

1. B
2. C
3. B
4. B
5. C
6. A
7. C
8. B
9. C
10. A
11. C
12. B
13. B
14. D
15. A
16. C
17. B
18. B
19. A
20. A