



MONTANA COUNCIL OF TEACHERS OF MATHEMATICS
2012 MATH CONTEST

Dimensions and Shapes

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

- Dakota is going to paint the walls in his room. The room is 14 ft. long, 12 ft. wide and 8 ft. high. He subtracts 10% of the wall area for windows and doors. One quart of paint covers 110 square feet. How many quarts of paint will he need to paint the walls?
(A) 3 qts. (B) 4 qts. (C) 7 qts. (D) 12 qts.
- A fish tank in the shape of a rectangular prism is 60 inches long, 24 inches wide, and 30 inches high. If the tank is completely full of water, what is the weight of the water? Note: 1 cubic foot of water weights 62.4 pounds.
(A) 1650 lbs. (B) 593 lbs. (C) 7113 lbs. (D) 1560 lbs.
- A spherical oil tank has a diameter of 25 feet. What is the volume of the tank? Use $\pi = 3.14$
(A) 65,417 cf. (B) 8,177 cf. (C) 2,604 cf. (D) 24,531 cf.
- The radius of the Moon is about 900 miles. The radius of the Earth is about 5 times that of the Moon. What is the approximate volume of the Earth? Use $\pi = 3.14$
(A) $3.1 \times 10^{12} \text{ mi}^3$ (B) $1.2 \times 10^{11} \text{ mi}^3$ (C) $3.8 \times 10^{11} \text{ mi}^3$ (D) $1.1 \times 10^{12} \text{ mi}^3$
- A beach ball has a surface area of approximately 2123 in.². What is the approximate volume of the ball? Use $\pi = 3.14$
(A) 804 in.³ (B) 2220 in.³ (C) 37,700 in.³ (D) 9,200 in.³
- A 64 ft. tall tree casts an 88 ft. long shadow on the ground. Find the distance from the top of the tree to the top of its shadow to the nearest foot.
(A) 152 ft. (B) 118 ft. (C) 109 ft. (D) 60 ft.
- A chocolate syrup storage tank is in the shape of a cylinder standing on a circular base with a radius of 8.5 ft. When the tank is $\frac{1}{2}$ full it contains 400 ft.³ of syrup. What is the height of the tank? Use $\pi = 3.14$
(A) 30.0 ft. (B) 1.8 ft. (C) 3.5 ft. (D) 15.0 ft.
- If the surface area of a cube is 150 ft.², what is the perimeter of the base?
(A) 10 ft. (B) 20 ft. (C) 30 ft. (D) 40 ft.
- Adrianna just returned from her vacation in Panama Beach, Florida where the average temperature is 87° F. Convert this temperature to the **nearest whole degree Celsius**, using $C = \frac{5}{9}(F - 32)$, where C is temperature in Celsius and F is the temperature in Fahrenheit.
(A) 31° (B) 69° (C) -8° (D) 16°
- Brandon rides his unicycle a distance of 1.5 km. If the radius of the unicycle wheel is 35 cm, approximately how many complete revolutions will the wheel make?
(A) 1365 rev. (B) 150 rev. (C) 40 rev. (D) 680 rev.

Dimensions and Shapes Math Test 2012 Page 2

11. An equilateral triangle and a regular pentagon share a common side. If the perimeter of the pentagon is $31\frac{1}{4}$ inches, what is the perimeter of the triangle?
(A) $18\frac{3}{4}$ in. (B) $6\frac{1}{4}$ in. (C) $12\frac{1}{2}$ in. (D) 24 in.
12. Alexis plans to build a swimming pool in her backyard. The pool will be 30 ft. long, 18 ft. wide with an average depth of 6 ft. If the price of excavation is \$3.35 per cubic yard, about how much will it cost to dig the hole for the swimming pool? Note: 1 yard = 3 feet.
(A) \$180 (B) \$400 (C) \$3,200 (D) \$10,800
13. Davin ran the 100 m dash in 12.3 seconds. How fast did he run the dash in kilometres per hour?
(A) 2.9 km/hr (B) 8.1 km/hr (C) 29.3 km/hr (D) 81.0 km/hr
14. Twyla used an entire sheet of cardboard that measured 12 feet by 18 ft to make a perfect cube. She cut and taped the cube together. What is the length of each edge of the cube?
(A) 4 ft (B) 6 ft (C) 8 ft (D) 9 ft
15. A square has a perimeter of 44 m. What is the length of its diagonal?
(A) $\sqrt{242}$ m (B) $\sqrt{11}$ m (C) $\sqrt{121}$ m (D) $\sqrt{44}$ m
16. Loren's soccer team plays on a field with an area of 540 m^2 and a perimeter of 138 m. Find the dimensions of the soccer field.
(A) 47 m by 22 m (B) 54 m by 10 m (C) 90 m by 6 m (D) 60 m by 9 m
17. A 30 ft. ladder is leaned against a vertical wall of a building. The foot of the ladder is 18 ft. from the base of the building. If the top of the ladder needs to be 2 ft higher, how much does the foot of the ladder need to be moved closer to the building?
(A) 15 ft. (B) 9 ft. (C) 6 ft. (D) 3 ft.
18. A fence encloses Justina's rectangular garden that is 36 ft. by 18 ft. If Justina wishes to change the shape of the garden to a circle with the same amount of perimeter fencing as the rectangle, what would be the approximate area of her new circular garden?
(A) 930 sq. ft. (B) 465 sq. ft. (C) 3,700 sq. ft. (D) 740 sq. ft.
19. Fabian wants to tile the floor of a square room, 15 feet on a side. The tiles are square, measuring 9 inches on a side. How many tiles does Fabian need to buy?
(A) 200 (B) 300 (C) 400 (D) 500
20. What is the volume of concrete in a driveway that is 30 feet long, 12 feet wide and 4 inches thick?
(A) 120 ft^3 (B) 550 ft^3 (C) 1440 ft^3 (D) $17,280\text{ ft}^3$
21. While Jordan is water skiing, he approaches a ski jump with a 30 degree elevation. If the length of the jump is 24 feet, about how high above the water surface is the end of the jump?
(A) 3 ft. (B) 6 ft. (C) 9 ft. (D) 12 ft.
22. Linda's personal Ferris Wheel has a diameter of 200 feet, and makes one rotation every 4 minutes. What is the speed of a car on the circumference when the wheel is in operation?
(A) 3.14 ft/sec (B) 50 ft/min (C) 15.7 ft/sec (D) 157 ft/min

Dimension and Shapes Math Math Test 2012

Answers

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