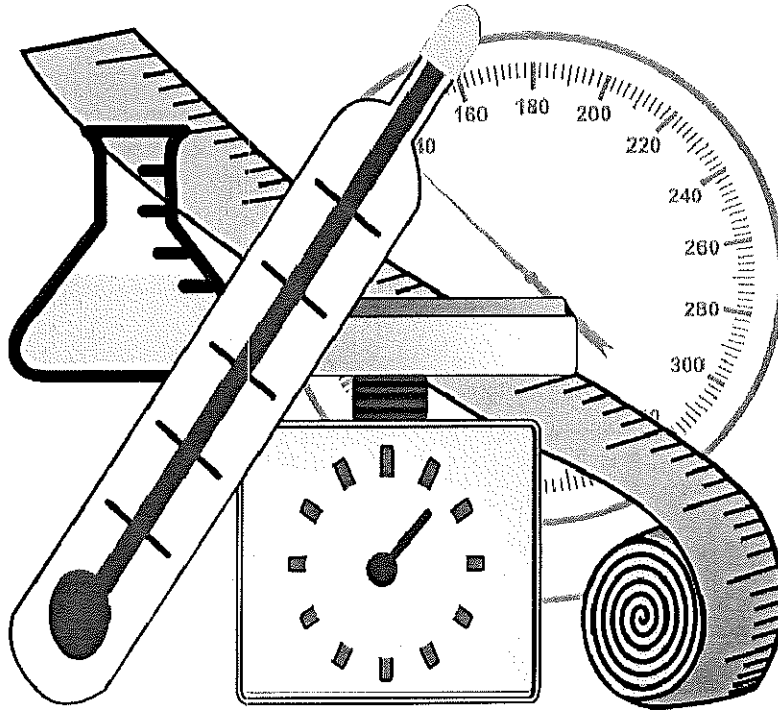


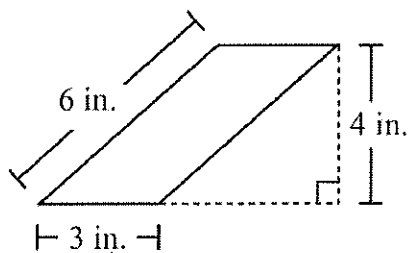
# Measurement



## MCAS Practice Problems

Name \_\_\_\_\_ PD \_\_\_\_\_

- 1 A parallelogram and its dimensions are shown below.



What is the area of the parallelogram?

- A. 12 sq. in.
- B. 13 sq. in.
- C. 18 sq. in.
- D. 24 sq. in.

Mark your answer here: 1. (A)(B)(C)(D)

- 2 The circumference of Sophie’s circular flower garden is 75 feet. Which of the following is closest to the **diameter** of her flower garden?

- A. 24 feet
- B. 12 feet
- C. 10 feet
- D. 5 feet

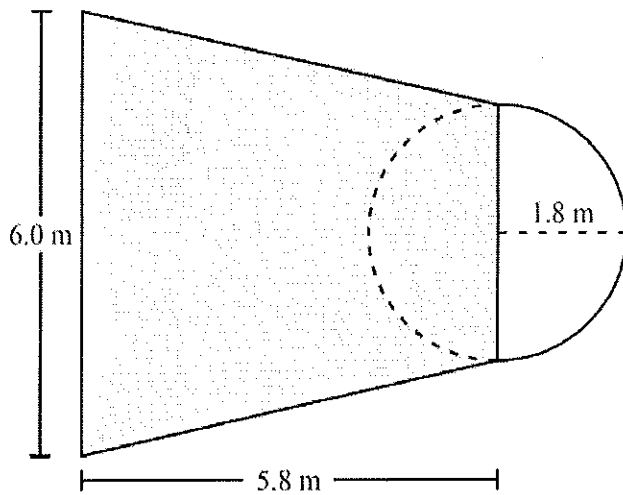
Mark your answer here: 2. (A)(B)(C)(D)



**3** An international basketball court has a region called the free-throw lane, shown as the shaded part in the diagram below.

Mark your answer here: 3. (A)(B)(C)(D)

- The free-throw lane is shaped like an isosceles trapezoid.
- A semicircle, shown as the unshaded part in the diagram, is attached to the shorter base of the trapezoid.
- The radius of the semicircle is 1.8 meters.

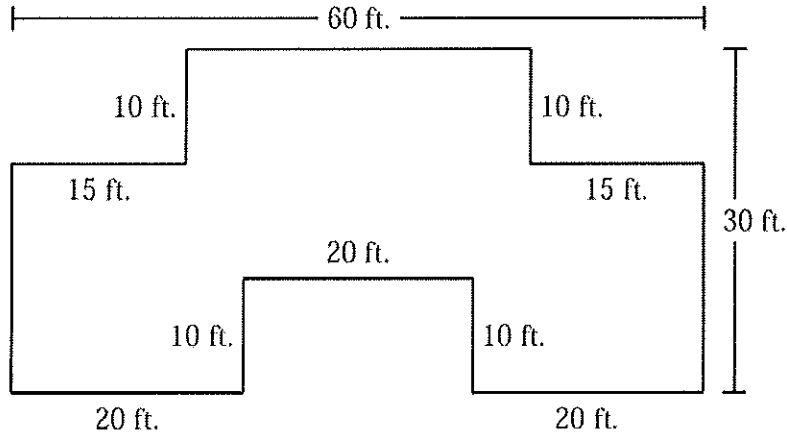


Based on the dimensions in the diagram, what is the area of the shaded free-throw lane?

- A. 22.62 square meters
- B. 27.84 square meters
- C. 34.80 square meters
- D. 55.68 square meters



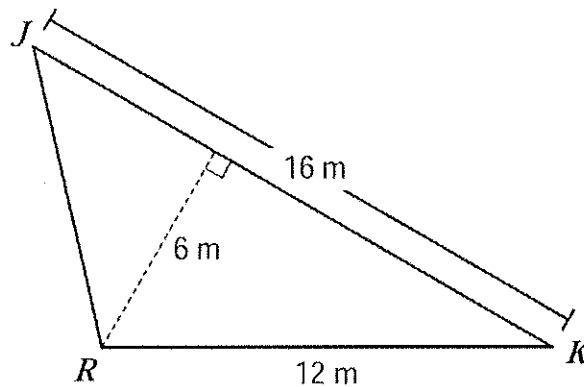
4 The diagram below shows the dimensions of a garden. Mark your answer here: 4. (A)(B)(C)(D)



In the diagram, all intersecting line segments intersect at right angles. What is the area of the garden?

- A. 1200 sq. ft.
- B. 1300 sq. ft.
- C. 1500 sq. ft.
- D. 1800 sq. ft.

5 Yoshi is designing a monument that has a triangular base. He drew  $\triangle JKR$  to represent the base of the monument, as shown in the diagram below.



Based on the measurements in the diagram, what is the area, in square meters, of  $\triangle JKR$ ?

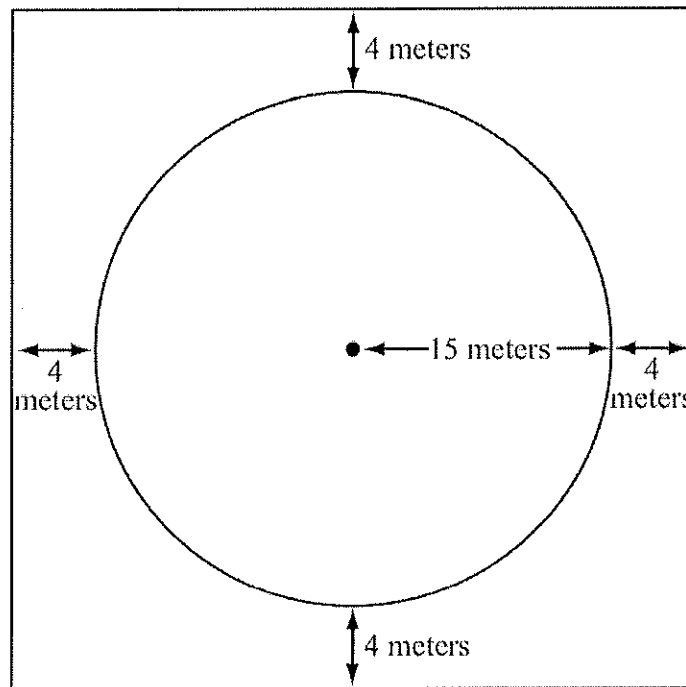
Write your answer here:



Directions: For the problem below, use a separate piece of paper to write your answers. Your teacher will not count anything you write on this page.

- 6** A helicopter landing pad is in the shape of a square and has a circle painted in its center. The radius of the circle is 15 meters. The shortest distance from each side of the landing pad to the circle is 4 meters, as shown below.

**Helicopter Landing Pad**



- a. What is the circumference, in meters, of the circle? Show your work.
- b. What is the perimeter, in meters, of the landing pad? Show your work.
- c. What is the area, in square meters, of the circle? Show your work.
- d. What is the area, in square meters, of the part of the landing pad that is **outside** the circle? Show your work.

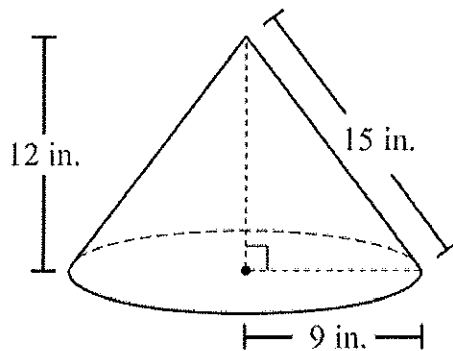


- 1 A sphere has a volume of  $\frac{500}{3}\pi$  cubic centimeters. What is the total surface area, in square centimeters, of the sphere?
- A.  $25\pi$
  - B.  $40\pi$
  - C.  $100\pi$
  - D.  $400\pi$

Mark your answer here: 1. (A)(B)(C)(D)

- 2 A cap in the shape of a right circular cone is built on top of a chimney. A diagram representing the cap is shown below.

Mark your answer here: 2. (A)(B)(C)(D)



- Based on the dimensions in the diagram, which of the following is closest to the lateral surface area of the cap?
- A. 212 sq. in.
  - B. 339 sq. in.
  - C. 424 sq. in.
  - D. 565 sq. in.



**3** Jessie has an aquarium that is shaped like a right rectangular prism with the following dimensions:

- height: 15 inches
- width: 20 inches
- length: 30 inches

What is the lateral surface area of a right rectangular prism with the dimensions of Jessie's aquarium?

- A. 260 sq. in.
- B. 750 sq. in.
- C. 1500 sq. in.
- D. 9000 sq. in.

Mark your answer here: 3. (A)(B)(C)(D)

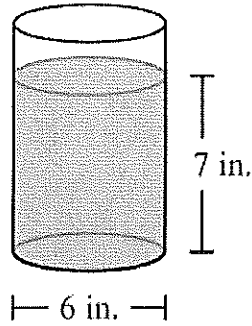
**4** Each edge of a cube is 3 inches long. What is the surface area of the cube?

- A. 54 square inches
- B. 36 square inches
- C. 27 square inches
- D. 18 square inches

Mark your answer here: 4. (A)(B)(C)(D)



- 5 Maya has a container in the shape of a right circular cylinder. She poured lemonade into the container until the height of the lemonade was 7 inches, as shown in the diagram below.



Mark your answer here: 5. (A)(B)(C)(D)

Based on the dimensions shown in the diagram, which of the following is closest to the volume of the lemonade in the container?

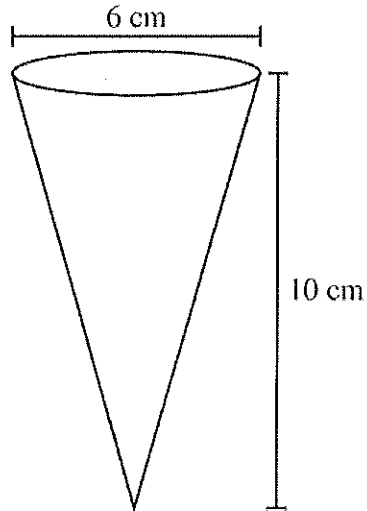
- A. 132 cubic inches
- B. 198 cubic inches
- C. 252 cubic inches
- D. 264 cubic inches





6

A paper cup in the shape of a right circular cone has a height of 10 centimeters and a diameter of 6 centimeters, as shown in the drawing below.

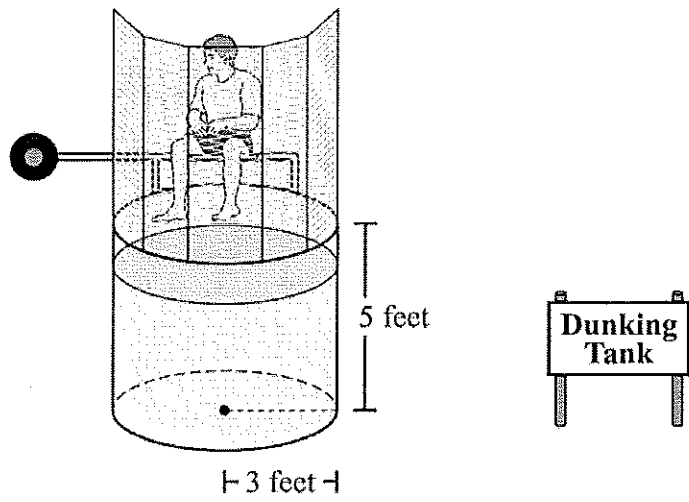


What is the volume, in cubic centimeters, of the cup?

Write your answer here:

Directions: For the problem below, use a separate piece of paper to write your answers. Your teacher will not count anything you write on this page.

- 7** A water dunking tank at a carnival is in the shape of a right circular cylinder. Its height is 5 feet, and the radius of each base is 3 feet, as shown in the picture below.



- a. What is the lateral surface area, in square feet, of the tank? Show your work.
- b. On the first day of the carnival, the dunking tank was filled with water to a height of 4 feet. What was the volume, in cubic feet, of the water in the tank on the first day of the carnival? Show your work.

At the end of the second day of the carnival, some water was drained from the tank. The volume of water drained was 35.3 cubic feet.

- c. Using your answer from part (b), determine the height, in feet, of the water remaining in the tank after the water was drained at the end of the second day. Show your work.

The water that was drained from the tank was poured into containers, each in the shape of a right rectangular prism. Each container was 2 feet in length, 1.5 feet in width, and 3 feet in height.

- d. What was the **least** number of containers needed to hold all the water that was drained at the end of the second day? Show your work.



1

Each of two different-sized boxes is in the shape of a right rectangular prism. The volume of the larger box is 4 times the volume of the smaller box. The dimensions of the smaller box are represented below.

- length:  $l$
- width:  $w$
- height:  $h$

Which of the following could represent the dimensions of the larger box?

- A.  $l, 4w, 4h$
- B.  $2l, 2w, h$
- C.  $2l, 2w, 4h$
- D.  $4l, 4w, 4h$

2

A mechanic has two pieces of sandpaper of different sizes. Each piece is in the shape of a circle. The radius of the larger circle is 4 times the radius of the smaller circle.

The area of the larger circle is how many times the area of the smaller circle?

- A. 2
- B. 4
- C. 8
- D. 16

Mark your answer here: 1. (A)(B)(C)(D)

Mark your answer here: 2. (A)(B)(C)(D)

3

Manuel is using a small paper rectangle and a large paper rectangle for an art project.

- The length of the small rectangle is half the length of the large rectangle.
- The width of the small rectangle is half the width of the large rectangle.

The area of the small rectangle is how many times the area of the large rectangle?

- A.  $\frac{1}{16}$
- B.  $\frac{1}{8}$
- C.  $\frac{1}{4}$
- D.  $\frac{1}{2}$

Mark your answer here: 3. (A)(B)(C)(D)

4

Dana drew two circles of different sizes. The area of the larger circle is 16 times the area of the smaller circle.

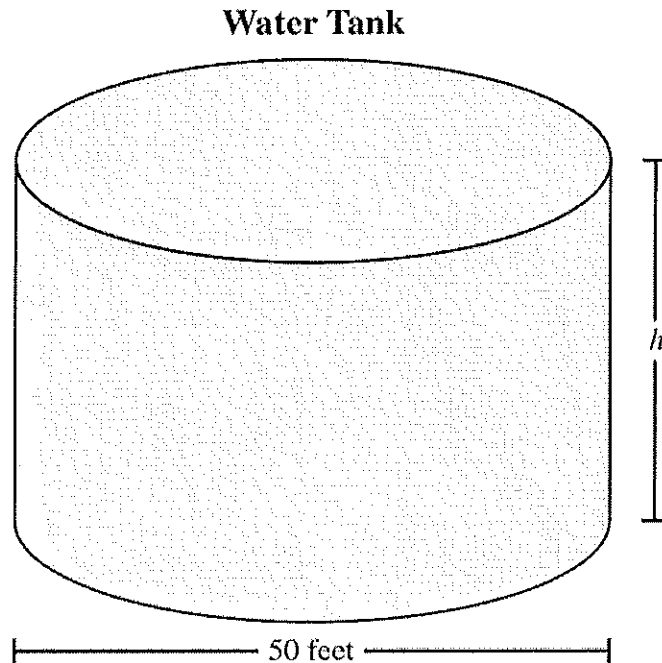
The radius of the larger circle is how many times the radius of the smaller circle?

- A. 2
- B. 4
- C. 8
- D. 16

Mark your answer here: 4. (A)(B)(C)(D)

Directions: For the problem below, use a separate piece of paper to write your answers. Your teacher will not count anything you write on this page.

- 5** The town of Brookville has a water tank that is shaped like a right circular cylinder with a diameter of 50 feet, as shown below.



- What is the radius, in feet, of the water tank? Show or explain how you got your answer.
- The water tank has a volume of 58,960 cubic feet. What is  $h$ , the height, in feet, of the water tank? Show or explain how you got your answer.

The town's planning board wants to build a new water tank to meet the needs of the town's growing population. The new water tank will be shaped like a right circular cylinder with the same height as the old water tank, but the volume of the new water tank will be 3 times the volume of the old water tank.

- Based on the town's plan, what would be the **diameter**, in feet, of the new water tank? Show or explain how you got your answer.

1

Ms. Burke correctly weighed a tomato to the nearest ounce and recorded the weight. The weight she recorded was 13 ounces.

What is the **least** possible actual weight of the tomato?

- A. 12.0 ounces
- B. 12.5 ounces
- C. 13.0 ounces
- D. 13.4 ounces

Mark your answer here: 1. (A)(B)(C)(D)

2

Maggie correctly measured the distance across a playing field to the nearest meter and recorded that distance. The distance she recorded was 55 meters.

Which of the following could **not** be the actual distance across the playing field?

- A. 55.7 meters
- B. 55.0 meters
- C. 54.9 meters
- D. 54.6 meters

Mark your answer here: 2. (A)(B)(C)(D)



**AREA FORMULAS**

- square .....  $A = s^2$
- rectangle .....  $A = bh$
- parallelogram .....  $A = bh$
- triangle .....  $A = \frac{1}{2}bh$
- trapezoid .....  $A = \frac{1}{2}h(b_1 + b_2)$
- circle .....  $A = \pi r^2$

**LATERAL SURFACE AREA FORMULAS**

- right rectangular prism .....  $LA = 2(hw) + 2(lh)$
- right circular cylinder .....  $LA = 2\pi r h$
- right circular cone .....  $LA = \pi r \ell$   
( $\ell$  = slant height)
- right square pyramid .....  $LA = 2s \ell$   
( $\ell$  = slant height)

**TOTAL SURFACE AREA FORMULAS**

- cube .....  $SA = 6s^2$
- right rectangular prism .....  $SA = 2(lw) + 2(hw) + 2(lh)$
- sphere .....  $SA = 4\pi r^2$
- right circular cylinder .....  $SA = 2\pi r^2 + 2\pi r h$
- right circular cone .....  $SA = \pi r^2 + \pi r \ell$   
( $\ell$  = slant height)
- right square pyramid .....  $SA = s^2 + 2s \ell$   
( $\ell$  = slant height)

**VOLUME FORMULAS**

- cube .....  $V = s^3$   
( $s$  = length of an edge)
- right rectangular prism .....  $V = lwh$
- OR
- $V = Bh$   
( $B$  = area of a base)
- sphere .....  $V = \frac{4}{3}\pi r^3$
- right circular cylinder .....  $V = \pi r^2 h$
- right circular cone .....  $V = \frac{1}{3}\pi r^2 h$
- right square pyramid .....  $V = \frac{1}{3}s^2 h$

**CIRCLE FORMULAS**

- $C = 2\pi r$
- $A = \pi r^2$

**SPECIAL RIGHT TRIANGLES**

