

You will need Evernote today. There are many vocabulary words and formulas in this lesson.

6-5

## Circumference and Area of a Circle

### What You'll Learn

To find the circumference and area of a circle

**New Vocabulary** circumference, diameter, radius, pi

© CONTENT STANDARDS

7.G.4

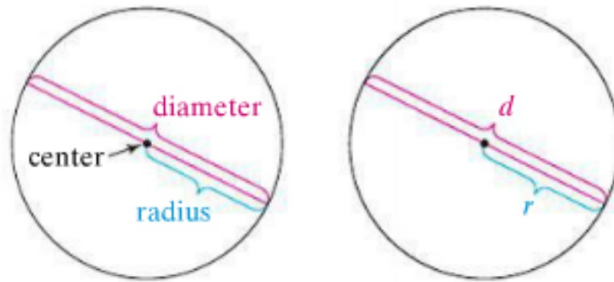
### Why Learn This?

If you know how to find the circumference of a circle, you can find how far you must travel to move all the way around the circle.

In the picture below, a Sacagawea dollar rolls along a surface. The distance the dollar rolls is the same as the distance around the edge of the dollar. This distance is the coin's circumference. **Circumference** is the distance around a circle.



A **diameter** is a segment that passes through the center of a circle and has both endpoints on the circle. A **radius** is a segment that connects the center of a circle to the circle. For the same circle, the length of a radius,  $r$ , is half the length of a diameter,  $d$ .



**Pi** is the ratio of a circle's circumference  $C$  to its diameter  $d$ . Use the symbol  $\pi$  for this ratio. So,  $\pi = \frac{C}{d}$ . The formula for the circumference comes from this ratio.

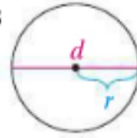
Pi is a nonterminating and nonrepeating decimal. Both  $\frac{22}{7}$  and 3.14 are good approximations for  $\pi$ . Many calculators have a key for  $\pi$  and display it to nine decimal places. Your results will vary slightly, depending on which value for  $\pi$  you use.

Put this in your notes:

### KEY CONCEPTS **Circumference of a Circle**

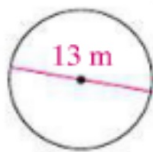
The circumference of a circle is  $\pi$  times the diameter  $d$ .

$$C = \pi d \text{ or } C = 2\pi r$$



### EXAMPLE **Finding the Circumference of a Circle**

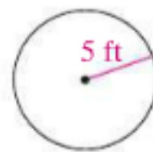
- a. Find the circumference of the circle using 3.14 for  $\pi$ .



$$\begin{aligned} C &= \pi d \\ &= 3.14(13) \\ &= 40.82 \end{aligned}$$

The circumference is about 40.8 m.

- b. Find the circumference of the circle using a calculator's  $\pi$  key.



$$\begin{aligned} C &= 2\pi r \\ &= 2\pi(5) \\ &\approx 31.41592654 \end{aligned}$$

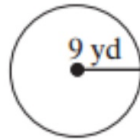
Use the formula for a circumference. →  
← Substitute. →  
Use a calculator. →

The circumference is about 31.4 ft.

## Examples

- 1 Finding the Circumference of a Circle** Find the circumference of each circle. Round to the nearest tenth.

a.



$$C = \boxed{\phantom{000}}$$

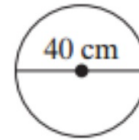
$$= 2\pi(\boxed{\phantom{00}})$$

$$= \boxed{\phantom{00000}}$$

The circumference is approximately

$\boxed{\phantom{000}}$  yd.

b.



$$C = \boxed{\phantom{000}}$$

$$= \pi(\boxed{\phantom{000}})$$

$$= \boxed{\phantom{00000}}$$

The circumference is approximately

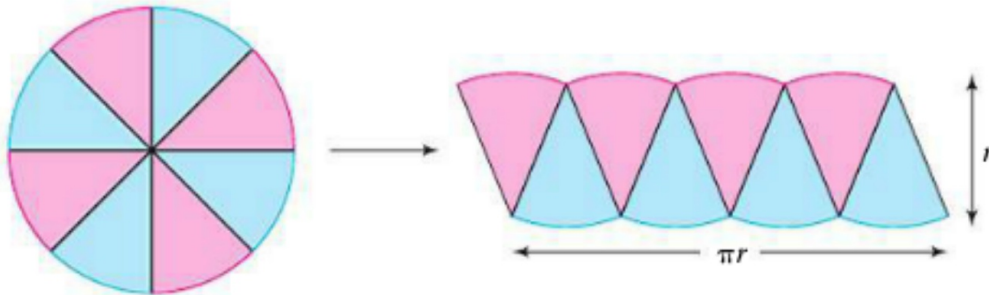
$\boxed{\phantom{000}}$  cm.

← Use the formula for circumference. →

← Substitute. →

← Use a calculator. →

If you cut a circle into equal sectors and place them side by side, you make a shape that is close to a parallelogram.



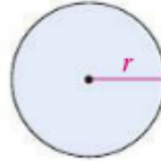
The length of the base of the “parallelogram” is half the circumference of the circle,  $\frac{2\pi r}{2}$ , or  $\pi r$ . The height of the “parallelogram” is  $r$ . So, the area of the “parallelogram” is  $\pi r \cdot r$  or  $\pi r^2$ . The area of a circle is  $\pi r^2$ .

Put this in your notes:

### KEY CONCEPTS Area of a Circle

The area of a circle is the product of  $\pi$  and the square of the radius  $r$ .

$$A = \pi r^2$$



### EXAMPLE Finding the Area of a Circle

2 A standard circus ring has a diameter of 13 m. What is the area of the ring? Round to the nearest tenth.

$$r = \frac{13}{2} = 6.5 \quad \leftarrow \text{The radius is half of the diameter.}$$

$$A = \pi r^2 \quad \leftarrow \text{Use the formula for the area of a circle.}$$

$$= \pi(6.5)^2 \quad \leftarrow \text{Substitute 6.5 for the radius.}$$

$$= 132.73328 \quad \leftarrow \text{Use a calculator.}$$

$$\approx 132.7 \quad \leftarrow \text{Round to the nearest tenth.}$$

The area of a standard circus ring is about  $132.7 \text{ m}^2$ .

- 2 Finding the Area of a Circle** A pizza has a diameter of 28 cm. What is the area of the pizza? Round to the nearest tenth.

$$r = \frac{\square}{2} = \square$$

← The radius is half the diameter.

$$A = \square$$

← Use the formula for the area of a circle.

$$= \pi (\square)^2$$

← Substitute  $\square$  for the radius.

$$\approx \square$$

← Use a calculator.

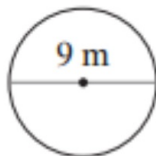
$$\approx \square$$

← Round the solution to the nearest tenth.

The area of the pizza is approximately  $\square \text{ cm}^2$ .

### Quick Check

1. Find the circumference of the circle. Round to the nearest tenth.



$$\square \text{ m}$$

2. Find the area of the circle. Round to the nearest square unit.



$$\square \text{ m}^2$$

You have an assignment on  
[m.socrative.com](http://m.socrative.com)

room number 262013


Feel free to use a calculator. Read  
directions and label appropriately.


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
*For all problems on this worksheet, use 3.14 for pi*


**Practice 6-5** **Circumference and Area of a Circle**


Find the circumference and area of each circle. Round your answers to the nearest tenth.


1.  C= \_\_\_\_\_ A= \_\_\_\_\_

2.  C= \_\_\_\_\_ A= \_\_\_\_\_

3.  C= \_\_\_\_\_ A= \_\_\_\_\_

4.  C= \_\_\_\_\_ A= \_\_\_\_\_

5.  C= \_\_\_\_\_ A= \_\_\_\_\_

6.  C= \_\_\_\_\_ A= \_\_\_\_\_

Estimate the radius of each circle with the given circumference. Round your answer to the nearest tenth.

7. 80 km \_\_\_\_\_

8. 92 ft \_\_\_\_\_

9. 420 in. \_\_\_\_\_

10. In the diagram at the right, the radius of the large circle is 8 in.  
The radius of each of the smaller circles is 1 in.

(a) Find the area of the large circle \_\_\_\_\_

(b) Find the area of one of the small circles \_\_\_\_\_

(c) How many small circles are there? \_\_\_\_\_

(d) Find the area of the shaded region to the nearest square unit. \_\_\_\_\_

