

# Lesson 23

## Introduction to Circles

Circle – The set of points in a plane that are a fixed distance from a given point.

Center – The point at the center of the circle.

To name a circle – Use the  $\odot$  symbol and the center point. For example,  $\odot A$  is read, “circle *A*.”

Interior – All the points within the circle.

Radius – Any segment whose endpoints are the center of the circle and a point on the circle.

Diameter – Any segment with both endpoints on the circle that passes through the center. The length of a diameter is always twice the length of a radius.

Two circles are congruent if they have congruent radii.

# Example 1 Naming Parts of a Circle

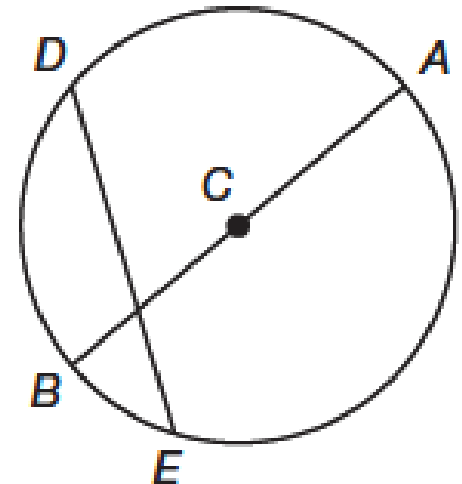
Identify a diameter, a radius, and the center of the circle at right.

SOLUTION

$\overline{AB}$  is a diameter

$\overline{AC}$  and  $\overline{BC}$  are both radii

The center of the circle is point  $C$ .

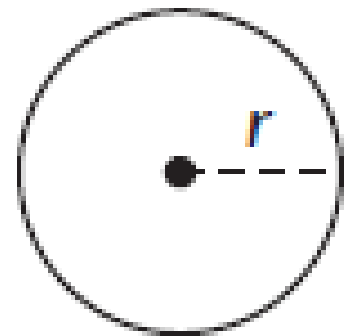


Circumference of a Circle – The perimeter of the circle or distance around the circle.

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

Pi, represented by the symbol  $\pi$ , is an irrational number that is defined as the ratio of the circumference of a circle to its diameter.

$$\pi \approx 3.14 \quad \text{or} \quad \pi \approx \frac{22}{7}$$



## Example 2 Finding Circumference

Find the circumference of the circle to the nearest hundredth of an inch. Use 3.14 for  $\pi$ .

SOLUTION

The radius of the circle is 14.00 inches.

$$C = 2\pi r$$

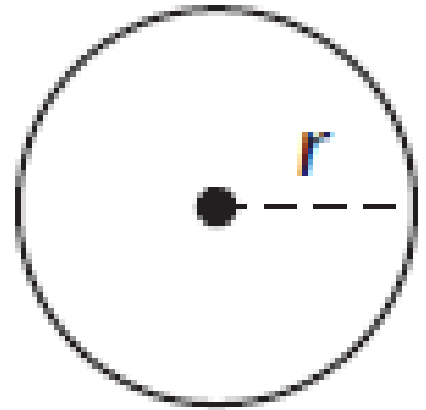
$$\approx 2(3.14)(14.00)$$

$$\approx 87.92$$

Therefore, the circumference is approximately 87.92 inches.

Area of a Circle – To find the area ( $A$ ) of a circle, use the formula below, where  $r$  is the circle's radius.

$$A = \pi r^2$$



# Example 3 Finding Area

Find the area of each circle to the nearest hundredth of a square unit. Use 3.14 for  $\pi$ .

a.

**SOLUTION**

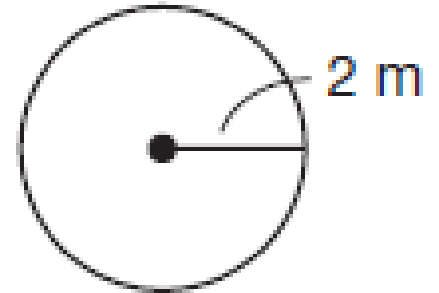
The radius of the circle is 2 meters.

$$A = \pi r^2$$

$$A \approx (3.14)2^2$$

$$A \approx 12.56$$

Therefore, the area is approximately  $12.56 \text{ m}^2$ .



# Example 3 Finding Area

Find the area of each circle to the nearest hundredth of a square unit. Use 3.14 for  $\pi$ .

b.

SOLUTION

Divide the diameter by 2 to determine the radius measurement.

$$r = \frac{26}{2}$$

$$r = 13$$

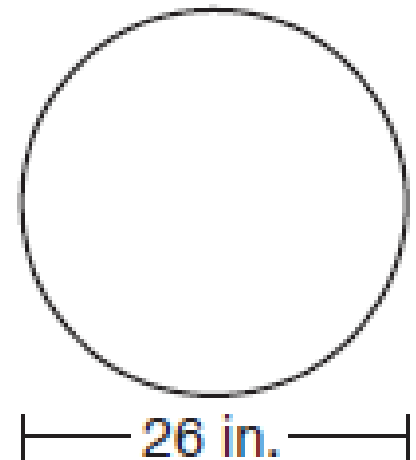
The radius of 13 inches can then be substituted into the formula.

$$A = \pi r^2$$

$$A \approx (3.14)13^2$$

$$A \approx 530.66$$

Therefore, the area is approximately  $530.66 \text{ ft}^2$ .





# Example 4 Application: Urban Design and Planning

A dog park is being constructed with a circular fence surrounding the park. The fence has a radius that is 50 yards long. Use 3.14 for  $\pi$ .

a. What is the distance around the fence to the nearest yard?

SOLUTION

To find the total distance around the fence, the circumference must be calculated.

$$\begin{aligned}C &= 2\pi r \\ &\approx 2(3.14)(50) \\ &\approx 314\end{aligned}$$

Therefore, the total distance around the fence is approximately 314 yards.

# Example 4 Application: Urban Design and Planning

A dog park is being constructed with a circular fence surrounding the park. The fence has a radius that is 50 yards long. Use 3.14 for  $\pi$ .

b. Approximately how many square yards of sod would be needed to completely cover the area inside the fence with grass?

SOLUTION

$$A = \pi r^2$$

$$A \approx (3.14)50^2$$

$$A \approx 7850$$

Therefore, the total area to be covered with sod is approximately  $7850yd^2$ .

# You Try!!!!!!

- a. Draw  $\odot P$  with a radius, a diameter, and the center labeled.
  
- c. Find the area of a circle with a radius of 31 centimeters. Use 3.14 for  $\pi$  and round to the nearest hundredth of a square centimeter.
  
- d. Find the area of a circle with a diameter of 1 yard. Use 3.14 for  $\pi$  and round to the nearest hundredth of a square yard.

# Assignment

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Lesson Practice (Ask Mr. Heintz)

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Practice 1–30 (Do the starred ones first)