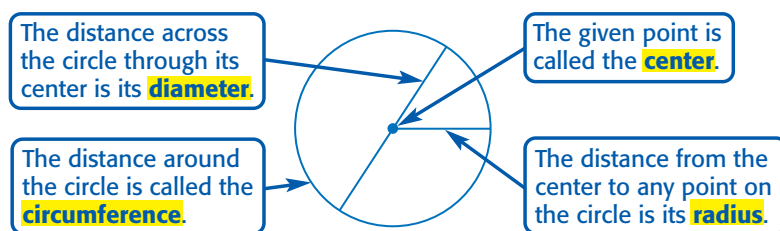


Area and Circumference of Circles

A **circle** is the set of all points in a plane that are the same distance from a given point.



The formula for the circumference of a circle is $C = \pi d$ or $C = 2\pi r$.

EXAMPLE

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

a. The radius is 3 feet.

$$\begin{aligned} C &= 2\pi r && \text{Circumference formula} \\ &= 2\pi(3) && \text{Replace } r \text{ with } 3. \\ &= 6\pi && \text{Simplify.} \end{aligned}$$

The exact circumference is 6π feet.

$$6 \quad \pi \quad \text{ENTER} \quad 18.8495592$$

The circumference is about 18.8 feet.

b. The diameter is 24 centimeters.

$$\begin{aligned} C &= \pi d && \text{Circumference formula} \\ &= \pi(24) && \text{Replace } d \text{ with } 24. \\ &= 24\pi && \text{Simplify.} \end{aligned}$$

$$= 75.4 \quad \text{Use a calculator to evaluate } 24\pi.$$

The circumference is about 75.4 centimeters.

The formula for the area of a circle is $A = \pi r^2$.

EXAMPLE

2 Find the area of each circle to the nearest tenth.

a. The radius is 4 inches.

$$\begin{aligned} A &= \pi r^2 && \text{Area formula} \\ &= \pi(4)^2 && \text{Replace } r \text{ with } 4. \\ &= 16\pi && \text{Simplify.} \\ &= 50.3 && \text{Use a calculator to evaluate } 16\pi. \end{aligned}$$

The area is about 50.3 square inches.

b. The diameter is 20 centimeters.

The radius is one half times the diameter, or 10 centimeters.

$$\begin{aligned} A &= \pi r^2 && \text{Area formula} \\ &= \pi(10)^2 && \text{Replace } r \text{ with } 10. \\ &= 100\pi && \text{Simplify.} \\ &= 314.2 && \text{Use a calculator to evaluate } 100\pi. \end{aligned}$$

The area is about 314.2 square centimeters.

EXAMPLE

3 HISTORY Stonehenge is an ancient monument in Wiltshire, England. Historians are not sure who erected Stonehenge or why. It may have been used as a calendar. The giant stones of Stonehenge are arranged in a circle 30 meters in diameter. Find the circumference and the area of the circle.

$$\begin{aligned}C &= \pi d && \text{Write the formula.} \\ &= \pi(30) && \text{Replace } d \text{ with } 30. \\ &= 30\pi \text{ or about } 94.2 && \text{Simplify.}\end{aligned}$$

Find the radius to evaluate the formula for the area.

$$\begin{aligned}A &= \pi r^2 && \text{Write the formula.} \\ &= \pi(15)^2 && \text{Replace } r \text{ with } \frac{1}{2}(30) \text{ or } 15. \\ &= 225\pi \text{ or about } 706.9 && \text{Simplify.}\end{aligned}$$

The circumference of Stonehenge is about 94.2 meters, and the area is about 706.9 square meters.