

Circles and Circumference

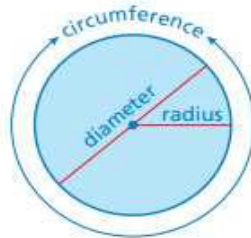
Essential Question How can you find the circumference of a circle?

Archimedes was a Greek mathematician, physicist, engineer, and astronomer.

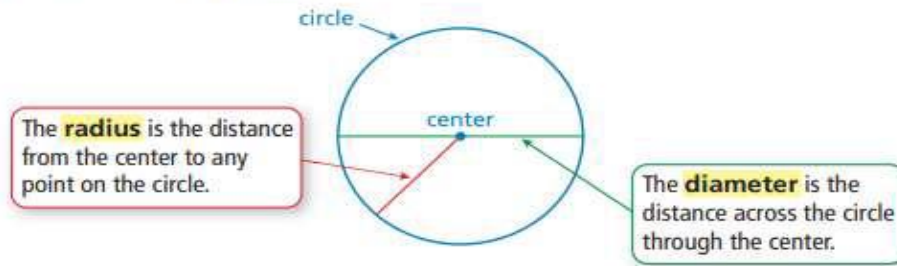
Archimedes discovered that in any circle the ratio of circumference to diameter is always the same. Archimedes called this ratio pi, or π (a letter from the Greek alphabet).

$$\pi = \frac{\text{circumference}}{\text{diameter}}$$

In Activities 1 and 2, you will use the same strategy Archimedes used to approximate π .



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



Key Idea

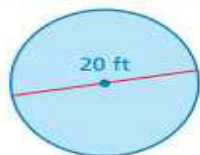
Radius and Diameter

Words The diameter d of a circle is twice the radius r . The radius r of a circle is one-half the diameter d .

Algebra **Diameter:** $d = 2r$ **Radius:** $r = \frac{d}{2}$

1 Finding a Radius and a Diameter

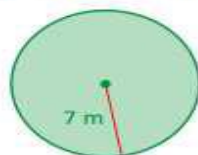
- a. The diameter of a circle is 20 feet. Find the radius.



$$\begin{aligned}r &= \frac{d}{2} && \text{Radius of a circle} \\ &= \frac{20}{2} && \text{Substitute 20 for } d. \\ &= 10 && \text{Divide.}\end{aligned}$$

∴ The radius is 10 feet.

- b. The radius of a circle is 7 meters. Find the diameter.



$$\begin{aligned}d &= 2r && \text{Diameter of a circle} \\ &= 2(7) && \text{Substitute 7 for } r. \\ &= 14 && \text{Multiply.}\end{aligned}$$

∴ The diameter is 14 meters.

On Your Own

1. The diameter of a circle is 16 centimeters. Find the radius.
2. The radius of a circle is 9 yards. Find the diameter.

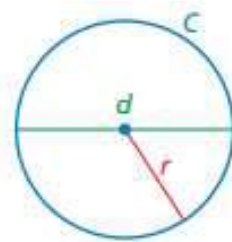
The distance around a circle is called the **circumference**. The ratio $\frac{\text{circumference}}{\text{diameter}}$ is the same for *every* circle and is represented by the Greek letter π , called **pi**. The value of π can be approximated as 3.14 or $\frac{22}{7}$.

Key Idea

Circumference of a Circle

Words The circumference C of a circle is equal to π times the diameter d or π times twice the radius r .

Algebra $C = \pi d$ or $C = 2\pi r$



EXAMPLE 2 Finding Circumferences of Circles



a. Find the circumference of the flying disc. Use 3.14 for π .

$$\begin{aligned} C &= 2\pi r && \text{Write formula for circumference.} \\ &\approx 2 \cdot 3.14 \cdot 5 && \text{Substitute 3.14 for } \pi \text{ and 5 for } r. \\ &= 31.4 && \text{Multiply.} \end{aligned}$$

••• The circumference is about 31.4 inches.



b. Find the circumference of the watch face. Use $\frac{22}{7}$ for π .

$$\begin{aligned} C &= \pi d && \text{Write formula for circumference.} \\ &\approx \frac{22}{7} \cdot 28 && \text{Substitute } \frac{22}{7} \text{ for } \pi \text{ and 28 for } d. \\ &= 88 && \text{Multiply.} \end{aligned}$$

••• The circumference is about 88 millimeters.

1 5.



4.



3.

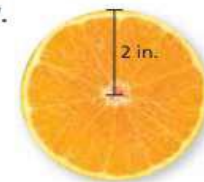


Find the diameter of the object.

6.



7.



8.



Find the circumference of the pizza. Use 3.14 or $\frac{22}{7}$ for π .

2 9.



10.



11.

