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

Like a polygon, a circle is a plane figure. But a circle is not a polygon because it is not made of line segments.

*The length of the diameter is twice the length of the radius.*

**1. Naming Parts of a Circle**

Name the circle, two chords, a diameter, and three radii.
The distance around a circle is called the **circumference**.

The ratio of the circumference to the diameter, \( \frac{C}{d} \), is the same for any circle. This ratio is represented by the Greek letter \( \pi \), which is read “\( \text{pi} \).”

\[
\frac{C}{d} = \pi
\]

The decimal representation of \( \pi \) starts with 3.14159265 \ldots and goes on forever without repeating. Most people approximate \( \pi \) using either 3.14 or \( \frac{22}{7} \). To make multiplying by \( \pi \) easier, you can round \( \pi \) to 3.

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

<table>
<thead>
<tr>
<th>Circumference of a Circle</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Words</strong></td>
</tr>
<tr>
<td>The circumference of any circle is equal to ( \pi ) times the diameter, or ( 2\pi ) times the radius.</td>
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</tbody>
</table>

**Architecture Application**

An architect is making a plan for a new circular theater. Estimate the circumference of the theater by rounding \( \pi \) to 3.
Using the Formula for the Circumference of a Circle

Find each missing value to the nearest hundredth. Use 3.14 for \( \pi \).

**A**

\[
8 \text{ ft}
\]

**B**

\[
3 \text{ cm}
\]

**C**

\[C = 37.68 \text{ in.; } d = ?\]
Think and Discuss

1. **Explain** how to find the radius in Example 3C.

2. **Tell** whether rounding $\pi$ to 3 in Example 3B will result in an overestimation or an underestimation.

---

8.7 # 6-11 (all), 12-17 (odds), 18-19. You must show all your work to receive full credit. No Work, No Credit.

6. Point $P$ is the center of the circle. Name the circle, two chords, a diameter, and three radii.

A gardener is digging a circular pond and planting a circular herb garden around it. Estimate the circumference by rounding $\pi$ to 3.

7. If the diameter of the pond is 5 yards, what is its circumference?

8. If the radius of the garden is 7 yards, what is its circumference?

Find each missing value to the nearest hundredth. Use 3.14 for $\pi$.

9. $C = ?$

10. $C = ?$

11. $d = ?$
Fill in the blanks. Use 3.14 for \( \pi \) and round to the nearest hundredth.

12. If \( r = 7 \text{ m} \), then \( d = \____? \), and \( C = \____? \).

13. If \( d = 11.5 \text{ ft} \), then \( r = \____? \), and \( C = \____? \).

14. If \( C = 7.065 \text{ cm} \), then \( d = \____? \), and \( r = \____? \).

15. If \( C = 16.956 \text{ in.} \), then \( d = \____? \), and \( r = \____? \).

16. **Measurement** Draw a circle. Name the center \( P \) and make the radius 2 inches long.
   a. Draw the diameter \( \overline{AB} \) and give its length.
   b. Find the circumference. Use 3.14 for \( \pi \). Round your answer to the nearest hundredth.

17. **History** The first Hula Hoop\(^\circ\) was introduced in 1958. What is the circumference of a Hula Hoop with a 3-foot diameter? Use 3.14 for \( \pi \).

Use the cylinders for Exercises 18 and 19.

18. **Estimation** About how many times greater is the circumference of the purple cylinder than the circumference of the blue cylinder?

19. **Choose a Strategy** If the circumference of the top of the yellow cylinder is 22.5 centimeters, which method can you use to find the radius?
   
   A. Divide 22.5 by \( \pi \).
   B. Multiply 22.5 by \( \pi \).
   C. Divide 22.5 by \( \pi \) and then divide the quotient by 2.
   D. Multiply 22.5 by \( \pi \) and then multiply the product by 2.