Lesson 11-3

Areas of Circles

The area of a circle is equal to \( \pi \) times the square of radius.

\[
\text{Area of a Circle} \quad A = \pi r^2.
\]

**Example**

Find the area of the circle \( p \).

\[
\begin{align*}
A &= \pi r^2 \\
&= \pi (6)^2 \\
&= 36\pi \\
&\approx 113.1 \\
\end{align*}
\]

The area of the circle is about 113.1 square meters.

**Exercises**

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

1. \( 5 \text{ in.} \) \quad 78.5 in\(^2\)
2. \( 20 \text{ m} \) \quad 314.2 m\(^2\)
3. \( 9.5 \text{ in.} \) \quad 283.5 in\(^2\)
4. \( 11 \text{ ft} \) \quad 95.0 ft\(^2\)
5. \( 88 \text{ m} \) \quad 6082.1 m\(^2\)
6. \( 11 \text{ in.} \) \quad 380.1 in\(^2\)

Find the indicated measure. Round to the nearest tenth.

7. The area of a circle is 153.9 square centimeters. Find the diameter. \( 14.0 \text{ cm} \)
8. Find the diameter of a circle with an area of 490.9 square millimeters. \( 25.0 \text{ mm} \)
9. The area of a circle is 907.9 square inches. Find the radius. \( 17.0 \text{ in.} \)
10. Find the radius of a circle with an area of 63.6 square feet. \( 4.5 \text{ ft} \)
Areas of Sectors

A sector of a circle is a region bounded by a central angle and its intercepted arc.

Area of a Sector

If a sector of a circle has an area of \( A \) square units, a central angle measuring \( \theta \)°, and a radius of \( r \) units, then

\[
A = \frac{\theta}{360} \pi r^2.
\]

Example

Find the area of the shaded sector.

\[
A = \frac{\theta}{360} \pi r^2 \quad \text{Area of a sector}
\]

\[
= \frac{36}{360} \pi (5)^2 \quad x = 36 \text{ and } r = 5
\]

\[
\approx 7.85 \quad \text{Use a calculator.}
\]

The area of the sector is about 7.85 square inches.

Exercises

Find the area of each shaded sector. Round to the nearest tenth.

1. \( \text{Area} = 3.5 \text{ ft}^2 \)

2. \( \text{Area} = 87.3 \text{ m}^2 \)

3. \( \text{Area} = 145.4 \text{ m}^2 \)

4. \( \text{Area} = 52.4 \text{ ft}^2 \)

5. \( \text{Area} = 282.7 \text{ m}^2 \)

6. \( \text{Area} = 43.2 \text{ cm}^2 \)

7. SANDWICHES

For a party, Samantha wants to have finger sandwiches. She cuts sandwiches into circles. If she cuts each circle into three congruent pieces, what is the area of each piece?

\( 6.5 \text{ in}^2 \)