Date:

Objective:

1. **Converting Between Radians and Degrees:**
    Since there are 2π radians in a circle (the circumference of the unit circle is 2π) and $360°$ in a circle,

$$2\pi \text{ radians} = 360°, \text{ or } \pi \text{ radians} = \underline{\hspace{1cm}}.$$

Degrees→Radians: multiply by   **Radians→Degrees:** multiply by

Examples:
Convert the degree measures to radians. Or convert the radian measures to degrees:

1. $45°$

2. $\frac{2\pi}{3}$

3. $-\frac{11\pi}{6}$
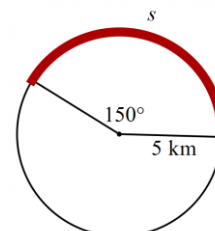
4. $-935°$

5. 3.1

6. $80°$

What is the formula for circumference?

Review example: Find the circumference of the given circle.

5 km

What if you only want part of the circumference? I only want the bold part of the circumference. How do I find it?

s

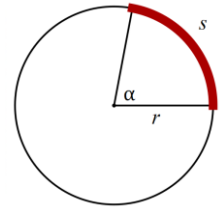$150°$

5 km
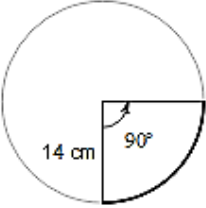
Arc length:

Degrees:

Radians: or   **This formula only works if α is in radians!**
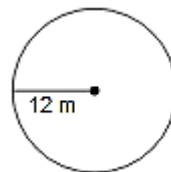
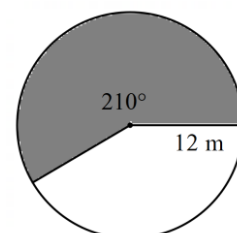Find the arc length. Write the exact answer in terms of π. Then write the rounded answer to the nearest tenth.

1. 14 cm 90°	2. $r = 17$ cm, $\theta = \dfrac{7\pi}{6}$ rad; find s
3. $s = 4$ m, $r = 2$ m; find θ	4. $s = 9$ in, $\theta = 6$ rad; find r

What is the area formula of a circle?

Review example: Find the area of the circle.

12 m

What if you only want part of the area? I only want the shaded part of the area. How do I find it?
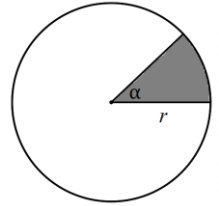
210°

12 m

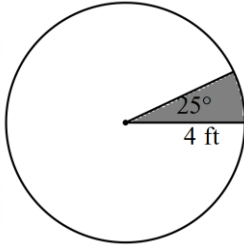Sector area:

Degrees:

**Radians:**   or   **This formula only works if α is in radians!**

Find the sector area. Write the exact answer in terms of π. Then write the rounded answer to the nearest tenth.

1.	2. $r = 9 \text{ mi}, \alpha = \dfrac{\pi}{4}$
25° 4 ft	
3. $r = 10 \text{ km}, \alpha = 300°$	4. $r = 10 \text{ ft}, \alpha = 60°$

Use the arc length formula and the given information to find the indicated measure. Round answers to the nearest tenth if necessary. Show work using the formula. Remember, leave work and answer in the units it begins with.

1. $s = 3.5 \text{ ft}, \ \theta = \dfrac{3\pi}{4} \text{ rad; find } r$

3.5 ft

$\dfrac{3\pi}{4}$

r
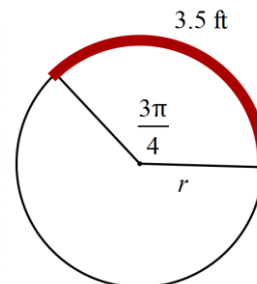
2. $r = 3 \text{ in}, s = 20.5 \text{ in; find } \theta \text{ in (leave answer in degrees)}$

Use the sector area formula and the given information to find the indicated measure. Round answers to the nearest tenth if necessary. Show work using the formula. Remember, leave work and answer in the units it begins with.
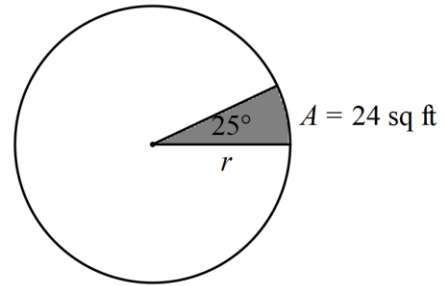
1. $\alpha = 25°$, $A = 24$ sq. ft; find r

25° $A = 24$ sq ft

r

2. $r = 3$ ft., $A = 36$ sq. ft.; find α (leave answer in radians)