

Practice:

Perform the following conversions.

1. Convert  $160^\circ$  to radians.
2. Convert  $\frac{11\pi}{6}$  radians to degrees.

What is the length of an arc with a measure of  $60^\circ$  in a circle with a 10-centimeter radius?

$$\frac{x}{20\pi} = \frac{160}{360}$$
$$\frac{x}{20\pi} \times \frac{1}{6} = \frac{x}{120\pi} = \frac{10}{20\pi}$$
$$= \frac{10\pi}{3}$$

Your turn:  
Convert  $315^\circ$  to radians.

$$\begin{array}{r} 63 \\ 5 \overline{) 315} \\ \underline{-30} \phantom{0} \\ 365 \\ \underline{-36} \phantom{0} \\ 30 \end{array}$$

$$\begin{array}{r} 315\pi \\ \underline{-360} \\ 55\pi \\ \underline{-45} \\ 10\pi \\ \underline{-8} \\ 2\pi \\ \underline{-2} \\ 0 \end{array}$$

Convert  $\frac{5\pi}{4}$  to degrees

$$\frac{5\pi}{4} \left( \frac{180}{\pi} \right) = \frac{5 \cdot 180}{4} = \frac{900}{4} = 225^\circ$$

An arc with a measure of  $120^\circ$  has an arc length of  $10\pi$  inches.  
What is the radius of the circle on with the arc sits?

$$\frac{10\pi}{d\pi} = \frac{120}{360}$$

$$\frac{10}{d} = \frac{1}{3}$$

$$30 = d$$

$$15 = r$$

An arc has a length of  $4\pi$  units and a radius of 6 units. What is the angle of the sector in radians?

$$\frac{1 \cancel{4\pi}}{3 \cancel{12\pi}} = \frac{x}{360}$$

$$\frac{2 \cancel{120\pi}}{3 \cancel{180}} = \frac{2\pi}{3}$$

$$\frac{1}{3} \times \frac{x}{360}$$

$$\frac{360}{3} = \frac{3x}{3} \quad x = 120^\circ$$

Suppose a circle with an 11.4 inch arc intercepted by the central angle and a radius that is 3 inches long. Determine the measure of the central angle in radians.

$$\frac{11.4}{6\pi} \times \frac{x}{360}$$

$$x = \frac{217.72349\pi}{180}$$

$$\frac{4104}{18.8496} = \frac{18.8496x}{18.8496}$$

$$x = 1.2\pi$$