

Exercise 3

You want to make an 80° angle by marking an arc on the perimeter of a 12-in.-diameter disk and drawing lines from the ends of the arc to the disk's center. To the nearest tenth of an inch, how long should the arc be?

Solution

The formula relating arc length, central angle, and radius is

$$s = r\theta,$$

where θ is in radians. Plug in the given quantities, noting that the radius is 6 inches.

$$\begin{aligned} s &= r\theta \\ &= (6 \text{ in.})(80^\circ) \\ &= (6 \text{ in.}) \left(80^\circ \times \frac{\pi}{180^\circ} \right) \\ &= (6 \text{ in.}) \left(\frac{4\pi}{9} \right) \\ &= \frac{8\pi}{3} \text{ in.} \\ &\approx 8.4 \text{ in.} \end{aligned}$$