

Exercise 174

Find the length of the arc intercepted by central angle θ in a circle of radius r . Round to the nearest hundredth. a. $r = 12.8$ cm, $\theta = \frac{5\pi}{6}$ rad b. $r = 4.378$ cm, $\theta = \frac{7\pi}{6}$ rad c. $r = 0.964$ cm, $\theta = 50^\circ$ d. $r = 8.55$ cm, $\theta = 325^\circ$

Solution

Use the formula for the arc length of a circle.

$$s = r\theta$$

Part (a)

If $r = 12.8$ cm and $\theta = \frac{5\pi}{6}$ rad, then

$$s = (12.8 \text{ cm}) \left(\frac{5\pi}{6} \right) \approx 33.51 \text{ cm.}$$

Part (b)

If $r = 4.378$ cm and $\theta = \frac{7\pi}{6}$ rad, then

$$s = (4.378 \text{ cm}) \left(\frac{7\pi}{6} \right) \approx 16.05 \text{ cm.}$$

Part (c)

If $r = 0.964$ cm and $\theta = 50^\circ$, then

$$s = (0.964 \text{ cm}) \left(50^\circ \times \frac{\pi}{180^\circ} \right) \approx 0.84 \text{ cm.}$$

Part (d)

If $r = 8.55$ cm and $\theta = 325^\circ$, then

$$s = (8.55 \text{ cm}) \left(325^\circ \times \frac{\pi}{180^\circ} \right) \approx 48.50 \text{ cm.}$$