

Pre-Calculus 12 Arc Length

The formula given for arc length is $s = \theta r$, where:

s is arc length

θ is the measure of the angle in radians

r is the radius length

Ex. 1) Find the arc length subtended by an angle of $\frac{7\pi}{6}$ in a circle with a radius of 4 cm.

$$\begin{aligned}
 s &= \theta r && \frac{7\pi}{6} \text{ in radians } \checkmark \\
 &= \frac{7\pi}{6} (4) \\
 &= \frac{14\pi}{3} \text{ cm} \\
 &\text{or } 14.66 \text{ cm}
 \end{aligned}$$

Ex. 2) Find the arc length subtended by an angle of 50° in a circle with radius of 6 cm.

$$\begin{aligned}
 &50^\circ \text{ (in degrees)} \\
 &\text{convert to radians} \\
 &\frac{50^\circ \pi}{180^\circ} \\
 &\frac{5\pi}{18}
 \end{aligned}$$

$$\begin{aligned}
 s &= \theta r \\
 &= \frac{5\pi}{18} (6) \\
 &= \frac{5\pi}{3} \text{ cm}
 \end{aligned}$$

Ex. 3) Determine the measure of θ for an arc length of 2π cm and a radius of 3 cm.

$$\begin{aligned}
 s &= \theta r \\
 2\pi &= \theta (3) \\
 \frac{2\pi}{3} &= \theta
 \end{aligned}$$