

Radians, Arc Length and Sector Area

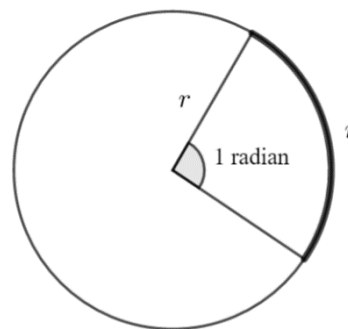
Radians

Radians is a useful measure for angles. Formulae for arc length and sector area are easier to work with. We use radians when doing Calculus with trigonometric functions.

The definition of a radian is the angle subtended by an arc of length of the radius of the circle

There are π radians in a full turn.

To convert between radians and degrees, remember that $180^\circ = \pi$ radians



Arc Length, Sector Area and Segment Area

	θ in degrees	θ in radians
<p>A diagram of a circle with center O. Two radii of length r are drawn from O to points A and B on the circumference, forming a central angle of θ. The arc between A and B is highlighted.</p>	<p>Arc Length</p> $= \frac{\theta}{360} \times 2\pi r$	<p>Arc Length</p> $= r\theta$
<p>A diagram of a circle with center O. Two radii of length r are drawn from O to points A and B on the circumference, forming a central angle of θ. The sector formed by the radii and the arc is shaded.</p>	<p>Sector Area</p> $= \frac{\theta}{360} \times \pi r^2$	<p>Sector Area</p> $= \frac{1}{2} r^2 \theta$
<p>A diagram of a circle with center O. Two radii of length r are drawn from O to points A and B on the circumference, forming a central angle of θ. The segment formed by the arc and the chord AB is shaded.</p>	<p>Segment Area</p> $= \frac{\theta}{360} \times \pi r^2 - \frac{1}{2} r^2 \sin \theta$	<p>Segment Area</p> $= \frac{1}{2} r^2 \theta - \frac{1}{2} r^2 \sin \theta$