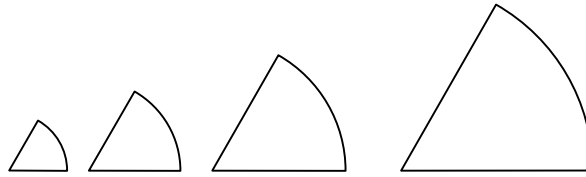


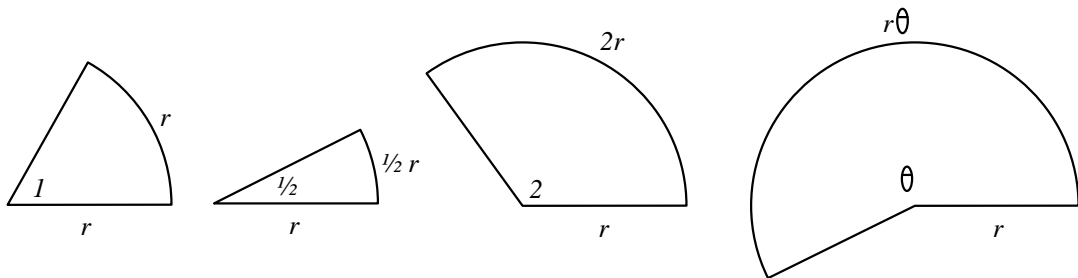
## ANGLES IN RADIANS

Consider sectors of circles such that the arc length is equal to the radius.



The angle is always the same. This angle is defined as 1 *radian* ( $1^\circ$  or 1 rad). The notation  $^\circ$  or rad is not usually used and all angles are assumed to be in radians unless they are shown in degrees.

Consider sectors with angles  $1, \frac{1}{2}, 2, \theta$  radians. The arc lengths are  $r, \frac{1}{2}r, 2r, r\theta$ .



arc length = radius x angle in radians $l = r\theta$
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When the arc is the circumference:

$$l = r\theta$$

$$2\pi r = r\theta$$

$$\theta = 2\pi$$

From which we see that  $2\pi$  radians is the same as  $360^\circ$ .

The following are also worth remembering.

degrees	360	180	90	270	60	45	30
radians	$2\pi$	$\pi$	$\frac{\pi}{2}$	$\frac{3\pi}{2}$	$\frac{\pi}{3}$	$\frac{\pi}{4}$	$\frac{\pi}{6}$

Conversions for any angle can be made using the flowchart:

