Radian Measure

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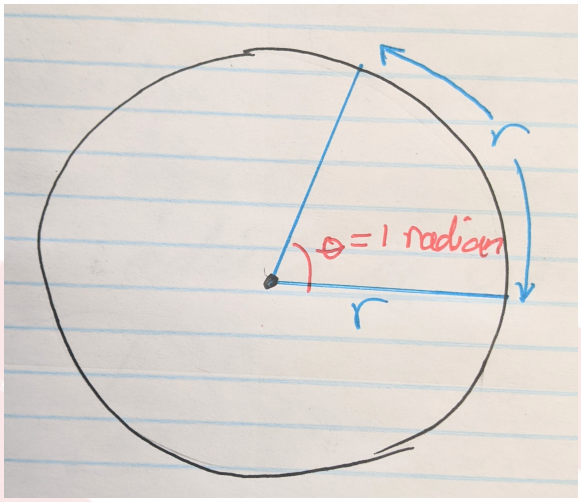
Radians

One radian is the measure of an angle subtended at the centre of a circle by an arc equal in legnth to the radius of the circle.



From here we have the ratio:

$$\begin{aligned} \frac{1 \text{ radian}}{360^\circ} &= \frac{\text{arc length}}{\text{circumference}} \\ \frac{1 \text{ radian}}{360^\circ} &= \frac{r}{2\pi r} \\ \pi \text{ radian} &= \frac{360^\circ}{2} \end{aligned}$$

Therefore, $\boxed{2\pi \text{radians} = 180^\circ}$. Fron here we have,

$$\frac{\pi}{2}\text{radians} = 90^\circ \qquad \frac{\pi}{4}\text{radians} = 45^\circ$$
$$\frac{\pi}{3}\text{radians} = 60^\circ \qquad \frac{\pi}{6}\text{radians} = 30^\circ$$

Arc length of a circle

The *arc length* a is subtended by an angle θ radians in a circle with radius r is given by,

$$\boxed{a = r\theta}$$

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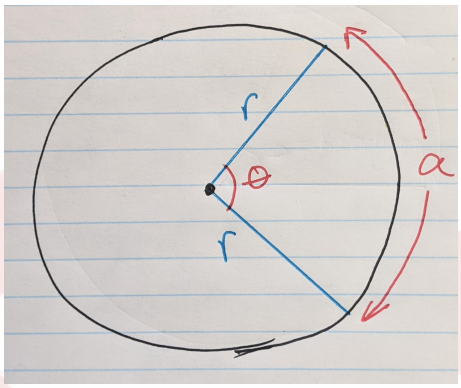

The *related acute angle* is the angle between the terminal arm and the x-axis. A *coterminal angle*, in radians, is, given an angle θ, by $(\theta + 2n\pi)$ radians where n is an integer.

Exercises

Convert to degrees.

(a) $7\pi/4$

(b) $11\pi/6$

(c) $\pi/6$

(d) π

(e) $4\pi/3$

(f) $5\pi/6$

(g) $\pi/4$

(h) $2\pi/3$

(i) 2π

(j) $\pi/3$

