

Further Trigonometry

Essential information

Radian measures 1 degree = $\frac{\pi}{180}$ and note that

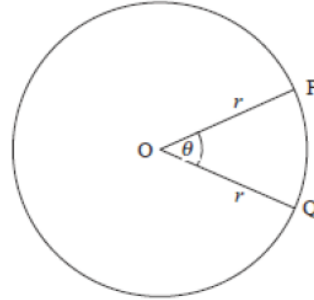
$$45^\circ = \frac{\pi}{4}, \quad 90^\circ = \frac{\pi}{2}, \quad 180^\circ = \pi, \quad 270^\circ = \frac{3\pi}{2}, \quad 360^\circ = 2\pi$$

Arc length

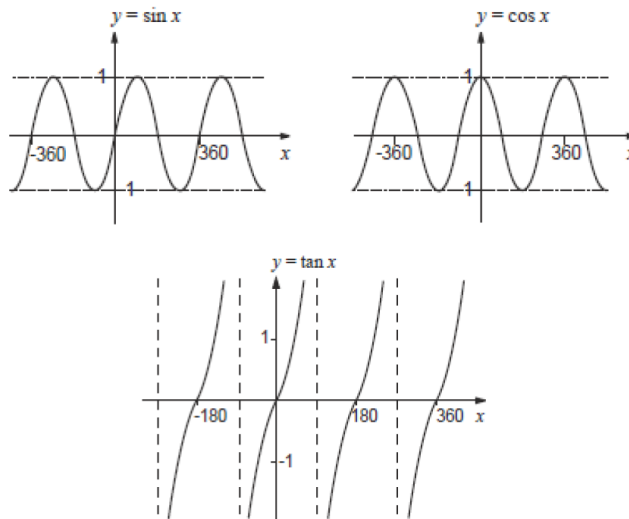
$$\text{arc length, } PQ = r\theta$$

Sector area

$$\text{sector area } OPQ = \frac{1}{2}r^2\theta$$



Sine, cosine and tangent functions for all angles



Properties of trig functions

| | <u>Degrees</u> | <u>Radians</u> |
|----|----------------------------------|--|
| 1. | $\cos(x) = \sin(90^\circ - x)$ | $\cos(x) = \sin\left(\frac{\pi}{2} - x\right)$ |
| 2. | $\sin(x) = \cos(90^\circ - x)$ | $\sin(x) = \cos\left(\frac{\pi}{2} - x\right)$ |
| 3. | $\cos(180^\circ - x) = -\cos(x)$ | $\cos(\pi - x) = -\cos(x)$ |
| 4. | $\sin(180^\circ - x) = +\sin(x)$ | $\sin(\pi - x) = \sin(x)$ |
| 5. | $\tan x = \frac{\sin x}{\cos x}$ | |
| 6. | $\sin^2 x + \cos^2 x = 1$ | |