

Trigonometry

$$\rightarrow \sin \theta = \frac{\text{Opp}}{\text{hypo}}$$

$$\cos \theta = \frac{\text{Adj}}{\text{hypo}}$$

$$\tan \theta = \frac{\text{Opp}}{\text{Adj}}$$

$$\rightarrow \sin \theta = \cos(90 - \theta)$$

$$\rightarrow \cos \theta = \sin(90 - \theta)$$

→ Cosine Rule

$$\cos A = \frac{b^2 + c^2 - a^2}{2bc}$$

→ Sine Rule

$$\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}$$

→ Range of $\sin$, $\cos$, $\tan$ for functions

$$-1 \leq \sin x \leq 1$$

$$0 \leq \sin^2 x \leq 1$$

$$-1 \leq \cos x \leq 1$$

$$0 \leq \cos^2 x \leq 1$$

$$-\infty \leq \tan x \leq \infty$$

$$0 \leq \tan^2 x \leq \infty$$

→ If angle moves anticlockwise, then its positive

→ If angle moves clockwise, then its negative

II S	I A
90-180	0-90
T III	C IV
180-270	270-360

+ve quadrants	II 180-θ S	I θ(0-90) A
	III 180+θ T	IV 360-θ C

Identities (Very Important)

$$\sin^2 \theta + \cos^2 \theta = 1$$

$$\tan \theta = \frac{\sin \theta}{\cos \theta}$$

-ve quadrants	III -(180+θ) T	IV -(360-θ) C
	II -(180-θ) S	I -θ A

→ Modelling: $y = A \sin(Bx + C) + D$ or $y = A \cos(Bx + C) + D$

A (amplitude)

B (dilation factor)

D (vertical shift)

$$\frac{\text{max} - \text{min}}{2}$$

$$\frac{2\pi}{\text{period}}$$

$$\frac{\text{max} + \text{min}}{2}$$

C = horizontal shift.