

## Trigonometric Formulas

$$\sin(a + b) = \sin a \cos b + \sin b \cos a$$

$$\cos(a + b) = \cos a \cos b - \sin a \sin b$$

$$\tan(a + b) = \frac{\tan a + \tan b}{1 - \tan a \tan b}$$

Ex 1: Knowing that a and b are 60 and 30 degrees, verify that

$$\sin(a + b) = \sin a \cos b + \sin b \cos a$$

$$\sin(60^\circ + 30^\circ) = \sin 60^\circ \cos 30^\circ + \sin 30^\circ \cos 60^\circ$$

$$\sin 90^\circ = \left(\frac{\sqrt{3}}{2}\right)\left(\frac{\sqrt{3}}{2}\right) + \left(\frac{1}{2}\right)\left(\frac{1}{2}\right)$$

$$= 1 \quad \frac{3}{4} + \frac{1}{4} = 1$$

$\therefore$  LHS = RHS  $\therefore$  QED

$$\sin(a - b) = \sin a \cos b - \sin b \cos a$$

$$\cos(a - b) = \cos a \cos b + \sin a \sin b$$

$$\tan(a - b) = \frac{\tan a - \tan b}{1 + \tan a \tan b}$$

Prove that

$$\sin(\pi - t) = \sin t$$

$$\sin(a - b) = \sin a \cos b - \sin b \cos a$$

$$\sin(\pi - t) = \sin \pi \cos t - \sin t \cos \pi$$

Read  $\sin \pi$  and  $\cos \pi$  from the trig circle.

$$(0)(\cos t) - \sin t(-1)$$

$$\begin{aligned} & \sin t \\ & = \text{RHS} \end{aligned}$$

Prove that

$$\cos(\pi - t) = -\cos t$$

$$\cos(a - b) = \cos a \cos b + \sin a \sin b$$

$$\cos(\pi - t) = \cos \pi \cos t + \sin \pi \sin t.$$

$$= -1 \cos t + 0 \cdot \sin t$$
$$\boxed{= -\cos t}$$

P 254 - 255

Q 1, 2, 3, 4