

## 10.4) Simple trigonometric equations

## Worked example

Solve in the interval  $0 \leq \theta \leq 360^\circ$ :

$$\sin \theta = \frac{\sqrt{3}}{2}$$

$$\sin \theta = -\frac{\sqrt{2}}{2}$$

## Your turn

Solve in the interval  $0 \leq \theta \leq 360^\circ$ :

$$\sin \theta = \frac{1}{2}$$

$$\theta = 30^\circ, 150^\circ$$

## Worked example

Solve in the interval  $0 \leq \theta \leq 360^\circ$ :

$$\cos \theta = \frac{\sqrt{3}}{2}$$

$$\cos \theta = -\frac{\sqrt{2}}{2}$$

## Your turn

Solve in the interval  $0 \leq \theta \leq 360^\circ$ :

$$\cos \theta = \frac{1}{2}$$

$$\theta = 60^\circ, 300^\circ$$

## Worked example

Solve in the interval  $0 \leq \theta \leq 360^\circ$ :

$$\tan \theta = \frac{\sqrt{3}}{3}$$

$$\tan \theta = -1$$

## Your turn

Solve in the interval  $0 \leq \theta \leq 360^\circ$ :

$$\tan \theta = \sqrt{3}$$

$$\theta = 60^\circ, 240^\circ$$

## Worked example

Solve in the interval  $0 \leq \theta \leq 360^\circ$ :

$$3 \cos \theta = -4$$

$$5 \tan \theta = 7$$

## Your turn

Solve in the interval  $0 \leq \theta \leq 360^\circ$ :

$$5 \sin \theta = -2$$

$$\theta = 204^\circ, 336^\circ \text{ (3 sf)}$$

## Worked example

Solve in the interval  $0 \leq \theta \leq 360^\circ$ :

$$\sqrt{3} \sin \theta = \cos \theta$$

## Your turn

Solve in the interval  $0 \leq \theta \leq 360^\circ$ :

$$\sin \theta = \sqrt{3} \cos \theta$$

$$\theta = 60^\circ, 240^\circ$$

## Worked example

Solve in the interval  $0 \leq \theta \leq 360^\circ$ :

$$2 \sin \theta + 3 \cos \theta = 0$$

## Your turn

Solve in the interval  $0 \leq \theta \leq 360^\circ$ :

$$5 \sin \theta - 4 \cos \theta = 0$$

$$\theta = 38.7^\circ, 218.7^\circ \text{ (1 dp)}$$

## Worked example

Solve in the interval  $0 \leq x \leq 360^\circ$ :

$$5 \cos^2 x - 3 \sin^2 x = 4$$

## Your turn

Solve in the interval  $0 \leq x \leq 360^\circ$ :

$$8 \sin^2 x - 7 \cos^2 x = 6$$

$$x = 84.6^\circ, 95.4^\circ, 256.0^\circ, 264.6^\circ \text{ (1 dp)}$$



## Worked example

Explain why there are no solutions to the equation  $3 \sin^2 x - 4 \cos^2 x = 5$

## Your turn

Explain why there are no solutions to the equation  $3 \sin^2 x + 4 \cos^2 x = 5$

$$\sin^2 x = -1$$

No real solutions

Or

$$\cos^2 x = 2$$

$$\cos x = \pm\sqrt{2} \text{ but } -1 \leq \cos x \leq 1$$

$\therefore$  No solutions