

## Solving Harder Trigonometric Equations in Radians

You need to solve them the same as any other quadratic equation

*Example 1:*  $2 \cos^2 \theta - \cos \theta = 1$  solve for  $0 \leq \theta \leq 360^\circ$

$$2 \cos^2 \theta - \cos \theta = 1$$

$$(2 \cos \theta + 1)(\cos \theta - 1) = 0$$

$$\cos \theta = -\frac{1}{2} \quad \text{or} \quad \cos \theta = 1$$

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

$$\theta = 60^\circ$$

$$\text{using } \cos \theta = 1$$

$$\theta = 0$$

$\cos \theta$  is negative in quadrants 2 & 3

$\cos \theta$  is positive in quadrants 1 & 4

$$\text{Q2 } \theta = 180 - 60$$

$$\theta = 120^\circ$$

$$\text{Q3 } \theta = 180 + 60$$

$$\theta = 240^\circ$$

$$\text{Q1 } \theta = 0^\circ$$

$$\text{Q4 } \theta = 360 - 0$$

$$\theta = 360^\circ$$

The solutions are  $0^\circ, 120^\circ, 240^\circ, 360^\circ$

Be aware you may need to use  $\sin^2 x + \cos^2 x = 1$  to simplify before you can factorise.