



Trigonometric Equations Ex 11.1 Q2(xi)

We have,

$$\begin{aligned}
 \sin \theta &= \tan \theta \\
 \Rightarrow \sin \theta &= \frac{\sin \theta}{\cos \theta} \\
 \Rightarrow \sin \theta &= \frac{\sin \theta}{\cos \theta} = 0 \\
 \Rightarrow \sin \theta (\cos \theta - 1) &= 0 \\
 \Rightarrow \text{either } \sin \theta &= 0 & \text{or } \cos \theta - 1 &= 0 \\
 \Rightarrow \theta = n\pi, n \in \mathbb{Z} & & \text{or } \cos \theta &= 1 \\
 & & \Rightarrow \cos \theta &= \cos 0^\circ \\
 & & \theta &= 2m\pi, m \in \mathbb{Z}
 \end{aligned}$$

Thus,

$$\theta = n\pi, n \in \mathbb{Z} \quad \text{or} \quad \theta = 2m\pi, m \in \mathbb{Z}$$

Trigonometric Equations Ex 11.1 Q2(xii)

$$\cos(2x) = -\sin(3x)$$

$$= -\cos\left(\frac{\pi}{2} - 3x\right)$$

$$= \cos\left(\frac{\pi}{2} + 3x\right)$$

$$\Rightarrow 2n\pi + 2x = \frac{\pi}{2} + 3x$$

$$x = (4n-1)\frac{\pi}{2}, n \in \mathbb{Z}$$

or

$$\Rightarrow 2n\pi - 2x = \frac{\pi}{2} + 3x$$

$$x = (4n-1)\frac{\pi}{10}, n \in \mathbb{Z}$$

Trigonometric Equations Ex 11.1 Q3(i)

We have,

$$\begin{aligned}
 \sin^2 \theta - \cos \theta &= \frac{1}{4} \\
 \Rightarrow 1 - \cos^2 \theta - \cos \theta &= \frac{1}{4} \quad \left[\because \sin^2 \theta = 1 - \cos^2 \theta \right] \\
 \Rightarrow \cos^2 \theta + \cos \theta - \frac{3}{4} &= 0 \\
 \Rightarrow 4\cos^2 \theta + 4\cos \theta - 3 &= 0 \\
 \Rightarrow 4\cos^2 \theta + 6\cos \theta - 2\cos \theta - 3 &= 0 \quad \left[\text{factorize it} \right] \\
 \Rightarrow 2\cos \theta (2\cos \theta + 3) - 1(\cos \theta + 3) &= 0 \\
 \Rightarrow (2\cos \theta - 1)(2\cos \theta + 3) &= 0 \\
 \Rightarrow \text{either} & \\
 2\cos \theta - 1 = 0 & \quad \text{or} \quad 2\cos \theta + 3 = 0 \\
 \Rightarrow \cos \theta = \frac{1}{2} & \quad \text{or} \quad \cos \theta = -\frac{3}{2} \quad \left[\text{This is not possible as } -1 < \cos \theta < 1 \right] \\
 \Rightarrow \cos \theta = \cos \frac{\pi}{3} & \\
 \Rightarrow \theta = 2n\pi \pm \frac{\pi}{3}, n \in \mathbb{Z} &
 \end{aligned}$$

Trigonometric Equations Ex 11.1 Q3(ii)

We have,

$$2\cos^2\theta - 5\cos\theta + 2 = 0$$

$$\Rightarrow 2\cos^2\theta - 4\cos\theta - \cos\theta + 2 = 0 \quad [\text{use factorization}]$$

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

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

\Rightarrow either

$$2\cos\theta - 1 = 0 \quad \text{or} \quad \cos\theta - 2 = 0$$

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

$$\Rightarrow \cos\theta = \cos\frac{\pi}{3} \quad [\text{This is not possible as } -1 < \cos\theta < 1]$$

$$\Rightarrow \theta = 2n\pi \pm \frac{\pi}{3}, n \in \mathbb{Z}$$

Thus,

$$\theta = 2n\pi \pm \frac{\pi}{3}, n \in \mathbb{Z}$$

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