Trigonometric Equations Ex 11.1 Q2(xi)

We have,

$\sin\theta = \tan\theta$

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

$\Rightarrow \sin\theta = \frac{\sin\theta}{\cos\theta} = 0$

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

$\Rightarrow$ either $\sin\theta = 0$ or $\cos\theta - 1 = 0$

$\Rightarrow \theta = n\pi, n \in z$ or $\cos\theta = 1$

$\Rightarrow \cos\theta = \cos 0°$

$\theta = 2m\pi,\ m \in z$

Thus,

$\theta = n\pi n \in z$ or $\theta = 2m\pi, m \in z$

Trigonometric Equations Ex 11.1 Q2(xii)

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

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

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

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

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

or

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

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

Trigonometric Equations Ex 11.1 Q3(i)

We have,

$\sin^2\theta - \cos\theta = \frac{1}{4}$

$\Rightarrow 1 - \cos^2\theta - \cos\theta = \frac{1}{4}$ $\left[\because \sin^2\theta = 1 - \cos^2\theta\right]$

$\Rightarrow \cos^2\theta + \cos\theta - \frac{3}{4} = 0$

$\Rightarrow 4\cos^2\theta + 4\cos\theta - 3 = 0$

$\Rightarrow 4\cos^2\theta + 6\cos\theta - 2\cos\theta - 3 = 0$ [factorize it]

$\Rightarrow 2\cos\theta(2\cos\theta + 3) - 1(\cos\theta + 3) = 0$

$\Rightarrow (2\cos\theta - 1)(2\cos\theta + 3) = 0$

$\Rightarrow$ either

$2\cos\theta - 1 = 0$ or $2\cos\theta + 3 = 0$

$\Rightarrow \cos\theta = \frac{1}{2}$ or $\cos\theta = -\frac{3}{2}$ [This is not possible as $-1 < \cos\theta < 1$]

$\Rightarrow \cos\theta = \cos\frac{\pi}{3}$

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

Trigonometric Equations Ex 11.1 Q3(ii)

We have,

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

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

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

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

$\Rightarrow$ either

$2\cos\theta - 1 = 0$ or $\cos\theta - 2 = 0$

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

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

$\Rightarrow \quad \theta = 2n\pi \pm \frac{\pi}{3}, n \in z$

Thus,

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

********** END **********