Trigonometric Equations Ex 11.1 Q6(iv)

We have,

$$\operatorname{cosec}\theta = 1 + \cot\theta$$

$$\Rightarrow \quad \frac{1}{\sin\theta} = 1 + \frac{\cos\theta}{\sin\theta}$$

$$\Rightarrow \quad 1 = \sin\theta + \cos\theta$$

Divide both side by $\sqrt{2}$, we get,

$$\Rightarrow \quad \frac{1}{\sqrt{2}}\sin\theta + \frac{1}{\sqrt{2}}\cos\theta = \frac{1}{\sqrt{2}}$$

$$\Rightarrow \quad \sin\frac{\pi}{4}\sin\theta + \cos\frac{\pi}{4}\cos\theta = \frac{1}{\sqrt{2}}$$

$$\Rightarrow \quad \cos\left(\theta - \frac{\pi}{4}\right) = \cos\frac{\pi}{4}$$

$$\Rightarrow \quad \theta = \frac{\pi}{4} = 2n\pi \pm \frac{\pi}{4}, n \in z$$

$$\therefore \theta\left(2n\pi + \frac{\pi}{2}\right) \quad \text{or} \quad 2n\pi, n \in z$$

Trigonometric Equations Ex 11.1 Q6(v)

$$\left(\sqrt{3}-1\right)\cos\theta + \left(\sqrt{3}+1\right)\sin\theta = 2$$

Divide on both sides by $2\sqrt{2}$

$$\frac{\left(\sqrt{3}-1\right)}{2\sqrt{2}}\cos\theta + \frac{\left(\sqrt{3}+1\right)}{2\sqrt{2}}\sin\theta = \frac{1}{\sqrt{2}}$$

$$\sin\left(\theta + \tan^{-1}\left(\frac{\sqrt{3}-1}{\sqrt{3}+1}\right)\right) = \sin\frac{\pi}{4}$$

$$\theta = 2n\pi + \frac{\pi}{3} \text{ or } 2n\pi - \frac{\pi}{6} \quad n \in Z$$

Trigonometric Equations Ex 11.1 Q7(i)

$$\cot x + \tan x = 2$$

$$2\sin x\cos x = 1$$

$$\sin 2x = 1$$

$$2x = \frac{(2n+1)}{2}\pi$$

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

Trigonometric Equations Ex 11.1 Q7(ii)

$2\sin^2\theta = 3\cos\theta$

$2-2\cos^2\theta=3\cos\theta$

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

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

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

$\cos\theta=-2$ or $\cos\theta=0.5$

$\cos\theta=-2$, never possible

$\cos\theta=0.5$, $\theta=60, 300$

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