



Trigonometric Equations Ex 11.1 Q2(vii)

We have,

$$\begin{aligned} \tan 2\theta, \tan \theta &= 1 \\ \Rightarrow \tan 2\theta &= \frac{1}{\tan \theta} \\ \Rightarrow \tan 2\theta &= \cot \theta \\ \Rightarrow \tan 2\theta &= \tan \left(\frac{\pi}{2} - \theta \right) \\ \Rightarrow 2\theta &= n\pi + \frac{\pi}{2} - \theta, n \in \mathbb{Z} \\ \Rightarrow 3\theta &= n\pi + \frac{\pi}{2}, n \in \mathbb{Z} \\ \Rightarrow \theta &= \frac{n\pi}{3} + \frac{\pi}{6}, n \in \mathbb{Z} \end{aligned}$$

Trigonometric Equations Ex 11.1 Q2(viii)

$$\begin{aligned} \tan m\theta + \cot n\theta &= 0 \\ \sin m\theta \sin n\theta + \cos m\theta \cos n\theta &= 0 \\ \cos(m-n)\theta &= 0 \\ (m-n)\theta &= \left(\frac{2k+1}{2} \right) \pi \\ \theta &= \left(\frac{2k+1}{2(m-n)} \right) \pi, k \in \mathbb{Z} \end{aligned}$$

Trigonometric Equations Ex 11.1 Q2(ix)

We have,

$$\begin{aligned} \tan p\theta &= \cot q\theta \\ \Rightarrow \tan p\theta &= \tan \left(\frac{\pi}{2} - q\theta \right) \\ \Rightarrow p\theta &= n\pi \pm \left(\frac{\pi}{2} - q\theta \right), n \in \mathbb{Z} \\ \Rightarrow (p+q)\theta &= n\pi + \frac{\pi}{2}, n \in \mathbb{Z} \\ \Rightarrow (p+q)\theta &= (2n+1) \frac{\pi}{2}, n \in \mathbb{Z} \\ \Rightarrow \theta &= \frac{(2n+1)}{(p+q)} \frac{\pi}{2}, n \in \mathbb{Z} \end{aligned}$$

Trigonometric Equations Ex 11.1 Q2(x)

$$\sin 2x + \cos x = 0$$

$$2 \sin x \cos x + \cos x = 0$$

$$\cos x (2 \sin x + 1) = 0$$

$$\cos x = 0 \text{ or } 2 \sin x + 1 = 0$$

$$x = (4m-1)\frac{\pi}{2} \text{ or } \sin x = -\frac{1}{2}$$

$$x = (4m-1)\frac{\pi}{2} \text{ or } x = (4n-1)\frac{\pi}{6}, \quad m, n \in \mathbb{Z}$$

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