



Trigonometric Identities Ex 6.1 Q24

Answer :

We have to prove $\frac{\cos^2 \theta}{\sin \theta} - \operatorname{cosec} \theta + \sin \theta = 0$

We know that, $\sin^2 \theta + \cos^2 \theta = 1$

So,

$$\begin{aligned}\frac{\cos^2 \theta}{\sin \theta} - \operatorname{cosec} \theta + \sin \theta &= \left(\frac{\cos^2 \theta}{\sin \theta} - \operatorname{cosec} \theta \right) + \sin \theta \\&= \left(\frac{\cos^2 \theta}{\sin \theta} - \frac{1}{\sin \theta} \right) + \sin \theta \\&= \left(\frac{\cos^2 \theta - 1}{\sin \theta} \right) + \sin \theta \\&= \left(\frac{-\sin^2 \theta}{\sin \theta} \right) + \sin \theta \\&= -\sin \theta + \sin \theta \\&= 0\end{aligned}$$

Trigonometric Identities Ex 6.1 Q25

Answer :

We have to prove $\frac{1}{1 + \sin A} + \frac{1}{1 - \sin A} = 2 \sec^2 A$

We know that, $\sin^2 A + \cos^2 A = 1$

So,

$$\begin{aligned}\frac{1}{1 + \sin A} + \frac{1}{1 - \sin A} &= \frac{(1 - \sin A) + (1 + \sin A)}{(1 + \sin A)(1 - \sin A)} \\&= \frac{1 - \sin A + 1 + \sin A}{1 - \sin^2 A} \\&= \frac{2}{\cos^2 A} \\&= 2 \sec^2 A\end{aligned}$$

Trigonometric Identities Ex 6.1 Q26

Answer :

We have to prove $\frac{1+\sin \theta}{\cos \theta} + \frac{\cos \theta}{1+\sin \theta} = 2 \sec \theta$

We know that, $\sin^2 \theta + \cos^2 \theta = 1$

Multiplying the denominator and numerator of the second term by $(1 - \sin \theta)$, we have

$$\begin{aligned} \frac{1+\sin \theta}{\cos \theta} + \frac{\cos \theta}{1+\sin \theta} &= \frac{1+\sin \theta}{\cos \theta} + \frac{\cos \theta(1-\sin \theta)}{(1+\sin \theta)(1-\sin \theta)} \\ &= \frac{1+\sin \theta}{\cos \theta} + \frac{\cos \theta(1-\sin \theta)}{1-\sin^2 \theta} \\ &= \frac{1+\sin \theta}{\cos \theta} + \frac{\cos \theta(1-\sin \theta)}{\cos^2 \theta} \\ &= \frac{1+\sin \theta}{\cos \theta} + \frac{1-\sin \theta}{\cos \theta} \\ &= \frac{1+\sin \theta+1-\sin \theta}{\cos \theta} \\ &= \frac{2}{\cos \theta} \\ &= 2 \sec \theta \end{aligned}$$

Trigonometric Identities Ex 6.1 Q27

Answer :

We have to prove that $\frac{(1+\sin \theta)^2 + (1-\sin \theta)^2}{2 \cos^2 \theta} = \frac{1+\sin^2 \theta}{1-\sin^2 \theta}$.

We know that, $\sin^2 \theta + \cos^2 \theta = 1$

So,

$$\begin{aligned} \frac{(1+\sin \theta)^2 + (1-\sin \theta)^2}{2 \cos^2 \theta} &= \frac{(1+2 \sin \theta + \sin^2 \theta) + (1-2 \sin \theta + \sin^2 \theta)}{2 \cos^2 \theta} \\ &= \frac{1+2 \sin \theta + \sin^2 \theta + 1-2 \sin \theta + \sin^2 \theta}{2 \cos^2 \theta} \\ &= \frac{2+2 \sin^2 \theta}{2 \cos^2 \theta} \\ &= \frac{2(1+\sin^2 \theta)}{2(1-\sin^2 \theta)} \\ &= \frac{1+\sin^2 \theta}{1-\sin^2 \theta} \end{aligned}$$

***** END *****