Trigonometric Identities Ex 6.1 Q5

Answer :

We know that,

$$\sec^2\theta - \tan^2\theta = 1,$$
$$\text{cosec}^2\theta - \cot^2\theta = 1$$

So,

$$
\begin{aligned}
(\sec^2\theta - 1)(\text{cosec}^2\theta - 1) &= \tan^2\theta \times \cot^2\theta \\
&= (\tan\theta \times \cot\theta)^2 \\
&= \left(\tan\theta \times \frac{1}{\tan\theta}\right)^2 \\
&= (1)^2 \\
&= 1
\end{aligned}
$$

Trigonometric Identities Ex 6.1 Q6

Answer :

We know that, $\sec^2\theta - \tan^2\theta = 1$

So,

$$\tan\theta + \frac{1}{\tan\theta} = \frac{\tan^2\theta + 1}{\tan\theta}$$

$$= \frac{\sec^2\theta}{\tan\theta}$$

$$= \sec\theta\, \frac{\sec\theta}{\tan\theta}$$

$$= \sec\theta\, \frac{\dfrac{1}{\cos\theta}}{\dfrac{\sin\theta}{\cos\theta}}$$

$$= \sec\theta\, \frac{1}{\sin\theta}$$

$$= \sec\theta\, \operatorname{cosec}\theta$$

Trigonometric Identities Ex 6.1 Q7

Answer :

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

Multiplying both numerator and the denominator by $(1 + \sin\theta)$, we have

$$\frac{\cos\theta}{1 - \sin\theta} = \frac{\cos\theta(1 + \sin\theta)}{(1 - \sin\theta)(1 + \sin\theta)}$$

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

$$= \frac{\cos\theta(1 + \sin\theta)}{\cos^2\theta}$$

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

Trigonometric Identities Ex 6.1 Q8

Answer :

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

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

$$\frac{\cos\theta}{1+\sin\theta} = \frac{\cos\theta(1-\sin\theta)}{(1+\sin\theta)(1-\sin\theta)}$$

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

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

$$= \frac{1-\sin\theta}{\cos\theta}$$

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