



Trigonometric Identities Ex 6.1 Q5

**Answer :**

We know that,

$$\sec^2 \theta - \tan^2 \theta = 1,$$

$$\operatorname{cosec}^2 \theta - \cot^2 \theta = 1$$

So,

$$(\sec^2 \theta - 1)(\operatorname{cosec}^2 \theta - 1) = \tan^2 \theta \times \cot^2 \theta$$

$$= (\tan \theta \times \cot \theta)^2$$

$$= \left( \tan \theta \times \frac{1}{\tan \theta} \right)^2$$

$$= (1)^2$$

$$= 1$$

Trigonometric Identities Ex 6.1 Q6

**Answer :**

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

So,

$$\begin{aligned}\tan \theta + \frac{1}{\tan \theta} &= \frac{\tan^2 \theta + 1}{\tan \theta} \\ &= \frac{\sec^2 \theta}{\tan \theta} \\ &= \sec \theta \frac{\sec \theta}{\tan \theta} \\ &= \sec \theta \frac{1}{\frac{\sin \theta}{\cos \theta}} \\ &= \sec \theta \frac{1}{\sin \theta} \\ &= \sec \theta \operatorname{cosec} \theta\end{aligned}$$

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

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

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

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

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