Trigonometric Identities Ex 6.1 Q81

Answer :

Given:

$\operatorname{cosec}\theta+\cot\theta=m,$

$\operatorname{cosec}\theta-\cot\theta=n$

We have to prove $mn=1$

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

Multiplying the two equations, we have

$$(\operatorname{cosec}\theta+\cot\theta)(\operatorname{cosec}\theta-\cot\theta)=mn$$

$$\Rightarrow\left(\frac{1}{\sin\theta}+\frac{\cos\theta}{\sin\theta}\right)\left(\frac{1}{\sin\theta}-\frac{\cos\theta}{\sin\theta}\right)=mn$$

$$\Rightarrow\left(\frac{1+\cos\theta}{\sin\theta}\right)\left(\frac{1-\cos\theta}{\sin\theta}\right)=mn$$

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

$$\Rightarrow\frac{1-\cos^2\theta}{\sin^2\theta}=mn$$

$$\Rightarrow\frac{\sin^2\theta}{\sin^2\theta}=mn$$

$$\Rightarrow 1=mn$$

$$\Rightarrow mn=1$$

Hence proved.

Trigonometric Identities Ex 6.1 Q82

Answer :

Given: $\cos A + \cos^2 A = 1$

We have to prove $\sin^2 A + \sin^4 A = 1$

Now,

$$\cos A + \cos^2 A = 1$$

$$\Rightarrow \quad \cos A = 1 - \cos^2 A$$

$$\Rightarrow \quad \cos A = \sin^2 A$$

$$\Rightarrow \quad \sin^2 A = \cos A$$

Therefore, we have

$$\begin{aligned} \sin^2 A + \sin^4 A &= \cos A + (\cos A)^2 \\ &= \cos A + \cos^2 A \\ &= 1 \end{aligned}$$

Hence proved.

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