Trigonometric Identities Ex 6.1 Q9

Answer :

We know that,

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

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

So,

$$\cos^2 A+\frac{1}{1+\cot^2 A}=\cos^2 A+\frac{1}{\operatorname{cosec}^2 A}$$

$$=\cos^2 A+\left(\frac{1}{\operatorname{cosec} A}\right)^2$$

$$=\cos^2 A+(\sin A)^2$$

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

$$=1$$

Trigonometric Identities Ex 6.1 Q10

Answer :

We know that,

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

$\sec^2 A-\tan^2 A=1$

So,

$$\sin^2 A+\frac{1}{1+\tan^2 A}=\sin^2 A+\frac{1}{\sec^2 A}$$

$$=\sin^2 A+\left(\frac{1}{\sec A}\right)^2$$

$$=\sin^2 A+(\cos A)^2$$

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

$$=1$$

Trigonometric Identities Ex 6.1 Q11

Answer :

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

Multiplying numerator and denominator under the square root by $(1-\cos\theta)$, we have

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

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

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

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

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

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

Trigonometric Identities Ex 6.1 Q12

Answer :

We have to prove $\frac{1-\cos\theta}{\sin\theta}=\frac{\sin\theta}{1+\cos\theta}$.

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

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

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

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

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

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

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