

Trigonometric Identities Ex 6.1 Q17

## Answer:

We have to prove 
$$(\sec \theta + \cos \theta)(\sec \theta - \cos \theta) = \tan^2 \theta + \sin^2 \theta$$
  
We know that,  
 $\sin^2 \theta + \cos^2 \theta = 1$ ,  
 $\sec^2 \theta - \tan^2 \theta = 1$   
 $(\sec \theta + \cos \theta)(\sec \theta - \cos \theta) = \sec^2 \theta - \cos^2 \theta$   
 $= (1 + \tan^2 \theta) - (1 - \sin^2 \theta)$   
 $= 1 + \tan^2 \theta - 1 + \sin^2 \theta$   
 $= \tan^2 \theta + \sin^2 \theta$ 

Trigonometric Identities Ex 6.1 Q18

## Answer:

We have to prove 
$$\sec A(1-\sin A)(\sec A + \tan A) = 1$$
  
We know that,  $\sec^2 A - \tan^2 A = 1$   
So,  $\sec A(1-\sin A)(\sec A + \tan A) = \{\sec A(1-\sin A)\}(\sec A + \tan A)$   
 $= (\sec A - \sec A \sin A)(\sec A + \tan A)$   
 $= \left(\sec A - \frac{1}{\cos A}\sin A\right)(\sec A + \tan A)$   
 $= \left(\sec A - \frac{\sin A}{\cos A}\right)(\sec A + \tan A)$   
 $= (\sec A - \tan A)(\sec A + \tan A)$   
 $= \sec^2 A - \tan^2 A$   
 $= 1$ 

Trigonometric Identities Ex 6.1 Q9

## Answer:

We have to prove  $(\csc A - \sin A)(\sec A - \cos A)(\tan A + \cot A) = 1$ We know that,  $\sin^2 A + \cos^2 A = 1$ So.

$$(\csc A - \sin A)(\sec A - \cos A)(\tan A + \cot A)$$

$$= \left(\frac{1}{\sin A} - \sin A\right) \left(\frac{1}{\cos A} - \cos A\right) \left(\frac{\sin A}{\cos A} + \frac{\cos A}{\sin A}\right)$$

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

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

$$= \frac{\sin^2 A \cos^2 A}{\sin^2 A \cos^2 A}$$

$$= 1$$

Trigonometric Identities Ex 6.1 Q20

## Answer:

We have to prove  $\tan^2 \theta - \sin^2 \theta = \tan^2 \theta \sin^2 \theta$ We know that,  $\sin^2 \theta + \cos^2 \theta = 1$ So,

$$\tan^{2}\theta - \sin^{2}\theta = \frac{\sin^{2}\theta}{\cos^{2}\theta} - \sin^{2}\theta$$

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

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

$$= \frac{\sin^{2}\theta\sin^{2}\theta}{\cos^{2}\theta}$$

$$= \frac{\sin^{2}\theta\sin^{2}\theta}{\cos^{2}\theta}$$

$$= \frac{\sin^{2}\theta\sin^{2}\theta}{\cos^{2}\theta}\sin^{2}\theta$$

$$= \tan^{2}\theta\sin^{2}\theta$$

\*\*\*\*\*\*\*\*\* END \*\*\*\*\*\*\*