

## Conditions

{sin theta + cosec theta}whole square + {cos theta + sec theta }whole square = ???

## Solution

Let's simplify it:

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

$$\sin^2\theta + \cos^2\theta = 1$$

$$2\sin\theta \frac{1}{\sin\theta} = 2$$

$$2\cos\theta \frac{1}{\cos\theta} = 2$$

Then:

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

$$5 + \frac{1}{\sin^2\theta} + \frac{1}{\cos^2\theta} = 5 + \sec^2\theta + \csc^2\theta$$