



Exercise 7A

Question 24

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

$\therefore \text{LHS} = \text{RHS}$

Question 25

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

$\therefore \text{LHS} = \text{RHS}$

Question 26

(i)

$$\begin{aligned}\text{LHS} &= \frac{(\operatorname{cosec} \theta + \cot \theta)}{(\operatorname{cosec} \theta - \cot \theta)} \times \frac{(\operatorname{cosec} \theta + \cot \theta)}{(\operatorname{cosec} \theta + \cot \theta)} \\ &= \frac{(\operatorname{cosec} \theta + \cot \theta)^2}{(\operatorname{cosec}^2 \theta - \cot^2 \theta)} = (\operatorname{cosec} \theta + \cot \theta)^2\end{aligned}$$

Further,

$$\begin{aligned}(\operatorname{cosec} \theta + \cot \theta)^2 &= \operatorname{cosec}^2 \theta + \cot^2 \theta + 2 \operatorname{cosec} \theta \cot \theta \\ &= 1 + \cot^2 \theta + \cot^2 \theta + 2 \operatorname{cosec} \theta \cot \theta \\ &= 1 + 2 \cot^2 \theta + 2 \operatorname{cosec} \theta \cot \theta\end{aligned}$$

$\therefore \text{LHS} = \text{RHS}$

(ii)

$$\begin{aligned}\text{LHS} &= \frac{(\sec \theta + \tan \theta)}{(\sec \theta - \tan \theta)} \times \frac{(\sec \theta + \tan \theta)}{(\sec \theta + \tan \theta)} \\ &= \frac{(\sec \theta + \tan \theta)^2}{(\sec^2 \theta - \tan^2 \theta)} = (\sec \theta + \tan \theta)^2\end{aligned}$$

Further,

$$\begin{aligned}(\sec \theta + \tan \theta)^2 &= \sec^2 \theta + \tan^2 \theta + 2 \sec \theta \tan \theta \\ &= 1 + \tan^2 \theta + \tan^2 \theta + 2 \sec \theta \tan \theta \\ &= 1 + 2 \tan^2 \theta + 2 \sec \theta \tan \theta = \text{RHS}\end{aligned}$$

$\therefore \text{LHS} = \text{RHS}$

***** END *****