



Exercise 7A

Question 20

(i)

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

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

(ii)

$$\begin{aligned}\text{LHS} &= \frac{\sec \theta - \tan \theta}{\sec \theta + \tan \theta} = \frac{\left(\frac{1}{\cos \theta} - \frac{\sin \theta}{\cos \theta}\right)}{\left(\frac{1}{\cos \theta} + \frac{\sin \theta}{\cos \theta}\right)} \\ &= \frac{(1 - \sin \theta)}{(1 + \sin \theta)} \\ &= \frac{(1 - \sin \theta)}{(1 + \sin \theta)} \times \frac{(1 + \sin \theta)}{(1 + \sin \theta)} = \frac{1 - \sin^2 \theta}{(1 + \sin \theta)^2} \\ &= \frac{\cos^2 \theta}{(1 + \sin \theta)^2} = \text{RHS}\end{aligned}$$

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

Question 21

$$\begin{aligned}\text{LHS} &= \frac{\sin \theta}{\cot \theta + \operatorname{cosec} \theta} - \frac{\sin \theta}{\cot \theta - \operatorname{cosec} \theta} \\ &= \frac{\sin \theta}{\operatorname{cosec} \theta + \cot \theta} + \frac{\sin \theta}{\operatorname{cosec} \theta - \cot \theta} \\ &= \frac{\sin \theta(\operatorname{cosec} \theta - \cot \theta) + \sin \theta(\operatorname{cosec} \theta + \cot \theta)}{\operatorname{cosec}^2 \theta - \cot^2 \theta} \\ &= \sin \theta(\operatorname{cosec} \theta - \cot \theta) + \sin \theta(\operatorname{cosec} \theta + \cot \theta) \\ &\quad \left[\because 1 + \cot^2 \theta = \operatorname{cosec}^2 \theta \text{ and } \operatorname{cosec}^2 \theta - \cot^2 \theta = 1 \right] \\ &= 2 \sin \theta \operatorname{cosec} \theta = 2 \sin \theta \times \frac{1}{\sin \theta} = 2 = \text{RHS}\end{aligned}$$

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

***** END *****

