



### Exercise 7A

#### Question 1

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

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

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

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

#### Question 2

$$\begin{aligned}
 \text{(i) LHS} &= (\sec^2 \theta - 1) \cot^2 \theta \quad \left[ \because (\sec^2 \theta - 1) = \tan^2 \theta \right] \\
 &= \tan^2 \theta \times \cot^2 \theta \\
 &= \tan^2 \theta \times \frac{1}{\tan^2 \theta} = 1 = \text{RHS}
 \end{aligned}$$

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

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

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

$$\begin{aligned}
 \text{(iii) } &(1 - \cos^2 \theta) \sec^2 \theta \\
 &= \sin^2 \theta \times \sec^2 \theta \quad \left[ \because (1 - \cos^2 \theta) = \sin^2 \theta \right] \\
 &= \sin^2 \theta \times \frac{1}{\cos^2 \theta} = \frac{\sin^2 \theta}{\cos^2 \theta} \\
 &= \tan^2 \theta = \text{RHS}
 \end{aligned}$$

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

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