



Exercise 7A

Question 22

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

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

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

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

Question 23

$$\begin{aligned}
 \text{LHS} &= \frac{\cos^3 \theta + \sin^3 \theta}{\cos \theta + \sin \theta} + \frac{\cos^3 \theta - \sin^3 \theta}{\cos \theta - \sin \theta} \\
 &= \frac{(\cos \theta + \sin \theta)(\cos^2 \theta - \cos \theta \sin \theta + \sin^2 \theta)}{\cos \theta + \sin \theta} \\
 &\quad + \frac{(\cos \theta - \sin \theta)(\cos^2 \theta + \cos \theta \sin \theta + \sin^2 \theta)}{\cos \theta - \sin \theta} \\
 &= \cos^2 \theta - \cos \theta \times \sin \theta + \sin^2 \theta + \cos^2 \theta + \cos \theta \sin \theta + \sin^2 \theta \\
 &= 2[\cos^2 \theta + \sin^2 \theta] = 2
 \end{aligned}$$

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

***** END *****