



Exercise 7A

Question 19

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

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

$$\begin{aligned}
 \text{(ii) LHS} &= \frac{\cot \theta}{(\operatorname{cosec} \theta + 1)} + \frac{(\operatorname{cosec} \theta + 1)}{\cot \theta} \\
 &= \frac{\left(\frac{\cos \theta}{\sin \theta}\right)}{\left(\frac{1}{\sin \theta} + 1\right)} + \frac{\left(\frac{1}{\sin \theta} + 1\right)}{\left(\frac{\cos \theta}{\sin \theta}\right)} \\
 &= \frac{\left(\frac{\cos \theta}{\sin \theta}\right)}{\left(\frac{1 + \sin \theta}{\sin \theta}\right)} + \frac{\left(\frac{1 + \sin \theta}{\sin \theta}\right)}{\left(\frac{\cos \theta}{\sin \theta}\right)} \\
 &= \frac{\cos \theta}{1 + \sin \theta} + \frac{(1 + \sin \theta)}{\cos \theta} = \frac{\cos^2 \theta + (1 + \sin \theta)^2}{\cos \theta(1 + \sin \theta)} \\
 &= \frac{\cos^2 \theta + 1 + \sin^2 \theta + 2 \sin \theta}{\cos \theta(1 + \sin \theta)} \\
 &= \frac{1 + 1 + 2 \sin \theta}{\cos \theta(1 + \sin \theta)} = \frac{2(1 + \sin \theta)}{\cos \theta(1 + \sin \theta)} = \frac{2}{\cos \theta} = 2 \sec \theta = \text{RHS}
 \end{aligned}$$

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

*****END*****