



Exercise 7A

Question 36

$$\begin{aligned}\text{LHS} &= \frac{\tan A + \tan B}{\cot A + \cot B} \\&= \frac{\frac{\sin A}{\cos A} + \frac{\sin B}{\cos B}}{\frac{\cos A}{\sin A} + \frac{\cos B}{\sin B}} = \frac{\frac{\sin A \cos B + \sin B \cos A}{\cos A \cos B}}{\frac{\cos A \sin B + \cos B \sin A}{\sin A \sin B}} \\&= \frac{(\sin A \cos B + \sin B \cos A) \times \sin A \sin B}{\cos A \cos B \times (\cos A \sin B + \cos B \sin A)} \\&= \frac{\sin A \sin B}{\cos A \cos B} = \tan A \tan B = \text{RHS}\end{aligned}$$

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

Question 37

(i) Putting $\theta = 30^\circ$, we get

$$\begin{aligned}\text{LHS} &= \cos^2 30^\circ + \cos 30^\circ = \left(\frac{\sqrt{3}}{2}\right)^2 + \frac{\sqrt{3}}{2} = \frac{3}{4} + \frac{\sqrt{3}}{2} \\&= \frac{3 + 2\sqrt{3}}{4}\end{aligned}$$

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

Hence the given equation is not an identity.

(ii) Putting $\theta = 30^\circ$, we get

$$\text{LHS} = \sin^2 30^\circ + \sin 30^\circ = \left(\frac{1}{2}\right)^2 + \left(\frac{1}{2}\right) = \frac{1}{4} + \frac{1}{2} = \frac{3}{4}$$

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

Hence the given equation is not an identity.

(iii) Putting $\theta = 30^\circ$, we get

$$\text{LHS} = \tan^2 30^\circ + \sin 30^\circ = \left(\frac{1}{\sqrt{3}}\right)^2 + \frac{1}{2} = \frac{1}{3} + \frac{1}{2} = \frac{5}{6}$$

$$\text{RHS} = \cos^2 30^\circ = \left(\frac{\sqrt{3}}{2}\right)^2 = \frac{3}{4}$$

$\text{LHS} \neq \text{RHS}$

Hence the given equation is not an identity.

Question 38

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

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

Hence, the given equation is an identity.

(ii)

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

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

***** END *****