Exercise 7A

Question 36

$$LHS = \frac{\tan A + \tan B}{\cot A + \cot B}$$

$$= \frac{\frac{\sin A}{\cos A} + \frac{\sin B}{\cos B}}{\frac{\cos A}{\sin A} + \frac{\cos B}{\sin B}} = \frac{\frac{\sin A \cos B + \sin B \cos A}{\cos A \cos B}}{\frac{\cos A \sin B + \cos B \sin A}{\sin A \sin B}}$$

$$= \frac{(\sin A \cos B + \sin B \cos A) \times \sin A \sin B}{\cos A \cos B \times (\cos A \sin B + \cos B \sin A)}$$

$$= \frac{\sin A \sin B}{\cos A \cos B} = \tan A \tan B = RHS$$

$\therefore$ LHS = RHS

Question 37

(i) Putting $\theta = 30^0$, we get

$$LHS = \cos^2 30° + \cos 30° = \left(\frac{\sqrt{3}}{2}\right)^2 + \frac{\sqrt{3}}{2} = \frac{3}{4} + \frac{\sqrt{3}}{2}$$

$$= \frac{3 + 2\sqrt{3}}{4}$$

$\therefore$ LHS $\neq$ RHS

Hence the given equation is not an identity.

(ii) Putting $\theta = 30^0$, we get

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

$\therefore$ LHS $\neq$ RHS

Hence the given equation is not an identity.

(iii) Putting $\theta = 30^0$, we get

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

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

LHS $\neq$ RHS

Hence the given equation is not an identity.

Question 38

(i) $\text{LHS} = \dfrac{\tan^2\theta}{\left(1+\tan^2\theta\right)} = \dfrac{\tan^2\theta}{\sec^2\theta}$

$= \left(\dfrac{\sin^2\theta}{\cos^2\theta} \times \cos^2\theta\right) = \sin^2\theta = \text{RHS}$

$\therefore$ LHS = RHS

Hence, the given equation is an identity.

(ii)

$$\text{LHS} = \frac{\cot\theta+\cos\theta}{\cot\theta-\cos\theta} = \frac{\left(\dfrac{\cos\theta}{\sin\theta}+\cos\theta\right)}{\left(\dfrac{\cos\theta}{\sin\theta}-\cos\theta\right)}$$

$$= \frac{\dfrac{(\cos\theta+\cos\theta\sin\theta)}{(\sin\theta)}}{\dfrac{(\cos\theta-\cos\theta\sin\theta)}{(\sin\theta)}} = \frac{(\cos\theta+\cos\theta\sin\theta)}{(\cos\theta-\cos\theta\sin\theta)}$$

$$= \frac{\cos\theta(1+\sin\theta)}{\cos\theta(1-\sin\theta)} = \frac{1+\sin\theta}{1-\sin\theta} = \text{RHS}$$

$\therefore$ LHS = RHS

********** END **********