



Exercise 7B

Question 8:

$$(\sin \theta + \cos \theta) = m \text{ and } (\sec \theta + \csc \theta) = n$$

$$\begin{aligned} \text{LHS} &= n(m^2 - 1) = (\sec \theta + \csc \theta) [(\sin \theta + \cos \theta)^2 - 1] \\ &= (\sec \theta + \csc \theta) \times [\sin^2 \theta + \cos^2 \theta + 2 \sin \theta \cos \theta - 1] \\ &= \left(\frac{1}{\cos \theta} + \frac{1}{\sin \theta} \right) (2 \sin \theta \cos \theta) \\ &= \left(\frac{\sin \theta + \cos \theta}{\sin \theta \cos \theta} \right) \times 2 \sin \theta \cos \theta \\ &= 2(\sin \theta + \cos \theta) \text{ ---- (1)} \\ \text{RHS} &= 2m = 2(\sin \theta + \cos \theta) \text{ ---- (2)} \end{aligned}$$

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

Question 9:

$$(\cot \theta + \tan \theta) = m \text{ and } (\sec \theta - \cos \theta) = n$$

$$\Rightarrow \left(\frac{1}{\tan \theta} + \tan \theta \right) = m \text{ and } \left(\frac{1}{\cos \theta} - \cos \theta \right) = n$$

$$\Rightarrow \left(\frac{1 + \tan^2 \theta}{\tan \theta} \right) = m \text{ and } \frac{(1 - \cos^2 \theta)}{\cos \theta} = n$$

$$\Rightarrow \left(\frac{\sec^2 \theta}{\tan \theta} \right) = m \text{ and } \frac{(1 - \cos^2 \theta)}{\cos \theta} = n$$

$$\Rightarrow \frac{1}{\cos^2 \theta \times \frac{\sin \theta}{\cos \theta}} = m \text{ and } \frac{\sin^2 \theta}{\cos \theta} = n$$

$$\Rightarrow \frac{1}{\cos \theta \sin \theta} = m \text{ and } \frac{\sin^2 \theta}{\cos \theta} = n$$

$$\begin{aligned} \therefore (m^2 n)^{\frac{2}{3}} - (mn^2)^{\frac{2}{3}} &= \left[\frac{1}{\cos^2 \theta \sin^2 \theta} \times \frac{\sin^2 \theta}{\cos \theta} \right]^{\frac{2}{3}} \\ &\quad - \left[\frac{1}{\cos \theta \sin \theta} \times \frac{\sin^4 \theta}{\cos^2 \theta} \right]^{\frac{2}{3}} \\ &= \left(\frac{1}{\cos^3 \theta} \right)^{\frac{2}{3}} - \left(\frac{\sin^3 \theta}{\cos^3 \theta} \right)^{\frac{2}{3}} = \frac{1}{\cos^2 \theta} - \frac{\sin^2 \theta}{\cos^2 \theta} \\ &= \sec^2 \theta - \tan^2 \theta = 1 \quad [\because \sec^2 \theta = 1 + \tan^2 \theta] \end{aligned}$$

$$\text{Hence, } (m^2 n)^{\frac{2}{3}} - (mn^2)^{\frac{2}{3}} = 1$$

***** END *****

