

3. Simplify:

$$\begin{aligned} \text{i) } & \sin \theta (1 - \cos \theta) + \cos \theta (1 + \sin \theta) \\ &= \sin \theta - \cancel{\sin \theta \cos \theta} + \cos \theta + \cancel{\sin \theta \cos \theta} \\ &= \sin \theta + \cos \theta \end{aligned}$$

$$\text{ii) } 7\cos^2 \theta - 5\sin^2 \theta - 6 \left( \cos^2 \theta + \frac{6\cos^2 \theta}{\sin} \right)$$

$$\begin{aligned} &\rightarrow 7\cos^2\theta - 5\sin^2\theta - 6\cos^2\theta + 6\sin^2\theta \\ &\rightarrow 7\cos^2\theta - 6\cos^2\theta + 6\sin^2\theta - 5\sin^2\theta \\ &\rightarrow \cos^2\theta + \sin^2\theta \end{aligned}$$

$$\begin{aligned} \text{iii)} & (1 + \tan A)^2 + (1 - \tan A)^2 \\ &\rightarrow (1)^2 + 2 \cdot 1 \cdot \tan A + (\tan A)^2 + (1)^2 - 2 \cdot 1 \cdot \tan A + (\tan A)^2 \\ &\rightarrow 1 + 2\tan A + \tan^2 A + 1 - 2\tan A + \tan^2 A \\ &\rightarrow 1 + 1 + \tan^2 A + \tan^2 A \\ &\rightarrow 2 + 2\tan^2 A \\ &\rightarrow 2(1 + \tan^2 A) \end{aligned}$$

$$\begin{aligned} \text{iv)} & \frac{(\sin A - \cos A)^2}{\sin^2 A - \cos^2 A} \\ &\rightarrow \frac{(\sin A - \cos A)(\sin A - \cos A)}{(\sin A + \cos A)(\sin A - \cos A)} \\ &\rightarrow \frac{\sin A - \cos A}{\sin A + \cos A} \end{aligned}$$

$$\begin{aligned} \text{v)} & (\sin A + \cos A)^2 + (\sin A - \cos A)^2 \\ &\rightarrow (\sin A + \cos A)(\sin A + \cos A) + (\sin A - \cos A)(\sin A - \cos A) \\ &\rightarrow \sin^2 A + 2\sin A \cos A + \cos^2 A + \sin^2 A - 2\sin A \cos A + \cos^2 A \end{aligned}$$



$$\begin{aligned} &\rightarrow \sin^2 A + \cos^2 A + \sin^2 A + \cos^2 A \\ &\rightarrow 2\sin^2 A + 2\cos^2 A \\ &\rightarrow 2(\sin^2 A + \cos^2 A) \end{aligned}$$

$$\text{vi) } \frac{1 - \tan^2 A}{1 + \tan A}$$

$$\rightarrow \frac{(1)^2 - (\tan A)^2}{1 + \tan A}$$

$$\rightarrow \frac{(1 + \cancel{\tan A})(1 - \tan A)}{(1 + \cancel{\tan A})}$$

$$\rightarrow 1 - \tan A$$

$$3 \text{ (vii)} \quad \frac{\tan^3 \theta - 4 \tan \theta}{\tan \theta + 2}$$

$$\rightarrow \frac{\tan \theta (\tan^2 \theta - 4)}{\tan \theta + 2}$$

$$\rightarrow \frac{\tan \theta \{ \tan^2 \theta - 2 \}^2}{\tan \theta + 2}$$

$$\rightarrow \frac{\tan \theta (\tan \theta + 2)(\tan \theta - 2)}{(\tan \theta + 2)}$$

$$\rightarrow \tan \theta (\tan \theta - 2)$$

viii)

$$\frac{1}{1+\cos\alpha} + \frac{1}{1-\cos\alpha}$$

$$\rightarrow \frac{1 - \cancel{\cos\alpha} + 1 + \cancel{\cos\alpha}}{(1 - \cos\alpha)(1 + \cos\alpha)}$$

$$\rightarrow \frac{2}{1 - \cos^2\alpha}$$



$$3(ix) \quad \frac{\sin A}{\sin A + \cos A} + \frac{\cos A}{\sin A + \cos A}$$

$$\rightarrow \frac{\sin A + \cos A}{\sin A + \cos A}$$

$$\rightarrow 1$$

$$3(x) \quad \frac{1}{1 - \sin \alpha} + \frac{\sin \alpha}{\sin \alpha - 1}$$

$$\rightarrow \frac{1}{1 - \sin \alpha} + \frac{\sin \alpha}{-(1 - \sin \alpha)} \rightarrow \frac{1}{1 - \sin \alpha} - \frac{\sin \alpha}{1 - \sin \alpha}$$

$$\rightarrow \frac{1 - \sin \alpha}{1 - \sin \alpha}$$

$$\rightarrow 1 \checkmark$$