

$$\begin{aligned} 3) i) & \frac{\sin^2 63^\circ + \sin^2 27^\circ}{\cos^2 17^\circ + \cos^2 73^\circ} \\ &= \frac{\sin^2 63^\circ + \cos^2 (90^\circ - 27^\circ)}{\cos^2 17^\circ + \sin^2 (90^\circ - 73^\circ)} \\ &= \frac{\sin^2 63^\circ + \cos^2 63^\circ}{\cos^2 17^\circ + \sin^2 17^\circ} \\ &= \frac{1}{1} \quad [\because \sin^2 \theta + \cos^2 \theta = 1] \\ &= 1 \end{aligned}$$

$$\begin{aligned} &= \frac{x + 2 \sin \theta \cos \theta - x}{\sin \theta \cos \theta} \\ &= \frac{2 \sin \theta \cos \theta}{\sin \theta \cos \theta} \\ &= 2 \quad (c) \end{aligned}$$

$$\begin{aligned} 3) ii) & \sin 25^\circ \cos 65^\circ + \cos 25^\circ \sin 65^\circ \\ &= \sin 25^\circ \sin (90^\circ - 65^\circ) + \cos 25^\circ \cos (90^\circ - 65^\circ) \\ &= \sin 25^\circ \sin 25^\circ + \cos 25^\circ \cos 25^\circ \\ &= \sin^2 25^\circ + \cos^2 25^\circ \\ &= 1 \quad [\because \sin^2 \theta + \cos^2 \theta = 1] \end{aligned}$$

$$\begin{aligned} 4) iii) & (\sec A + \tan A)(1 - \sin A) \\ &= \left( \frac{1}{\cos A} + \frac{\sin A}{\cos A} \right) (1 - \sin A) \\ &= \frac{(1 + \sin A)(1 - \sin A)}{\cos A} \end{aligned}$$

$$\begin{aligned} 4) i) & 9 \sec^2 A - 9 \tan^2 A \\ &= 9(\sec^2 A - \tan^2 A) \\ &= 9 \times 1 \quad [\because 1 + \tan^2 A = \sec^2 A] \\ &= 9 \quad (B) \end{aligned}$$

$$\begin{aligned} &= \frac{1 - \sin^2 A}{\cos A} \\ &= \frac{\cos^2 A}{\cos A} \\ &= \cos A \quad (D) \end{aligned}$$

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

$$\begin{aligned} 4) iv) & \frac{1 + \tan^2 A}{1 + \cot^2 A} \\ &= \frac{1 + \tan^2 A}{1 + \frac{1}{\tan^2 A}} \\ &= \frac{1 + \tan^2 A}{\frac{\tan^2 A + 1}{\tan^2 A}} \\ &= \tan^2 A \frac{(1 + \tan^2 A)}{(1 + \tan^2 A)} \\ &= \tan^2 A \quad (D) \end{aligned}$$