



Question 4:

(i) $\text{LHS} = \cos 81^\circ - \sin 9^\circ$

$= \cos(90^\circ - 9^\circ) - \sin 9^\circ = \sin 9^\circ - \sin 9^\circ$

$= 0 = \text{RHS}$

(ii) $\text{LHS} = \tan 71^\circ - \cot 19^\circ$

$= \tan(90^\circ - 19^\circ) - \cot 19^\circ = \cot 19^\circ - \cot 19^\circ$

$= 0 = \text{RHS}$

(iii) $\text{LHS} = \operatorname{cosec} 80^\circ - \sec 10^\circ$

$= \operatorname{cosec}(90^\circ - 10^\circ) - \sec(10^\circ)$

$= \sec 10^\circ - \sec 10^\circ = 0$

$= \text{RHS}$

$$\begin{aligned}
 \text{(iv)} \quad \text{LHS} &= \operatorname{cosec}^2 72^\circ - \tan^2 18^\circ \\
 &= \operatorname{cosec}^2 (90^\circ - 18^\circ) - \tan^2 18^\circ \\
 &= \sec^2 18^\circ - \tan^2 18^\circ \\
 &= 1 + \tan^2 18^\circ - \tan^2 18^\circ \\
 &\quad [\because 1 + \tan^2 18^\circ = \sec^2 18^\circ] \\
 &= 1 = \text{RHS}
 \end{aligned}$$

$$\begin{aligned}
 \text{(v)} \quad \text{LHS} &= \cos^2 75^\circ + \cos^2 15^\circ \\
 &= \cos^2 (90^\circ - 15^\circ) + \cos^2 15^\circ \\
 &\quad [\because \cos (90^\circ - \theta) = \sin \theta] \\
 &= \sin^2 15^\circ + \cos^2 15^\circ = 1 = \text{RHS}
 \end{aligned}$$

$$\begin{aligned}
 \text{(vi)} \quad \text{LHS} &= \tan^2 66^\circ - \cot^2 24^\circ \\
 &= \tan^2 66^\circ - \cot^2 (90^\circ - 66^\circ) \\
 &\quad [\because \cot (90^\circ - \theta) = \tan \theta] \\
 &= \tan^2 66^\circ - \tan^2 66^\circ = 0 = \text{RHS} \\
 \therefore \text{LHS} &= \text{RHS}
 \end{aligned}$$

$$\begin{aligned}
 \text{(vii)} \quad &\sin^2 48^\circ + \sin^2 42^\circ \\
 &= \sin^2 48^\circ + \sin^2 (90^\circ - 48^\circ) = \sin^2 48^\circ + \cos^2 48^\circ \\
 &= 1 = \text{RHS} \\
 \therefore \text{LHS} &= \text{RHS}
 \end{aligned}$$

$$\begin{aligned}
 \text{(viii)} \quad \text{LHS} &= \cos^2 75^\circ - \sin^2 33^\circ \\
 &= \cos^2 (90^\circ - 33^\circ) - \sin^2 33^\circ \\
 &= \sin^2 33^\circ - \sin^2 33^\circ = 0 = \text{RHS}
 \end{aligned}$$

$$\begin{aligned}
 \text{(ix)} \quad \text{LHS} &= (\sin 65^\circ + \cos 25^\circ)(\sin 65^\circ - \cos 25^\circ) \\
 &= \sin^2 65^\circ - \cos^2 25^\circ \\
 &= \sin^2 65^\circ - \cos^2 (90^\circ - 65^\circ) \\
 &= \sin^2 65^\circ - \sin^2 65^\circ = 0 = \text{RHS}
 \end{aligned}$$

***** END *****