

$$(12) \quad 2 \sin^2 \theta - \cos^2 \theta = 2$$

$$\Rightarrow 2 \sin^2 \theta - (1 - \sin^2 \theta) = 2$$

$$\Rightarrow 2 \sin^2 \theta - 1 + \sin^2 \theta = 2$$

$$\Rightarrow 3 \sin^2 \theta = 3$$

$$\Rightarrow \sin^2 \theta = 1$$

$$\Rightarrow \sin \theta = \sqrt{1} \quad [0^\circ \leq \theta \leq 90^\circ]$$

$$\Rightarrow \sin \theta = 1$$

$$\Rightarrow \theta = 90^\circ$$

LHS NCERT Exemplar Solutions by Dev Anoop (Bathinda)

$$(13) \quad \cos^2(45^\circ + \theta) + \cos^2(45^\circ - \theta)$$

$$= \frac{\tan(60^\circ + \theta) \tan(30^\circ - \theta)}{\tan(60^\circ + \theta) \tan(30^\circ - \theta)}$$

$$= \frac{\cos^2(45^\circ + \theta) + \sin^2(90^\circ - 45^\circ + \theta)}{\tan(60^\circ + \theta) \cot(90^\circ - 30^\circ + \theta)}$$

$$= \frac{\cos^2(45^\circ + \theta) + \sin^2(45^\circ + \theta)}{\tan(60^\circ + \theta) \cot(60^\circ + \theta)}$$

$$= \frac{\cos^2(45^\circ + \theta) + \sin^2(45^\circ + \theta)}{\tan(60^\circ + \theta) \cot(60^\circ + \theta)}$$

$$= \frac{\cos^2(45^\circ + \theta) + \sin^2(45^\circ + \theta)}{\tan(60^\circ + \theta) \cot(60^\circ + \theta)}$$

$$[\because \cot \theta = \frac{1}{\tan \theta}]$$

$$= 1 \quad [\because \sin^2 \theta + \cos^2 \theta = 1]$$

$$(15) \quad \text{LHS} = \tan^4 \theta + \tan^2 \theta$$

$$= \tan^2 \theta (\tan^2 \theta + 1)$$

$$= (\sec^2 \theta - 1)(\sec^2 \theta)$$

$$= \sec^4 \theta - \sec^2 \theta$$

$$= \text{RHS}$$