



Question 17:

$$A = 45^\circ \text{ and } B = 45^\circ \Rightarrow (A + B) = (45^\circ + 45^\circ) = 90^\circ$$

$$(A - B) = 45^\circ - 45^\circ = 0$$

$$(i) \text{ LHS} = \sin(A + B) = \sin 90^\circ = 1$$

$$\text{RHS} = \sin A \cos B + \cos A \sin B$$

$$= \sin 45^\circ + \cos 45^\circ + \cos 45^\circ \sin 45^\circ$$

$$= \left(\frac{1}{\sqrt{2}} \times \frac{1}{\sqrt{2}} + \frac{1}{\sqrt{2}} \times \frac{1}{\sqrt{2}} \right)$$

$$= \left(\frac{1}{2} + \frac{1}{2} \right) = \frac{2}{2} = 1$$

$$\text{Hence, } \sin(A + B) = \sin A \cos B + \cos A \sin B$$

$$(ii) A - B = 45^\circ - 45^\circ = 0$$

$$\text{LHS} = \sin(A - B) = \sin 0^\circ = 0$$

$$\text{RHS} = \sin A \cos B - \cos A \sin B$$

$$= \sin 45^\circ \cos 45^\circ - \cos 45^\circ \sin 45^\circ$$

$$= \frac{1}{\sqrt{2}} \times \frac{1}{\sqrt{2}} - \frac{1}{\sqrt{2}} \times \frac{1}{\sqrt{2}} = \frac{1}{2} - \frac{1}{2} = 0$$

$$\text{Hence, } \sin(A - B) = \sin A \cos B - \cos A \sin B$$

$$(iii) \text{ LHS} = \cos(A + B) = \cos 90^\circ = 0$$

$$\text{RHS} = \cos A \cos B - \sin A \sin B$$

$$= \cos 45^\circ \cos 45^\circ - \sin 45^\circ \sin 45^\circ$$

$$= \frac{1}{\sqrt{2}} \times \frac{1}{\sqrt{2}} - \frac{1}{\sqrt{2}} \times \frac{1}{\sqrt{2}} = \frac{1}{2} - \frac{1}{2} = 0$$

$$\text{Hence, } \cos A \cos B - \sin A \sin B$$

$$(iv) \text{ LHS} = \cos(A - B) = \cos 0^\circ = 1$$

$$\text{RHS} = \cos A \cos B + \sin A \sin B$$

$$= \cos 45^\circ \cos 45^\circ + \sin 45^\circ \sin 45^\circ$$

$$= \frac{1}{\sqrt{2}} \times \frac{1}{\sqrt{2}} + \frac{1}{\sqrt{2}} \times \frac{1}{\sqrt{2}}$$

$$= \frac{1}{2} + \frac{1}{2}$$

$$= \frac{2}{2} = 1$$

$$\text{Hence, } \cos(A - B) = \cos A \cos B + \sin A \sin B$$

***** END *****

