

Question 17:

A = 45° and B = 45°
$$\Rightarrow$$
 (A + B) = (45° + 45°) = 90° (A - B) = 45° - 45° = 0

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

RHS = sinA cosB + cosA sinB

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

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

Hence, sin (A + B) = sin A cos B + cos A sin B

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

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

RHS = sin A cos B - cos A sin B

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

Hence, sin(A - B) = sin A cos B - cos A sin B

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

 $RHS = \cos A \cos B - \sin A \sin B$

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

Hence, cos A cos B - sin A sin B

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

RHS = $\cos A \cos B + \sin A \sin B$

= cos45°cos45° + sin45°sin45°

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

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

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

Hence, cos(A - B) = cos A cos B + sin A sin B

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