Question 17:

A = 45° and B = 45° ⇒ (A + B) = (45° + 45°) = 90°

(A - B) = 45° - 45° = 0

(i) LHS = sin(A + B) = sin90° = 1

RHS = sinA cosB + cosA sinB

= sin 45° + cos45° + cos45° sin45°

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

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

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

(ii) A − B = 45° − 45° = 0

LHS = sin (A − B) = sin 0° = 0

RHS = sin A cos B − cos A sin B

$$= \sin 45° \cos 45° - \cos 45° \sin 45°$$

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

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

(iii) LHS = cos(A + B) = cos90° = 0

RHS = cos A cos B − sin A sin B

$$= \sin 45° \cos 45° - \cos 45° \sin 45°$$

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

Hence, cos A cos B − sin A sin B

(iv) LHS = cos(A − B) = cos 0°= 1

RHS = cos A cos B + sin A sin B

$$= \cos 45° \cos 45° + \sin 45° \sin 45°$$

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

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

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

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

********** END **********