Question 11:

(i) $\text{L.H.S.} = \sin 60° \cos 30° - \cos 60° \sin 30°$

$$= \frac{\sqrt{3}}{2} \times \frac{\sqrt{3}}{2} - \frac{1}{2} \times \frac{1}{2} \Rightarrow \frac{3}{4} - \frac{1}{4} = \frac{2}{4} = \frac{1}{2}$$

$$\text{R.H.S.} = \sin 30° = \frac{1}{2}$$

R.H.S. = L.H.S.

Hence, sin60° cos30° - cos60° sin30° = sin30°

(ii) L.H.S. = cos60° cos30° + sin60° sin30°

$$= \frac{1}{2} \times \frac{\sqrt{3}}{2} + \frac{\sqrt{3}}{2} \times \frac{1}{2} = \frac{\sqrt{3}}{4} + \frac{\sqrt{3}}{4} = \frac{\sqrt{3}}{2}$$

$$\text{R.H.S.} = \cos 30° = \frac{\sqrt{3}}{2}$$

$\therefore$ L.H.S = R.H.S

Hence, $\cos 60° \cos 30° + \sin 60° \sin 30° = \cos 30°$

(iii) $\text{LHS} = 2 \sin 30° \cos 30° \Rightarrow 2 \times \frac{1}{2} \times \frac{\sqrt{3}}{2} = \frac{\sqrt{3}}{2}$

$$\text{RHS} = \sin 60° = \frac{\sqrt{3}}{2}$$

R.H.S. = L.H.S.

Hence, 2sin30° cos30° = sin60°

(iv) $\text{LHS} = 2 \sin 45° \cos 45° = 2 \times \frac{1}{\sqrt{2}} \times \frac{1}{\sqrt{2}} = 1$

R.H.S. = sin90° = 1

R.H.S. = L.H.S.

Hence, 2 sin 45° cos45° = sin90°

Question 12:

$A = 45° \Rightarrow 2A = 90°$

(i) $\sin 2A = \sin 90° = 1$

$\therefore \quad 2\sin A \cos A = 2\sin 45° \cos 45° = 2 \times \frac{1}{\sqrt{2}} \times \frac{1}{\sqrt{2}} = 1$

$\therefore \quad \sin 2A = 2\sin A \cos A$

(ii) $\cos 2A = \cos 90° = 0$

$$2\cos^2 A - 1 = 2\cos^2 45° - 1$$

$$= 2\left(\frac{1}{\sqrt{2}}\right)^2 - 1 = 1 - 1 = 0$$

$$1 - 2\sin^2 A = 1 - 2\sin^2 45° = 1 - 2 \times \left(\frac{1}{\sqrt{2}}\right)^2 = 1 - 1 = 0$$

$$\therefore \cos 2A = 2\cos^2 A - 1 = 1 - 2\sin^2 A$$

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