



Question 14:

Putting $A = 30^\circ \Rightarrow 2A = 60^\circ$

$$\cos A = \sqrt{\frac{1 + \cos 2A}{2}}$$

$$\begin{aligned}\cos 30^\circ &= \sqrt{\frac{1 + \cos 60^\circ}{2}} = \sqrt{\frac{1 + \frac{1}{2}}{2}} = \sqrt{\frac{\frac{3}{2}}{2}} \\ &= \frac{\sqrt{3}}{\sqrt{2}} \times \frac{1}{\sqrt{2}} = \frac{\sqrt{3}}{2}\end{aligned}$$

$$\text{Hence, } \cos 30^\circ = \frac{\sqrt{3}}{2}$$

Question 15:

Putting $A = 30^\circ \Rightarrow 2A = 60^\circ$

$$\sin 30^\circ = \sqrt{\frac{1 - \cos 60^\circ}{2}}$$

Squaring both sides, we get

$$\sin^2 30^\circ = \frac{1 - \cos 60^\circ}{2} = \frac{1 - \frac{1}{2}}{2} = \frac{1}{4}$$

$$\sin 30^\circ = \sqrt{\frac{1}{4}}$$

$$\sin 30^\circ = \frac{1}{2}$$

Question 16:

Putting $A = 30^\circ \Rightarrow 2A = 60^\circ$

$$\begin{aligned}\tan 60^\circ &= \frac{2 \tan 30^\circ}{1 - \tan^2 30^\circ} = \frac{2 \times \frac{1}{\sqrt{3}}}{1 - \left(\frac{1}{\sqrt{3}}\right)^2} = \frac{2 \times \frac{1}{\sqrt{3}}}{1 - \frac{1}{3}} \\ &= \frac{2}{\sqrt{3}} \times \frac{3}{2} = \sqrt{3}\end{aligned}$$

Hence, $\tan 60^\circ = \sqrt{3}$

***** END *****