$\hat{i}$ and j are unit vectors along x- and y- axis respectively. What is the magnitude and direction of the vectors (i) $\hat{i} + \hat{j}$ (ii) $\hat{i} - \hat{j}$?

Ans) Magnitude of $\hat{i} + \hat{j}$

i) $= \sqrt{1^2 + 1^2} = \sqrt{2}$

Direction, $\tan \theta = \dfrac{1}{1} = 1$

$\implies \theta = 45^o$

So, $\hat{i} + \hat{j}$ makes 45° angle with the X-axis.

ii) Magnitude of $\hat{i} - \hat{j}$

$= \sqrt{1^2 + 1^2} = \sqrt{2}$

Direction, $\tan \theta = \dfrac{-1}{1} = -1$

$\implies \theta = 135^o$

So, $\hat{i} - \hat{j}$ makes 135° angle with the X-axis.