

1.10.28

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Question:

Write a unit vector in **XY** plane making an angle 30° with positive direction of **X** axis

Solution:

Given a vector,

Angle made by the vector with X axis = 30°

Angle made by the vector with Y axis = $90^\circ - 30^\circ = 60^\circ$

Angle made by the vector with Z axis = 90°

Axis	Angle (in degrees)
X-axis	30°
Y-axis	60°
Z-axis	0°

TABLE 0: Angles made by the X, Y, Z axes

Unit vector is given by

$$\begin{aligned} &\Rightarrow \begin{pmatrix} \cos 30^\circ \\ \cos 60^\circ \\ \cos 90^\circ \end{pmatrix} \\ &\Rightarrow \begin{pmatrix} \frac{\sqrt{3}}{2} \\ \frac{1}{2} \\ 0 \end{pmatrix} \end{aligned}$$

The unit vector of the given vector is given by $\frac{\sqrt{3}}{2} \mathbf{i} + \frac{1}{2} \mathbf{j}$

Refer Fig

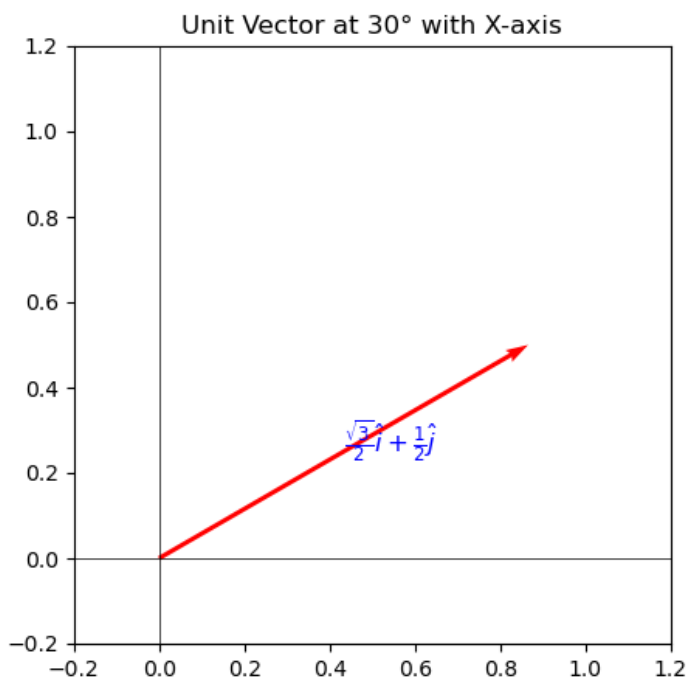


Fig. 0: Plot