

Equation of Unit Vector

1 12th Maths - Chapter 10

This is Problem-5 from Exercise 5.5

1. Find the value of x for which $x(\hat{i} + \hat{j} + \hat{k})$ is a unit vector

2 Solution

Given points are

$$\mathbf{X} = \begin{pmatrix} x \\ x \\ x \end{pmatrix} \quad (1)$$

unit vector formula is

$$\|\mathbf{X}\| = 1 \quad (2)$$

where

$$1 = \sqrt{(x \ x \ x) \begin{pmatrix} x \\ x \\ x \end{pmatrix}} \quad (3)$$

$$1 = \sqrt{3x^2} \quad (4)$$

$$1 = \sqrt{3}x \quad (5)$$

$$x = \pm \frac{1}{\sqrt{3}} \quad (6)$$