

Exercise 10

In Exercises 6 to 11, compute $\|\mathbf{u}\|$, $\|\mathbf{v}\|$, and $\mathbf{u} \cdot \mathbf{v}$ for the given vectors in \mathbb{R}^3 .

$$\mathbf{u} = -\mathbf{i} + 3\mathbf{k}, \quad \mathbf{v} = 4\mathbf{j}$$

Solution

$$\|\mathbf{u}\| = \sqrt{(-1)^2 + 3^2} = \sqrt{10} \approx 3.16$$

$$\|\mathbf{v}\| = \sqrt{4^2} = 4$$

$$\mathbf{u} \cdot \mathbf{v} = (-\mathbf{i} + 3\mathbf{k}) \cdot (4\mathbf{j}) = (-1)(0) + (0)(4) + (3)(0) = 0$$