

Tutorial 01 : Scalars and vectors

Let the vectors : $\vec{u} = \vec{i} - 2\vec{j} - 3\vec{k}$, $\vec{v} = 2\vec{i} + \vec{j} - \vec{k}$, and $\vec{w} = \vec{i} + 3\vec{j} - 2\vec{k}$.

Exercise 01 :

Calculate : $2\vec{u} - \vec{v} + 3\vec{w}$, $\vec{u} + 4\vec{v} - 2\vec{k}$, $|\vec{w} - \vec{u}|$.

Exercise 02 :

Find : The unit vector along the direction of vector $\vec{v}$.

A vector $\vec{s}$ of modulus 5 in the direction of the vector $\vec{u}$.

Exercise 03 :

Calculate : $\vec{u} \cdot \vec{v}$, $(\vec{u} \cdot \vec{v}) \vec{w}$, $\vec{u} (\vec{v} \cdot \vec{w})$, $\vec{v} \times \vec{w}$, $\vec{u} \times (\vec{v} \times \vec{w})$, $(\vec{u} \times \vec{v}) \times \vec{w}$

Exercise 04 :

Find : The angle between the vectors $\vec{v}$ and $\vec{w}$.

The value of α for which vectors $\vec{v}$ and $\vec{v}_1 = \alpha\vec{i} + 3\vec{j} - 5\vec{k}$ are perpendicular .

Exercise 05 :

Show that : $(\vec{u} \times \vec{v}) \times \vec{w} = \vec{v}(\vec{u} \cdot \vec{w}) - \vec{u}(\vec{v} \cdot \vec{w})$

$$\vec{u} \cdot (\vec{v} \times \vec{w}) = \vec{v} \cdot (\vec{w} \times \vec{u}) = \vec{w} \cdot (\vec{u} \times \vec{v})$$