Finding components

Friday, 29 January, 2021 21:11

A small airplane leaves an airport on an overcast day and is later sighted 215 km away, in a direction making an angle of 22° east of due north. How far east and north is the airplane from the airport when sighted?

Finding magnitude and direction

Friday, 29 January, 2021 21:33

A person walks 3 km due east and then 2 km due north. What is his displacement vector?

Using unit vectors - 1

Friday, 29 January, 2021 21:33

A car travels 20 km due north and then 35 km in a direction 60° west of north. Find the magnitude and direction of the car's resultant displacement.

Using unit vectors - 2

Friday, 29 January, 2021 21:33

Find the sum of two displacement vectors $\vec{A}$ and $\vec{B}$ lying in the xy plane and given by: $\vec{A} = (2\hat{\imath} + 2\hat{\jmath})\ m$ and $\vec{B} = (2\hat{\imath} - 4\hat{\jmath})\ m$.

Using unit vectors - 3

Friday, 29 January, 2021 21:33

A particle undergoes three consecutive displacements: $\vec{A} = (15\hat{i} + 30\hat{j} + 12\hat{k})\,m$, $\vec{B} = (23\hat{i} - 14\hat{j} - 5\hat{k})\,m$ and $\vec{C} = (-13\hat{i} + 15\hat{j})\ cm$. Find unit-vector notation for the resultant displacement and its magnitude.

Using unit vectors - 4

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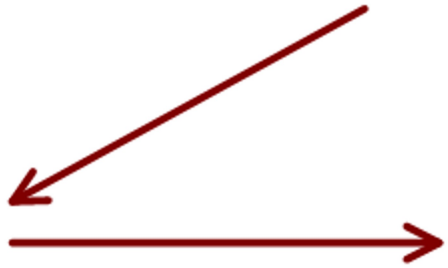
Given the two displacements: $\vec{A} = 16\hat{\imath} + 30\hat{\jmath} + 12\hat{k}\,m$ and $\vec{B} = 26\hat{\imath} - 14\hat{\jmath} - 5\hat{k}\,m$. Find the magnitude of the displacement $2\vec{A} - \vec{B}$.

The scalar product

Friday, 29 January, 2021 21:33

The figure shows two vectors lying in the xy plane, if $|\vec{A}| = 6$, $|\vec{B}| = 5$ and $\alpha = 40^{\circ}$. Determine the scalar product of them.



A

$\alpha = 40^{\circ}$

B

The scalar product

Friday, 29 January, 2021 21:33

Vectors $\vec{A}$ and $\vec{B}$ have magnitudes of 3 units and 4 units, respectively.

- What is the angle between the directions of $\vec{A}$ and $\vec{B}$ if $\vec{A} \cdot \vec{B} = 0$
- What is the angle between the directions of $\vec{A}$ and $\vec{B}$ if $\vec{A} \cdot \vec{B} = 12$
- What is the angle between the directions of $\vec{A}$ and $\vec{B}$ if $\vec{A} \cdot \vec{B} = -12$

Angle between two vectors using dot products

Friday, 29 January, 2021 21:33

The vectors $\vec{A}$ and $\vec{B}$ are given by: $\vec{A} = 3\hat{\imath} - 4\hat{\jmath} + \hat{k}$ and $\vec{B} = -2\hat{\imath} + 3\hat{k}$.

- Find the magnitude of the two vectors.
- Determine the scalar product $\vec{A} \cdot \vec{B}$.
- Find the angle between the directions of two vectors.
- Find the angle between $\vec{A}$ and the positive x-axis.

The Vector product-1

Friday, 29 January, 2021 21:33

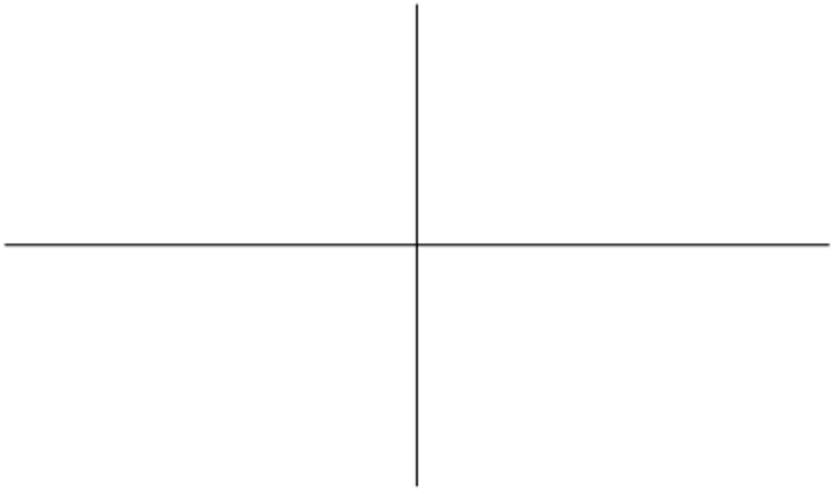
Vectors $\vec{A}$ and $\vec{B}$ have magnitudes of 3 units and 4 units, respectively.

- What is the angle between the directions of $\vec{A}$ and $\vec{B}$ if $\vec{A} \times \vec{B} = 0$
- What is the angle between the directions of $\vec{A}$ and $\vec{B}$ if $\vec{A} \times \vec{B} = 12$

The Vector product-2

Friday, 29 January, 2021 21:33

The figure shows two vectors lying in the xy plane, if $|\vec{A}| = 6$, $|\vec{B}| = 5$ and $\alpha = 40^{\circ}$. Determine the vector product $\vec{A} \times \vec{B}$ of them.



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A

$\alpha = 40^{\circ}$

B

Cross product, unit-vector notation

Saturday, 30 January, 2021 12:20

If $\vec{A} = 3\hat{\imath} - 4\hat{\jmath} + \hat{k}$ and $\vec{B} = -2\hat{\imath} + 3\hat{k}$. What is $\vec{C} = \vec{B} \times \vec{A}$?