

Vectors As level Edexcel Maths Past Papers Questions

01.

. Given that the point A has position vector $3\mathbf{i} - 7\mathbf{j}$ and the point B has position vector $8\mathbf{i} + 3\mathbf{j}$,

(a) find the vector \overline{AB} . (2)

(b) Find $|\overline{AB}|$. Give your answer as a simplified surd. (2)

02.

Given that the point A has position vector $4\mathbf{i} - 5\mathbf{j}$ and the point B has position vector $-5\mathbf{i} - 2\mathbf{j}$,

(a) find the vector \overrightarrow{AB} , (2)

(b) find $|\overrightarrow{AB}|$.

Give your answer as a simplified surd. (2)

03.

- (i) Two non-zero vectors, \mathbf{a} and \mathbf{b} , are such that

$$|\mathbf{a} + \mathbf{b}| = |\mathbf{a}| + |\mathbf{b}|$$

Explain, geometrically, the significance of this statement.

(1)

- (ii) Two different vectors, \mathbf{m} and \mathbf{n} , are such that $|\mathbf{m}| = 3$ and $|\mathbf{m} - \mathbf{n}| = 6$
The angle between vector \mathbf{m} and vector \mathbf{n} is 30°

Find the angle between vector \mathbf{m} and vector $\mathbf{m} - \mathbf{n}$, giving your answer, in degrees, to one decimal place.

(4)

04.

[In this question the unit vectors \mathbf{i} and \mathbf{j} are due east and due north respectively.]

A coastguard station O monitors the movements of a small boat.

At 10:00 the boat is at the point $(4\mathbf{i} - 2\mathbf{j})$ km relative to O .

At 12:45 the boat is at the point $(-3\mathbf{i} - 5\mathbf{j})$ km relative to O .

The motion of the boat is modelled as that of a particle moving in a straight line at constant speed.

(a) Calculate the bearing on which the boat is moving, giving your answer in degrees to one decimal place.

(3)

(b) Calculate the speed of the boat, giving your answer in km h^{-1}

(3)

05.

[In this question the unit vectors \mathbf{i} and \mathbf{j} are due east and due north respectively.]

A stone slides horizontally across ice.

Initially the stone is at the point $A(-24\mathbf{i} - 10\mathbf{j})\text{m}$ relative to a fixed point O .

After 4 seconds the stone is at the point $B(12\mathbf{i} + 5\mathbf{j})\text{m}$ relative to the fixed point O .

The motion of the stone is modelled as that of a particle moving in a straight line at constant speed.

Using the model,

(a) prove that the stone passes through O ,

(2)

(b) calculate the speed of the stone.

(3)

06.

The triangle PQR is such that $\vec{PQ} = 3\mathbf{i} + 5\mathbf{j}$ and $\vec{PR} = 13\mathbf{i} - 15\mathbf{j}$

(a) Find \vec{QR} (2)

(b) Hence find $|\vec{QR}|$ giving your answer as a simplified surd. (2)

The point S lies on the line segment QR so that $QS:SR = 3:2$

(c) Find \vec{PS} (2)

07.

Relative to a fixed origin O

- point A has position vector $10\mathbf{i} - 3\mathbf{j}$
- point B has position vector $-8\mathbf{i} + 9\mathbf{j}$
- point C has position vector $-2\mathbf{i} + p\mathbf{j}$ where p is a constant

(a) Find \overrightarrow{AB} (2)

(b) Find $|\overrightarrow{AB}|$ giving your answer as a fully simplified surd. (2)

Given that points A , B and C lie on a straight line,

- (c) (i) find the value of p ,
- (ii) state the ratio of the area of triangle AOC to the area of triangle AOB . (3)