

- 1 The points A , B and C have coordinates $(6, 1)$, $(2, 3)$ and $(-4, 3)$ respectively and O is the origin. Find, in terms of \mathbf{i} and \mathbf{j} , the vectors
- a \overrightarrow{OA} b \overrightarrow{AB} c \overrightarrow{BC} d \overrightarrow{CA}
- 2 Given that $\mathbf{p} = \mathbf{i} - 3\mathbf{j}$ and $\mathbf{q} = 4\mathbf{i} + 2\mathbf{j}$, find expressions in terms of \mathbf{i} and \mathbf{j} for
- a $4\mathbf{p}$ b $\mathbf{q} - \mathbf{p}$ c $2\mathbf{p} + 3\mathbf{q}$ d $4\mathbf{p} - 2\mathbf{q}$
- 3 Given that $\mathbf{p} = \begin{pmatrix} 3 \\ -4 \end{pmatrix}$ and $\mathbf{q} = \begin{pmatrix} 1 \\ 2 \end{pmatrix}$, find
- a $|\mathbf{p}|$ b $|2\mathbf{q}|$ c $|\mathbf{p} + 2\mathbf{q}|$ d $|3\mathbf{q} - 2\mathbf{p}|$
- 4 Given that $\mathbf{p} = 2\mathbf{i} + \mathbf{j}$ and $\mathbf{q} = \mathbf{i} - 3\mathbf{j}$, find, in degrees to 1 decimal place, the angle made with the vector \mathbf{i} by the vector
- a \mathbf{p} b \mathbf{q} c $5\mathbf{p} + \mathbf{q}$ d $\mathbf{p} - 3\mathbf{q}$
- 5 Find a unit vector in the direction
- a $\begin{pmatrix} 4 \\ 3 \end{pmatrix}$ b $\begin{pmatrix} 7 \\ -24 \end{pmatrix}$ c $\begin{pmatrix} -1 \\ 1 \end{pmatrix}$ d $\begin{pmatrix} 2 \\ 4 \end{pmatrix}$
- 6 Find a vector
- a of magnitude 26 in the direction $5\mathbf{i} + 12\mathbf{j}$,
 b of magnitude 15 in the direction $-6\mathbf{i} - 8\mathbf{j}$,
 c of magnitude 5 in the direction $2\mathbf{i} - 4\mathbf{j}$.
- 7 Given that $\mathbf{m} = 2\mathbf{i} + \lambda\mathbf{j}$ and $\mathbf{n} = \mu\mathbf{i} - 5\mathbf{j}$, find the values of λ and μ such that
- a $\mathbf{m} + \mathbf{n} = 3\mathbf{i} - \mathbf{j}$ b $2\mathbf{m} - \mathbf{n} = -3\mathbf{i} + 8\mathbf{j}$
- 8 Given that $\mathbf{r} = 6\mathbf{i} + c\mathbf{j}$, where c is a positive constant, find the value of c such that
- a \mathbf{r} is parallel to the vector $2\mathbf{i} + \mathbf{j}$ b \mathbf{r} is parallel to the vector $-9\mathbf{i} - 6\mathbf{j}$
 c $|\mathbf{r}| = 10$ d $|\mathbf{r}| = 3\sqrt{5}$
- 9 Given that $\mathbf{p} = \mathbf{i} + 3\mathbf{j}$ and $\mathbf{q} = 4\mathbf{i} - 2\mathbf{j}$,
- a find the values of a and b such that $a\mathbf{p} + b\mathbf{q} = -5\mathbf{i} + 13\mathbf{j}$,
 b find the value of c such that $c\mathbf{p} + \mathbf{q}$ is parallel to the vector \mathbf{j} ,
 c find the value of d such that $\mathbf{p} + d\mathbf{q}$ is parallel to the vector $3\mathbf{i} - \mathbf{j}$.
- 10 Relative to a fixed origin O , the points A and B have position vectors $\begin{pmatrix} 3 \\ 6 \end{pmatrix}$ and $\begin{pmatrix} -5 \\ 2 \end{pmatrix}$ respectively. Find
- a the vector \overrightarrow{AB} ,
 b $|\overrightarrow{AB}|$,
 c the position vector of the mid-point of AB ,
 d the position vector of the point C such that $OABC$ is a parallelogram.