

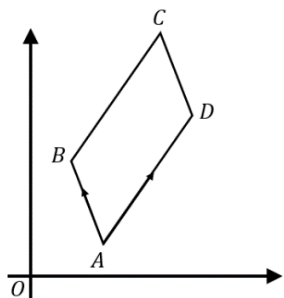
Vectors and Coordinates

(a)

$ABCD$ is a parallelogram.

$$\overrightarrow{AB} = \begin{pmatrix} -2 \\ 3 \end{pmatrix} \text{ and } \overrightarrow{AD} = \begin{pmatrix} 3 \\ 5 \end{pmatrix}$$

Given that the coordinates of A are $(3, 1)$, find the coordinates of points B , C and D .

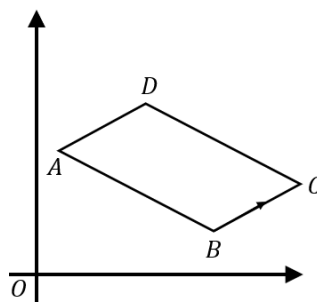


$$\begin{aligned} B &(1, 4) \\ C &(4, 9) \\ D &(6, 6) \end{aligned}$$

(c)

$ABCD$ is a parallelogram. $\overrightarrow{BC} = \begin{pmatrix} 3 \\ 2 \end{pmatrix}$

The coordinates of A are $(2, 7)$ and of B are $(8, 3)$. Find the coordinates of C and D , and the vector \overrightarrow{DC} .



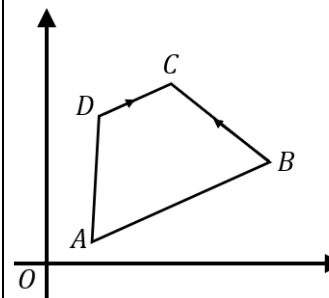
$$\begin{aligned} C &(11, 5) \\ D &(5, 9) \\ \overrightarrow{DC} &= \begin{pmatrix} 6 \\ -4 \end{pmatrix} \end{aligned}$$

(e)

$ABCD$ is a trapezium. $\overrightarrow{AB} = 2\overrightarrow{DC}$.

$$\overrightarrow{DC} = \begin{pmatrix} 3 \\ 1 \end{pmatrix} \text{ and } \overrightarrow{BC} = \begin{pmatrix} -3 \\ 4 \end{pmatrix}$$

The coordinates of D are $(2, 8)$. Find the coordinates of A , and the vector \overrightarrow{AD} .



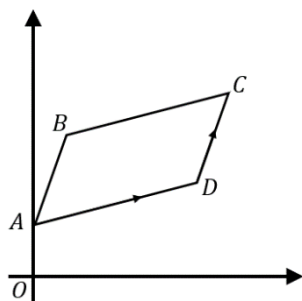
$$\begin{aligned} A &(2, 3) \\ \overrightarrow{AD} &= \begin{pmatrix} 0 \\ 5 \end{pmatrix} \end{aligned}$$

(b)

$ABCD$ is a parallelogram.

$$\overrightarrow{AD} = \begin{pmatrix} 6 \\ 1 \end{pmatrix} \text{ and } \overrightarrow{DC} = \begin{pmatrix} 2 \\ 4 \end{pmatrix}$$

Given that the coordinates of A are $(0, 1)$, find the coordinates of points B , C and D .

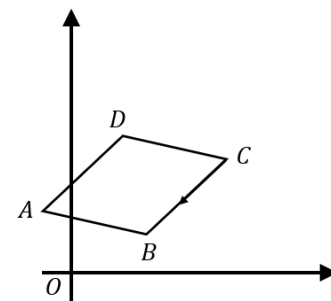


$$\begin{aligned} B &(2, 5) \\ C &(8, 6) \\ D &(6, 2) \end{aligned}$$

(d)

$ABCD$ is a rhombus. $\overrightarrow{CB} = \begin{pmatrix} -3 \\ -4 \end{pmatrix}$

The coordinates of A are $(-1, 4)$ and of B are $(3, 1)$. Find the coordinates of C and D , and the vector \overrightarrow{DC} .



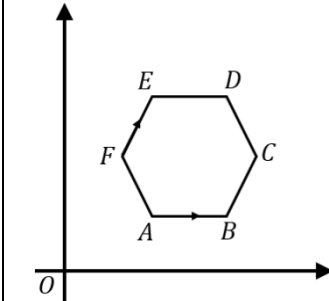
$$\begin{aligned} C &(6, 5) \\ D &(2, 8) \\ \overrightarrow{DC} &= \begin{pmatrix} 4 \\ -3 \end{pmatrix} \end{aligned}$$

(f)

$ABCDEF$ is a regular hexagon.

$$\overrightarrow{AB} = \begin{pmatrix} 4 \\ 0 \end{pmatrix} \text{ and } \overrightarrow{FE} = \begin{pmatrix} 2 \\ 2\sqrt{3} \end{pmatrix}$$

$\overrightarrow{FC} = 2\overrightarrow{AB}$. The coordinates of A are $(5, 2)$. Find the coordinates of B , C and D .



$$\begin{aligned} B &(9, 2) \\ C &(11, 2 + 2\sqrt{3}) \\ D &(9, 2 + 4\sqrt{3}) \end{aligned}$$