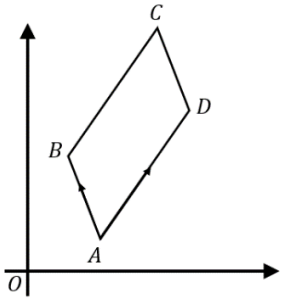
Vectors and Coordinates

(a)

$ABCD$ is a parallelogram.

$\overrightarrow{AB} = \begin{pmatrix} -2 \\ 3 \end{pmatrix}$ 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.

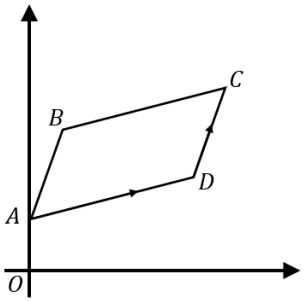


(b)

$ABCD$ is a parallelogram.

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

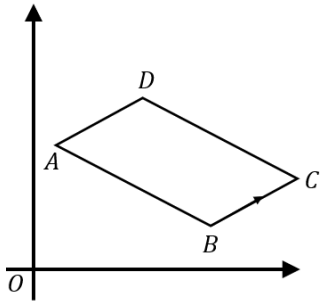
Given that the coordinates of A are $(0, 1)$, find the coordinates of points B, C and D.



(c)

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

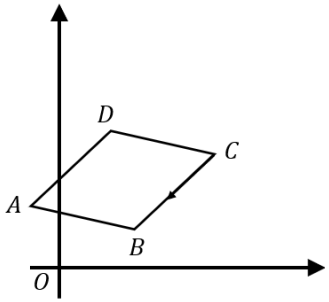
The coordinates of A are $(2, 7)$ and of B are $(8, 3)$. Find the coordinates of C and D, and the vector $\overrightarrow{DC}$.



(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 $\overrightarrow{DC}$.

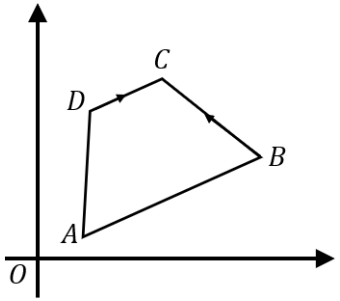


(e)

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

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

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



(f)

$ABCDEF$ is a regular hexagon.

$\overrightarrow{AB} = \begin{pmatrix} 4 \\ 0 \end{pmatrix}$ 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.