1.3.2

AI25BTECH11023 - Pratik R

Question:
The coordinates of the three consecutive vertices of a parallelogram $ABCD$ are $\mathbf{A}(1,3)$, $\mathbf{B}(-1,2)$, and $\mathbf{C}(2,5)$. Find the coordinates of the fourth vertex $\mathbf{D}$.

Solution:
Given that

$$\mathbf{A} = \begin{pmatrix}1\\3\end{pmatrix}, \mathbf{B} = \begin{pmatrix}-1\\2\end{pmatrix}, \mathbf{C} = \begin{pmatrix}2\\5\end{pmatrix}.$$

The coordinates of D of parallelogram $ABCD$ are obtained by equating midpoint of parallelogram:

$$\frac{\mathbf{D}+\mathbf{B}}{2} = \frac{\mathbf{A}+\mathbf{C}}{2} \tag{0.1}$$

$$\mathbf{D} = \mathbf{A} + \mathbf{C} - \mathbf{B} \tag{0.2}$$

$$\mathbf{D} = \begin{pmatrix}1\\3\end{pmatrix} + \begin{pmatrix}2\\5\end{pmatrix} - \begin{pmatrix}-1\\2\end{pmatrix} \tag{0.3}$$

$$\mathbf{D} = \begin{pmatrix}4\\6\end{pmatrix} \tag{0.4}$$

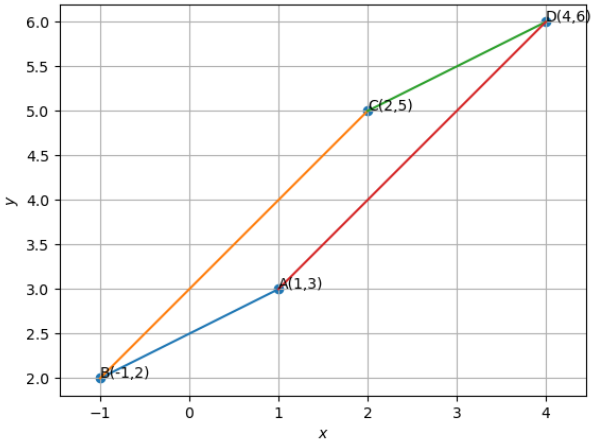

Fig. 0.1