

1.2.12

EE24BTECH11020 - Ellanti Rohith

Question:

If $(1,2)$, $(4,y)$, $(x,6)$ and $(3,5)$ are the vertices of parallelogram taken in order, find x and y .

Solution:

Let ABCD be the given Parallelogram,

TABLE 0: Coordinates of the vertices of parallelogram ABCD

| Vertex | Coordinates |
|--------|-------------|
| A | $(1, 2)$ |
| B | $(4, y)$ |
| C | $(x, 6)$ |
| D | $(3, 5)$ |

we know that \mathbf{AB} is parallel to \mathbf{DC} and $\|\mathbf{AB}\| = \|\mathbf{DC}\|$
Then,

$$\mathbf{B} - \mathbf{A} = \mathbf{C} - \mathbf{D} \quad (0.1)$$

$$\begin{pmatrix} 4 \\ y \end{pmatrix} - \begin{pmatrix} 1 \\ 2 \end{pmatrix} = \begin{pmatrix} x \\ 6 \end{pmatrix} - \begin{pmatrix} 3 \\ 5 \end{pmatrix} \quad (0.2)$$

$$\begin{pmatrix} 3 \\ y-2 \end{pmatrix} = \begin{pmatrix} x-3 \\ 1 \end{pmatrix} \quad (0.3)$$

From equation (0.3),

$$3 = x - 3 \Rightarrow x = 6 \quad (0.4)$$

$$y - 2 = 1 \Rightarrow y = 3 \quad (0.5)$$

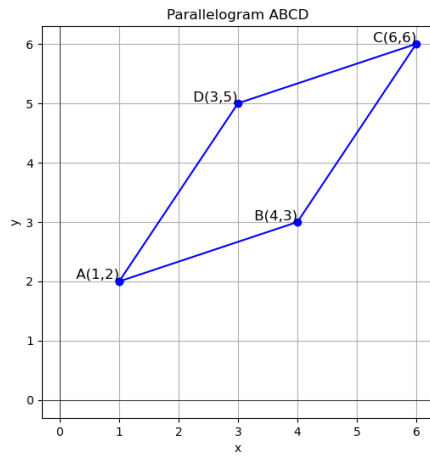


Fig. 0.1: Plot of parallelogram ABCD