

MatGeo Assignment 1.2.13

AI25BTECH11007

August 28, 2025

Question

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

Theoretical Solution

Let us solve the given equation theoretically and then verify the solution computationally

According to the question,

We are given the vertices of a parallelogram in order:

$$(1, 2), (4, y), (x, 6), (3, 5).$$

In a parallelogram, the diagonals bisect each other. So, the midpoints of the diagonals are equal.

Theoretical Solution

Given the vertices of a parallelogram: $A(1, 2)$, $B(4, y)$, $C(x, 6)$, $D(3, 5)$.

Property: In a parallelogram, diagonals bisect each other.

Midpoint of AC = Midpoint of BD

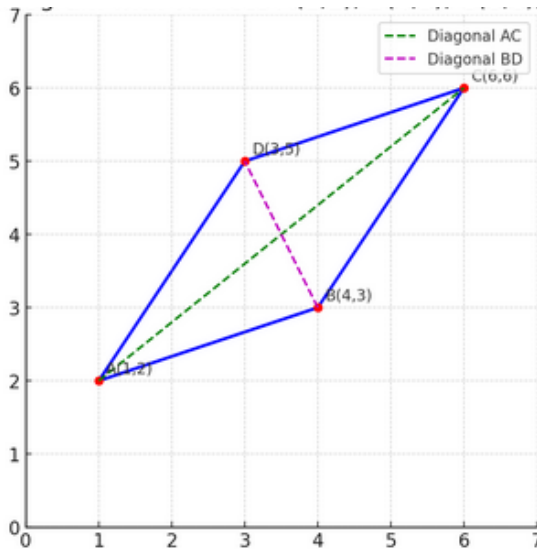
$$\frac{1}{2} \begin{pmatrix} 1 + x \\ 2 + 6 \end{pmatrix} = \frac{1}{2} \begin{pmatrix} 4 + 3 \\ y + 5 \end{pmatrix}$$

$$\begin{pmatrix} \frac{1+x}{2} \\ \frac{8}{2} \end{pmatrix} = \begin{pmatrix} \frac{7}{2} \\ \frac{y+5}{2} \end{pmatrix}$$

$$\Rightarrow \frac{1+x}{2} = \frac{7}{2}, \quad \frac{8}{2} = \frac{y+5}{2}$$

$$\Rightarrow x = 6, \quad y = 3$$

Plot



Conclusion

From the figure it is clearly verified that theoretical solution matches with the computational solution.