1.3.4

AI25BTECH11025-R Nikhil

1.3.4

If $A(1,3), B(-1,2), C(2,5)$ and $D(x,4)$ are the vertices of a parallelogram ABCD , then the value of x is _____(10, 2012)

Solution:
In a parallelogram, the opposite sides are equal. Therefore, the length of side AC equals to the length of side BD:
Substituting the coordinates:

$$\begin{pmatrix} x \\ 4 \end{pmatrix} = \begin{pmatrix} -1 \\ 2 \end{pmatrix} + \begin{pmatrix} 2 \\ 5 \end{pmatrix} - \begin{pmatrix} 1 \\ 3 \end{pmatrix} \tag{0.1}$$

$$= \begin{pmatrix} -1 + 2 - (-1) \\ 2 + 5 - 3 \end{pmatrix} \tag{0.2}$$

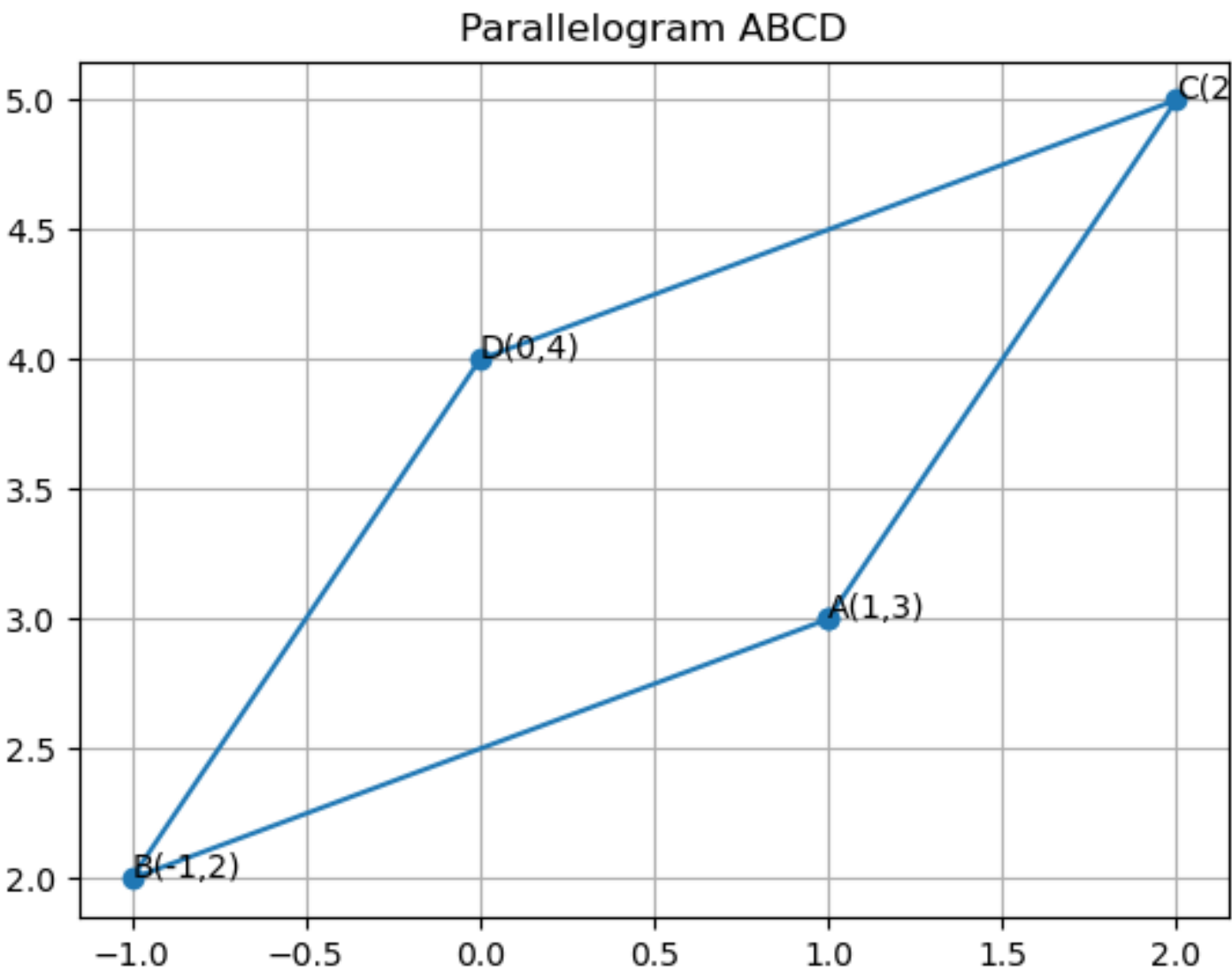
$$= \begin{pmatrix} 0 \\ 4 \end{pmatrix} \tag{0.3}$$

This gives us the equations:

$$x = 0 \tag{0.4}$$

$$4 = 4 \tag{0.5}$$

Answer: x=0


Parallelogram ABCD
C(2
D(0,4)
A(1,3)
B(−1,2)
5.0
4.5
4.0
3.5
3.0
2.5
2.0
−1.0
−0.5
0.0
0.5
1.0
1.5
2.0