

1.6.23

AI25BTECH11008 - Chiruvella Harshith Sharan

Question: Are $A(3,1)$, $B(6,4)$ and $C(8,6)$ collinear?

Solution:

We check collinearity using vector method.

$$\mathbf{B} - \mathbf{A} = \begin{pmatrix} 6 - 3 \\ 4 - 1 \end{pmatrix} = \begin{pmatrix} 3 \\ 3 \end{pmatrix}$$

$$\mathbf{C} - \mathbf{A} = \begin{pmatrix} 8 - 3 \\ 6 - 1 \end{pmatrix} = \begin{pmatrix} 5 \\ 5 \end{pmatrix}$$

Now form the matrix:

$$\mathbf{M} = (\mathbf{B} - \mathbf{A} \quad \mathbf{C} - \mathbf{A})^T = \begin{pmatrix} 3 & 5 \\ 3 & 5 \end{pmatrix}$$

Clearly, both rows are multiples of each other, so

$$\text{rank}(\mathbf{M}) = 1$$

$\therefore A(3, 1), B(6, 4), C(8, 6)$ are collinear.

Collinearity of Points A(3,1), B(6,4), and C(8,6)

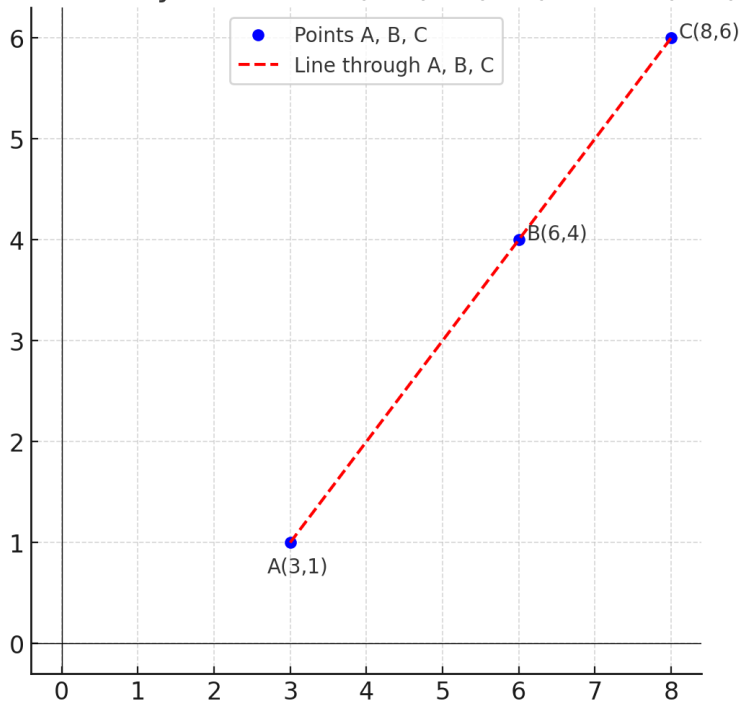


Fig. 0.1: Graph showing collinear points A, B, C