

1.6.7

EE24BTECH11002 - Agamjot Singh

Question:

Find a relation between x and y if the points (x, y) , $(1, 2)$ and $(7, 0)$ are collinear.

Solution:

Let the points be **A** $(1, 2)$, **B** $(7, 0)$ and **C** (x, y) .

The collinearity matrix is given by

$$\begin{pmatrix} \mathbf{B} - \mathbf{A} & \mathbf{C} - \mathbf{A} \end{pmatrix}^T = \begin{pmatrix} 6 & x - 1 \\ -2 & y - 2 \end{pmatrix} \quad (1)$$

$$\xrightarrow{R_2 = R_2 + \frac{R_1}{3}} \begin{pmatrix} 6 & x - 1 \\ 0 & y - 2 + \frac{x-1}{3} \end{pmatrix} \quad (2)$$

For the points to be collinear, the rank of this matrix has to be one.

$$y - 2 + \frac{x - 1}{3} = 0 \quad (3)$$

$$x + 3y - 7 = 0 \quad (4)$$

The relation between x and y is a line.

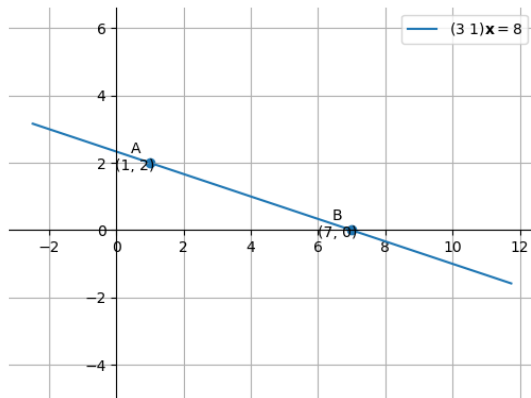


Fig. 0: Line which represents the relation between x and y