

1.7.10

EE24BTECH11012 - Bhavanisankar G S

QUESTION

Find the relation between x and y if the points $\mathbf{A}(x, y)$, $\mathbf{B}(-5, 7)$ and $\mathbf{C}(-4, 5)$ are collinear.

(10, 2015).

SOLUTION

Variable name	Description	Formula
$\mathbf{A} = \begin{pmatrix} x \\ y \end{pmatrix}$	The point with unknown coordinates	$\text{rank}(\mathbf{C} - \mathbf{B} \quad \mathbf{A} - \mathbf{B})$
$\mathbf{B} = (-5, 7)$	The point in 2-D plane with coordinates $\begin{pmatrix} -5 \\ 7 \end{pmatrix}$	For points to be collinear,
$\mathbf{M} = (-4, 5)$	The point with coordinates $\begin{pmatrix} -4 \\ 5 \end{pmatrix}$	

Three points A, B and C are said to be collinear if

$$\text{rank}(\mathbf{C} - \mathbf{B} \quad \mathbf{B} - \mathbf{A}) = 1$$

$$\begin{pmatrix} 1 & -5 - x \\ -2 & 7 - y \end{pmatrix} \leftrightarrow R_2 \rightarrow R_2 + 2R_1$$

$$\begin{pmatrix} 1 & -5 - x \\ 0 & -3 - y - 2x \end{pmatrix} \quad (0.1)$$

For the rank of the matrix to be one, $2x + y + 3 = 0$.

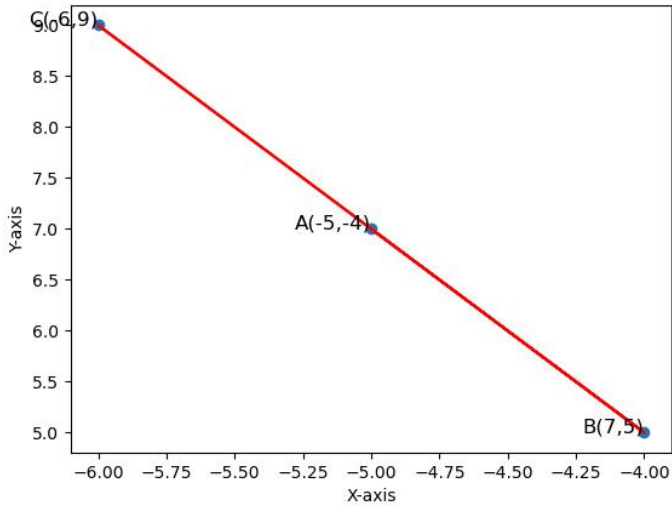


Fig. 0.1: A plot of the given question.