

ASSIGNMENT 1

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Download all python codes from

<https://github.com/Vallidevibolla/vallidevi/blob/main/Collinear.py>

and latex-tikz codes from

<https://github.com/Vallidevibolla/vallidevi/blob/main/no.tex>

1 QUESTION No.14

Find the value of k , if the points $\begin{pmatrix} k \\ 3 \end{pmatrix}$, $\begin{pmatrix} 6 \\ -2 \end{pmatrix}$ and $\begin{pmatrix} -3 \\ 4 \end{pmatrix}$ are collinear.

2 SOLUTION

Let

$$\mathbf{A} = \begin{pmatrix} k \\ 3 \end{pmatrix} \quad (2.0.1)$$

$$\mathbf{B} = \begin{pmatrix} 6 \\ -2 \end{pmatrix} \quad (2.0.2)$$

$$\mathbf{C} = \begin{pmatrix} -3 \\ 4 \end{pmatrix} \quad (2.0.3)$$

As, given that the points are collinear,

$$\begin{pmatrix} \mathbf{A} - \mathbf{B} \\ \mathbf{B} - \mathbf{C} \end{pmatrix}^T \quad (2.0.4)$$

$$\begin{pmatrix} (\mathbf{A} - \mathbf{B}) & (\mathbf{B} - \mathbf{C}) \end{pmatrix}^T \quad (2.0.5)$$

$$\begin{aligned} & \begin{pmatrix} k-6 & 3-(-2) \\ 6-(-3) & -2-4 \end{pmatrix} \\ \rightarrow & \begin{pmatrix} k-6 & 5 \\ 9 & -6 \end{pmatrix} \xrightarrow{R_2 \rightarrow R_1} \begin{pmatrix} 9 & -6 \\ k-6 & 5 \end{pmatrix} \\ \rightarrow & \begin{pmatrix} 9 & -6 \\ 0 & 9 \times 5 - (-6 \times (k-6)) \end{pmatrix} \\ \rightarrow & \begin{pmatrix} 9 & -6 \\ 0 & 9+6k \end{pmatrix} \\ \xrightarrow{R_2 \rightarrow R_2/6} & \begin{pmatrix} 9 & -6 \\ 0 & \frac{3}{2} + k \end{pmatrix} \end{aligned}$$

Equalising R_2 to 0 $\Rightarrow k + \frac{3}{2} = 0$
 $\Rightarrow k = -\frac{3}{2}$
 \therefore Finally the value of k is $-\frac{3}{2}$

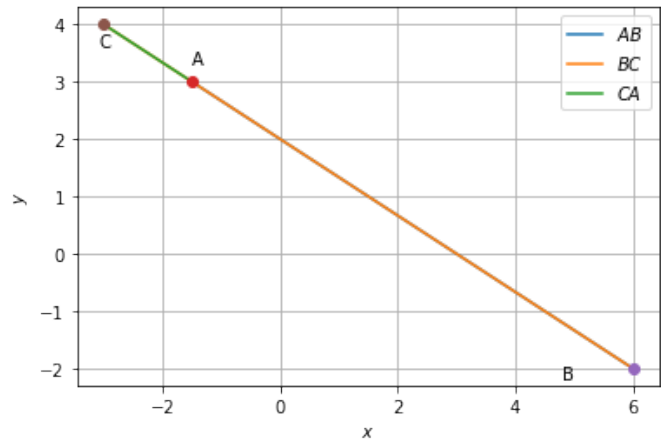


Fig. 0: collinear