## 1.1.5.23

## EE24BTECH11024 - G. Abhimanyu Koushik

**Question:** 

Show that the points  $\begin{pmatrix} -2\\3\\5 \end{pmatrix}$ ,  $\begin{pmatrix} 1\\2\\3 \end{pmatrix}$  and  $\begin{pmatrix} 7\\0\\-1 \end{pmatrix}$  are collinear.

**Solution:** The Collinearity matrix is given by

Name	Point
$ \begin{pmatrix} -2 \\ 3 \\ 5 \end{pmatrix} $	Point A
$\begin{pmatrix} 1 \\ 2 \\ 3 \end{pmatrix}$	Point B
$ \begin{pmatrix} 7 \\ 0 \\ -1 \end{pmatrix} $	Point C

TABLE 0: Variables Used

$$(\mathbf{B} - \mathbf{A} \quad \mathbf{C} - \mathbf{A})^{T} = \begin{pmatrix} 3 & -1 & -2 \\ 9 & -3 & -6 \end{pmatrix}$$

$$\xrightarrow{R_{2} \leftarrow R_{1} - 3R_{2}} \begin{pmatrix} 3 & -1 & -2 \\ 0 & 0 & 0 \end{pmatrix}$$

$$(0.1)$$

$$\stackrel{R_2 \leftarrow R_1 - 3R_2}{\longleftrightarrow} \begin{pmatrix} 3 & -1 & -2 \\ 0 & 0 & 0 \end{pmatrix} \tag{0.2}$$

Since the rank of the Collinearity matrix is 1, the points are collinear

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## Line passing through given points

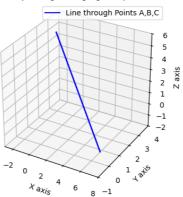


Fig. 0.1: Line through the given points