## EE25BTECH11052 - Shriyansh Chawda

## **Question:**

Determine if the points (1, 5), (2, 3) and (-2, -11) are collinear.

## **Solution:**

Points A, B, C are defined to be collinear if

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

(1.1.9.1)

Let A = (1,5), B = (2,3), C = (-2,-11). From this, the collinearity matrix can be expressed as

$$\begin{pmatrix} \mathbf{B} - \mathbf{A} & \mathbf{C} - \mathbf{A} \end{pmatrix} = \begin{pmatrix} 1 & -3 \\ -2 & -16 \end{pmatrix} \xrightarrow{R_2 \to R_2 + 2R_1} \begin{pmatrix} 1 & -3 \\ 0 & -22 \end{pmatrix}$$

which is a rank 2 matrix. Using (1.1.9.1), the above-mentioned property, we conclude that the given points are **not** collinear. Graph shown as in the fig. 0.1.

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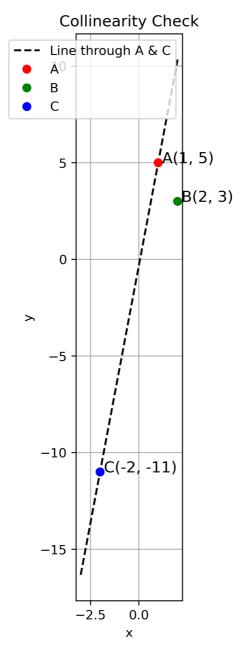


Fig. 0.1