# 1.3.4

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 $\mathbf{A}\,(1, 2)$ ,$\mathbf{B}\,(7, 0)$ and $\mathbf{C}\,(x, y)$.

The collinearity matrix is given by

$$\begin{pmatrix}\mathbf{B}-\mathbf{A} & \mathbf{C}-\mathbf{A}\end{pmatrix}^{\top} = \begin{pmatrix}6 & x-2\\ -2 & y-2\end{pmatrix} \tag{1}$$

$$\xrightarrow{R_2=R_2+3R_1} \begin{pmatrix}6 & x-2\\ 0 & 3x+y-8\end{pmatrix} \tag{2}$$

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

$$3x + y - 8 = 0 \tag{3}$$

The relation between $x$ and $y$ is a line.

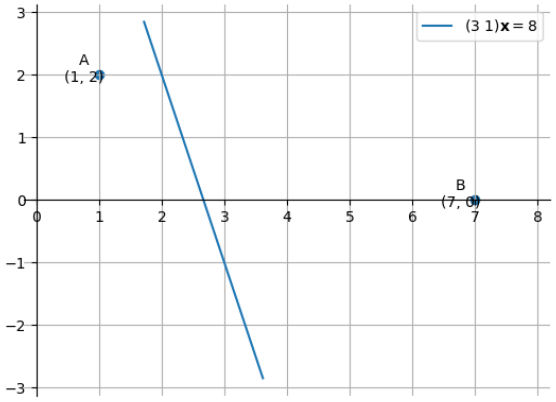


Fig. 0: Line which represents the relation between x and y