

ASSIGNMENT-11.10.4.9

Question : Find the value of p so that the three lines $3x + y - 2 = 0$, $px + 2y - 3 = 0$ and $2x - y - 3 = 0$ may intersect at one point.

Solution :

$$\begin{pmatrix} 3 & 1 & -2 \\ p & 2 & -3 \\ 2 & -1 & -3 \end{pmatrix} \quad (1)$$

$$\xrightarrow[R'_2=R_2+2R_3]{R'_1=R_1+R_3} \begin{pmatrix} 5 & 0 & -5 \\ 4+p & 0 & -9 \\ 2 & -1 & -3 \end{pmatrix} \quad (2)$$

For intersecting at one point the above expression should be zero. So,

$$\begin{vmatrix} 5 & 0 & -5 \\ 4+p & 0 & -9 \\ 2 & -1 & -3 \end{vmatrix} = 0 \quad (3)$$

$$\text{or, } 0 + 0 + 1 \begin{vmatrix} 5 & -5 \\ 4+p & -9 \end{vmatrix} = 0 \quad (4)$$

$$\text{or, } p = 5 \quad (5)$$

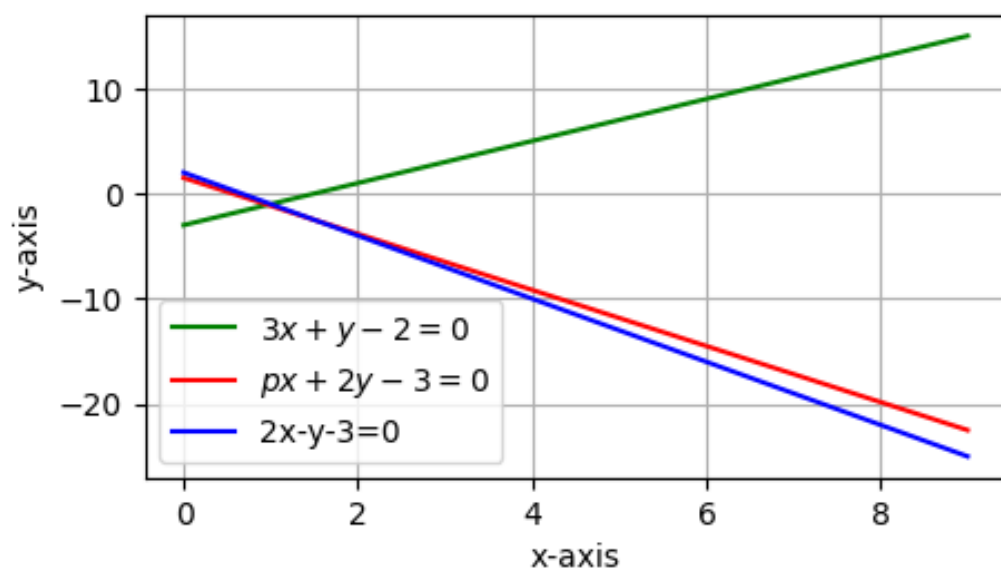


Figure 1: