## 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:

$$\begin{pmatrix} 3 & 1 & -2 \\ p & 2 & -3 \\ 2 & -1 & -3 \end{pmatrix} \tag{1}$$

$$\frac{R_2' = 3R_2 - pR_1}{R_3' = 3R_3 - 2R_1} \begin{pmatrix} 3 & 1 & -2 \\ 0 & 6 - p & -9 + 2p \\ 0 & -5 & -5 \end{pmatrix}$$
(2)

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

$$\xrightarrow{R'_2 = 3R_2 - pR_1}
\begin{pmatrix}
3 & 1 & -2 \\
0 & 6 - p & -9 + 2p \\
0 & -5 & -5
\end{pmatrix}$$

$$\xrightarrow{R''_3 = R_3(6-p) + 5R_2}
\begin{pmatrix}
3 & 1 & -2 \\
0 & 6 - p & -9 + 2p \\
0 & 0 & -75 + 15p
\end{pmatrix}$$
(2)

$$\implies -75 + 15p = 0 \tag{4}$$

$$p = 5 \tag{5}$$

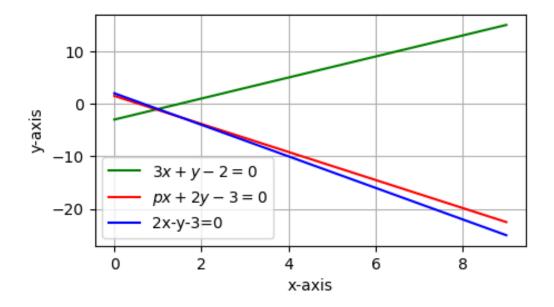


Figure 1: