

CLASS-11
CHAPTER-10
STRAIGHT LINES

Exercise 10.4

Q6. Find the equation of the line parallel to y-axis and drawn through the point of intersection of the lines $x - 7y + 5 = 0$ and $3x + y = 0$.

Solution

The given line equations represented in vector form:

$$\begin{pmatrix} 1 & -7 \end{pmatrix} \mathbf{x} = -5 \quad (1)$$

$$\begin{pmatrix} 3 & 1 \end{pmatrix} \mathbf{x} = 0 \quad (2)$$

$$(3)$$

The intersection of two lines is given by:

$$\begin{pmatrix} 1 & -7 & 5 \\ 3 & 1 & 0 \end{pmatrix} \mathbf{x} = 0 \quad (4)$$

$$\begin{pmatrix} 1 & -7 & 5 \\ 3 & 1 & 0 \end{pmatrix} \xleftrightarrow{R_2=R_2-3R_1} \begin{pmatrix} 1 & -7 & 5 \\ 0 & 22 & -15 \end{pmatrix} \mathbf{x} = 0 \quad (5)$$

$$\xleftrightarrow{R_2=\frac{R_2}{22}} \begin{pmatrix} 1 & -7 & 5 \\ 0 & 1 & -\frac{15}{22} \end{pmatrix} \mathbf{x} = 0 \quad (6)$$

$$\xleftrightarrow{R_1=R_1+7R_2} \begin{pmatrix} 1 & 0 & \frac{5}{22} \\ 0 & 1 & -\frac{15}{22} \end{pmatrix} \mathbf{x} = 0 \quad (7)$$

$$\mathbf{x} = \begin{pmatrix} -\frac{5}{22} \\ \frac{15}{22} \end{pmatrix} \quad (8)$$

$$(9)$$

The equation of line parallel to y-axis is given by:

$$\begin{pmatrix} 1 & 0 \end{pmatrix} \mathbf{x} = -\frac{5}{22} \quad (10)$$

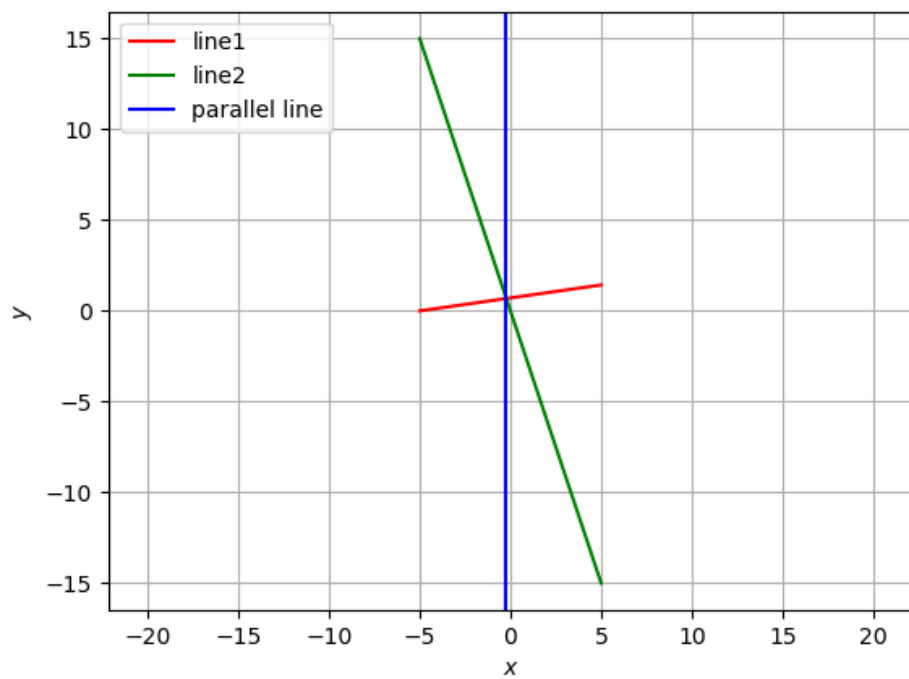


Figure 1: