5.2.68

AI25BTECH11001 - ABHISEK MOHAPATRA

Question: Solve $2x+3y=11$ and $2x+4y=-24$ and hence find the value of m fror which $y=mx+3$.
Solution: Given:

$$2x+3y=11 \tag{1}$$

And,

$$2x+4y=-24 \tag{2}$$

So,

$$\begin{pmatrix}2 & 3\\ 2 & 4\end{pmatrix}\mathbf{X}=\begin{pmatrix}11\\ -24\end{pmatrix} \tag{3}$$

Augumented Matrix:

$$\left(\begin{array}{cc|c}2 & 3 & 11\\ 2 & 4 & -24\end{array}\right) \tag{4}$$

$$\xrightarrow{R_2\to R_2-R_1}\left(\begin{array}{cc|c}2 & 3 & 11\\ 0 & 1 & -35\end{array}\right) \tag{5}$$

$$\xrightarrow{R_1\to R_1-3R_2}\left(\begin{array}{cc|c}2 & 0 & 116\\ 0 & 1 & -35\end{array}\right) \tag{6}$$

$$\Rightarrow\left(\begin{array}{cc|c}1 & 0 & 58\\ 0 & 1 & -35\end{array}\right) \tag{7}$$

So,

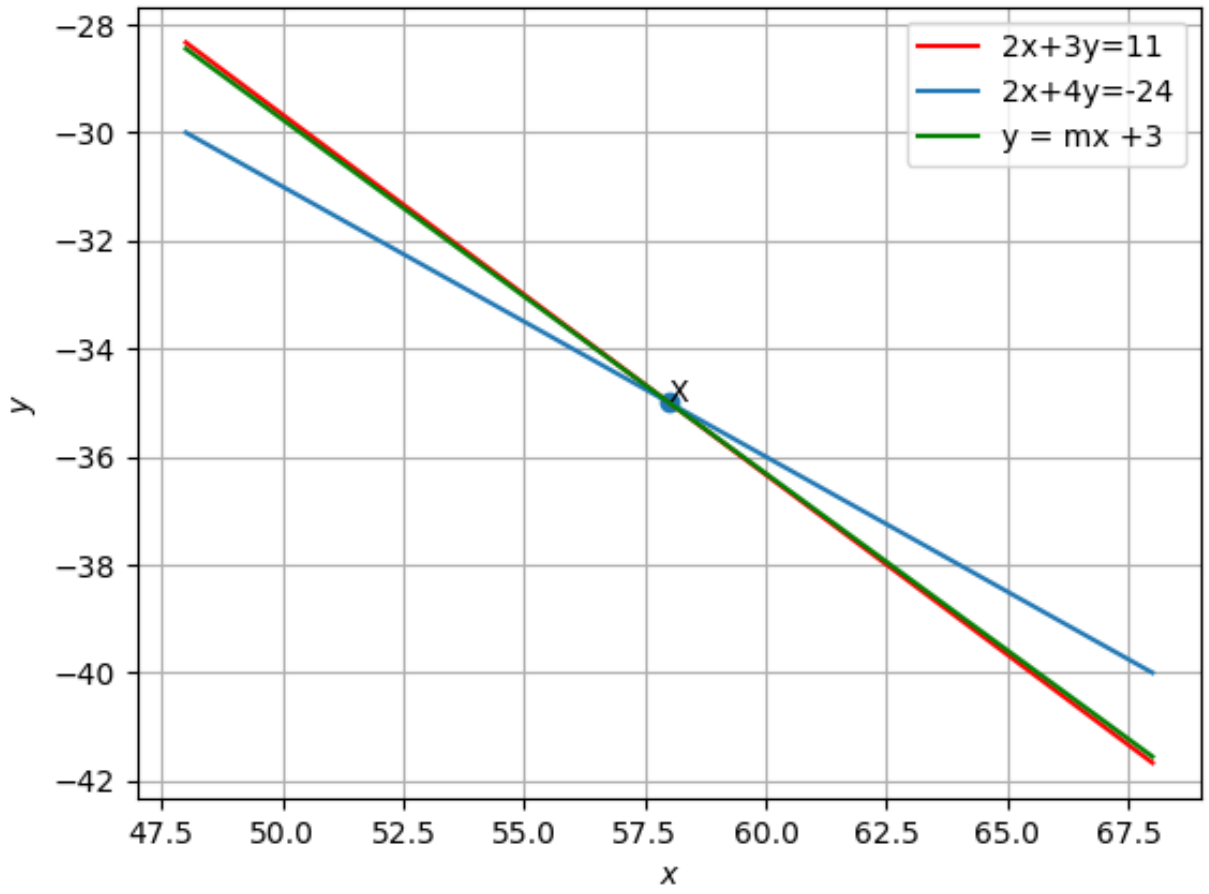
$$\mathbf{X}=\begin{pmatrix}x\\ y\end{pmatrix}=\begin{pmatrix}58\\ -35\end{pmatrix} \tag{8}$$

Given,

$$y=mx+3 \tag{9}$$

$$\Rightarrow m=\frac{y-3}{x}=-\frac{19}{29} \tag{10}$$

So, m = $-\frac{19}{29}$
Graph:


2x+3y=11
2x+4y=-24
y = mx +3
X
−28
−30
−32
−34
−36
−38
−40
−42
47.5
50.0
52.5
55.0
57.5
60.0
62.5
65.0
67.5
y
x