# 5.3.12

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**Question:**

Solve for x and y

x + y = 6, 2x -3y = 4

**Solution:**

Let :

$$\mathbf{r_1} = \begin{pmatrix} 1 & 1 \end{pmatrix} \mathbf{x} = 6 \tag{0.1}$$

$$\mathbf{r_2} = \begin{pmatrix} 2 & -3 \end{pmatrix} \mathbf{x} = 4 \tag{0.2}$$

The augmented matrix of the above equations is given by,

$$\begin{pmatrix} 1 & 1 & 6 \\ 2 & -3 & 4 \end{pmatrix} \overset{R_2 \leftarrow R_2 - 2R_1}{\longleftrightarrow} \begin{pmatrix} 1 & 1 & 6 \\ 0 & -5 & -8 \end{pmatrix} \tag{0.3}$$

$$\begin{pmatrix} 1 & 1 & 6 \\ 0 & -5 & -8 \end{pmatrix} \overset{R_1 \leftarrow 5R_1 + R_2}{\longleftrightarrow} \begin{pmatrix} 5 & 0 & 22 \\ 0 & -5 & -8 \end{pmatrix} \tag{0.4}$$

$$5x = 22 \qquad x = \frac{22}{5} \tag{0.5}$$

$$-5y = -8 \qquad y = \frac{8}{5} \tag{0.6}$$

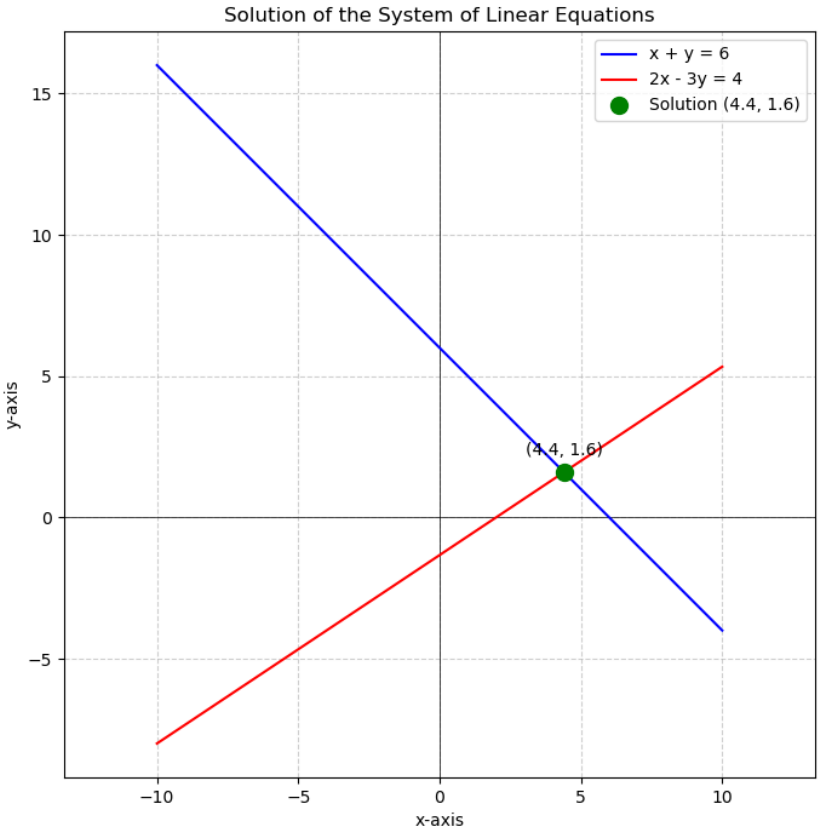
Solution of the System of Linear Equations
x + y = 6
2x - 3y = 4
Solution (4.4, 1.6)
(4.4, 1.6)
15
10
5
0
−5
y-axis
−10
−5
0
5
10
x-axis

Fig. 0.1