Assignment No.1

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Download all python codes from

https://github.com/sravani706/Assignment_1.git

and latex-tikz codes from

https://github.com/sravani706/Assignment_1.git

1 Question No.23

represent the following pair of equation graphically and write the coordinates of points where the line is intersect y axis.

$$x + 3y = 6 \tag{1.0.1}$$

$$2x - 3y = 12 \tag{1.0.2}$$

2 Solution

$$x + 3y = 6$$

(2.0.1)

$$2x - 3y = 12 \tag{2.0.2}$$

plotting graph
x 0 6 3
y 2 0 -1
plotting graph
x 0 6 9
y -4 0 2

Solving 2 and 2 , can be expressed as a Matrix Equation

$$\begin{pmatrix} 1 & 3 \\ 2 & -3 \end{pmatrix} \mathbf{x} = \begin{pmatrix} 6 \\ 12 \end{pmatrix} \tag{2.0.3}$$

The augmented matrix for the above equation is row reduced as follows

$$\begin{pmatrix} 1 & 3 & 6 \\ 2 & -3 & 12 \end{pmatrix} \xleftrightarrow{R_2 \leftarrow R_2 + R_1} \begin{pmatrix} 1 & 3 & 6 \\ 3 & 0 & 18 \end{pmatrix} \tag{2.0.4}$$

$$\begin{pmatrix} 1 & 1 & 12 \\ 3 & 0 & 18 \end{pmatrix} \xleftrightarrow{R_1 \leftarrow 3R_1 - R_2} \begin{pmatrix} 0 & 9 & 18 \\ 3 & 0 & 18 \end{pmatrix} \tag{2.0.5}$$

$$\begin{pmatrix} 0 & 9 & 18 \\ 3 & 0 & 18 \end{pmatrix} \xleftrightarrow{R_2 \leftarrow \frac{R_2}{3}} \begin{pmatrix} 0 & 9 & 18 \\ 1 & 0 & 6 \end{pmatrix} \tag{2.0.6}$$

$$\begin{pmatrix} 0 & 9 & 18 \\ 1 & 0 & 6 \end{pmatrix} \xleftrightarrow{R-1 \leftarrow \frac{R_1}{9}} \begin{pmatrix} 0 & 1 & 2 \\ 1 & 0 & 6 \end{pmatrix} \tag{2.0.7}$$

$$\Rightarrow \mathbf{x} = \begin{pmatrix} 2 \\ 6 \end{pmatrix} \tag{2.0.8}$$

$$\begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} 2 \\ 6 \end{pmatrix}$$