

# Assignment No.1

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**Abstract**—This is a simple document to learn about writing vectors and matrices using latex, draw figures using Python, Latex.

Download all and latex-tikz codes from

svn co [https://github.com/sravani706/Assignment-1\\_new.git](https://github.com/sravani706/Assignment-1_new.git)

## 1 VECTORS

(CBSE-MATH-X-2008. 30/2/2-Q.23)

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

$$x + 3y - 6 = 0 \quad (1.1.1)$$

$$2x - 3y - 12 = 0 \quad (1.1.2)$$

**Solution:**

- a) Line  $x+3y-6=0$  can be represented in vector form as,

$$\begin{pmatrix} 1 & 3 \end{pmatrix} \mathbf{x} = 6 \quad (1.1.3)$$

- b) Line  $2x-3y-12=0$  can be represented in vector form as,

$$\begin{pmatrix} 2 & -3 \end{pmatrix} \mathbf{x} = 12 \quad (1.1.4)$$

- c) Also the equation of y axis is

$$\begin{pmatrix} 1 & 0 \end{pmatrix} \mathbf{x} = 0 \quad (1.1.5)$$

Let line (1.1.3) and line (1.1.4) meet at point A. Then,

$$\begin{pmatrix} 1 & 3 \\ 2 & -3 \end{pmatrix} \mathbf{A} = \begin{pmatrix} 6 \\ 12 \end{pmatrix} \quad (1.1.6)$$

$$\mathbf{A} = \begin{pmatrix} 1 & 3 \\ 2 & -3 \end{pmatrix}^{-1} \begin{pmatrix} 6 \\ 12 \end{pmatrix} \quad (1.1.7)$$

$$\mathbf{A} = \begin{pmatrix} 6 \\ 0 \end{pmatrix} \quad (1.1.8)$$

Let line (1.1.3) and line (1.1.5) meet at point B. Then,

$$\begin{pmatrix} 1 & 3 \\ 1 & 0 \end{pmatrix} \mathbf{B} = \begin{pmatrix} 6 \\ 0 \end{pmatrix} \quad (1.1.9)$$

$$\mathbf{B} = \begin{pmatrix} 1 & 3 \\ 1 & 0 \end{pmatrix}^{-1} \begin{pmatrix} 6 \\ 0 \end{pmatrix} \quad (1.1.10)$$

$$\mathbf{B} = \begin{pmatrix} 0 \\ 2 \end{pmatrix} \quad (1.1.11)$$

Let line (1.1.4) and line (1.1.5) meet at point C. Then,

$$\begin{pmatrix} 2 & -3 \\ 1 & 0 \end{pmatrix} \mathbf{C} = \begin{pmatrix} 12 \\ 0 \end{pmatrix} \quad (1.1.12)$$

$$\mathbf{C} = \begin{pmatrix} 2 & -3 \\ 1 & 0 \end{pmatrix}^{-1} \begin{pmatrix} 12 \\ 0 \end{pmatrix} \quad (1.1.13)$$

$$\mathbf{C} = \begin{pmatrix} 0 \\ -4 \end{pmatrix} \quad (1.1.14)$$

So  $\triangle ABC$  is formed by intersection of (1.1.3), (1.1.4) and (1.1.5)

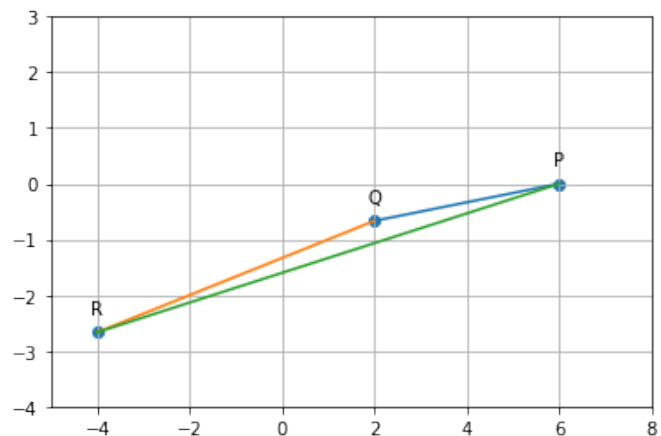


Fig. 1.1: Graphical solution