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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

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.

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

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

Solution:

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

$$\begin{pmatrix} 1 & 3 \end{pmatrix} \mathbf{x} = 6 \tag{1.1.3}$$

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

$$(2 -3)\mathbf{x} = 12 \tag{1.1.4}$$

c) Also the equation of y axis is

$$\begin{pmatrix} 1 & 0 \end{pmatrix} \mathbf{x} = 0 \tag{1.1.5}$$

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

$$\begin{pmatrix} 1 & 3 \\ 2 & -3 \end{pmatrix} \mathbf{P} = \begin{pmatrix} 6 \\ 12 \end{pmatrix} \tag{1.1.6}$$

$$\mathbf{P} = \begin{pmatrix} 1 & 3 \\ 2 & -3 \end{pmatrix}^{-1} \begin{pmatrix} 6 \\ 12 \end{pmatrix} \tag{1.1.7}$$

$$\mathbf{P} = \begin{pmatrix} 6 \\ 0 \end{pmatrix} \tag{1.1.8}$$

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

$$\begin{pmatrix} 1 & 3 \\ 1 & 0 \end{pmatrix} \mathbf{Q} = \begin{pmatrix} 6 \\ 0 \end{pmatrix} \tag{1.1.9}$$

$$\mathbf{Q} = \begin{pmatrix} 1 & 3 \\ 1 & 0 \end{pmatrix}^{-1} \begin{pmatrix} 6 \\ 0 \end{pmatrix} \tag{1.1.10}$$

$$\mathbf{Q} = \begin{pmatrix} 0 \\ 2 \end{pmatrix} \tag{1.1.11}$$

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

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

$$\mathbf{R} = \begin{pmatrix} 2 & -3 \\ 1 & 0 \end{pmatrix}^{-1} \begin{pmatrix} 12 \\ 0 \end{pmatrix} \tag{1.1.13}$$

$$\mathbf{R} = \begin{pmatrix} 0 \\ -4 \end{pmatrix} \tag{1.1.14}$$

So $\triangle PQRisformed by intersection of (1.1.3), (1.1.4) and (1.1.5)$

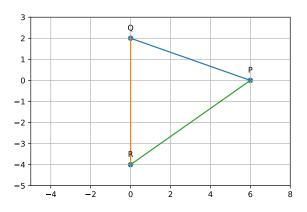


Fig. 1.1: Graphical solution