Assignment No.1

Sravani sandhya

***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.

$$\mathbf{x + 3y - 6 = 0} \tag{1.1.1}$$

$$\mathbf{2x - 3y - 12 = 0} \tag{1.1.2}$$

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,

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

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,

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

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

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

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

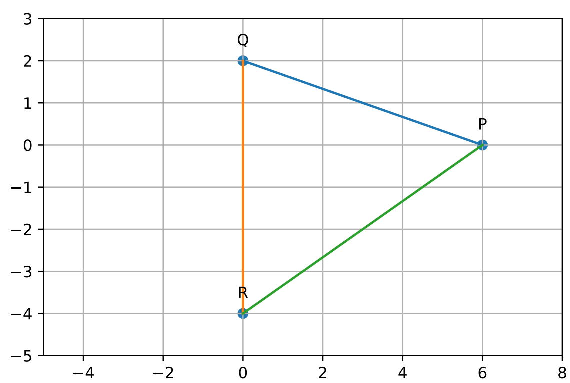

Fig. 1.1: Graphical solution