# Assignment - 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/arjunjc93/Assignment-1_new.git
```

## 1 Vectors
(CBSE-Math-X-2006-Set 1-Q.1)

1.1. Find the coordinates of the point which divides the line joining the points $\mathbf{A} = \begin{pmatrix}1\\3\end{pmatrix}$ and $\mathbf{B} = \begin{pmatrix}2\\7\end{pmatrix}$ in the ratio 3 : 4

**Solution:**

a) Let point **P** divide the line in the desired ratio.

$$\mathbf{P} = \begin{pmatrix}x\\y\end{pmatrix} \tag{1.1.1}$$

$$\frac{AP}{PB} = \frac{3}{4} \tag{1.1.2}$$

In general the coordinates of the point $\mathbf{P} = \begin{pmatrix}x\\y\end{pmatrix}$ dividing the line joining the points,

$$\mathbf{A} = \begin{pmatrix}p\\q\end{pmatrix} \tag{1.1.3}$$

$$\mathbf{B} = \begin{pmatrix}r\\s\end{pmatrix} \tag{1.1.4}$$

internally in the ratio $\frac{m_1}{m_2}$ is given by

$$\frac{(m_1 r + m_2 p)}{(m_1 + m_2)}, \frac{(m_1 s + m_2 q)}{(m_1 + m_2)} \tag{1.1.5}$$

This is known as the section formula.

Given,

$$\frac{m_1}{m_2} = \frac{3}{4} \tag{1.1.6}$$

$$\implies \mathbf{P} = \begin{pmatrix}\frac{3\times2+4\times1}{3+4}\\\frac{3\times7+4\times3}{3+4}\end{pmatrix} \tag{1.1.7}$$

$$\implies \mathbf{P} = \begin{pmatrix}\frac{10}{7}\\\frac{33}{7}\end{pmatrix} \tag{1.1.8}$$

is the point which divides the line joining the points $\mathbf{A} = \begin{pmatrix}1\\3\end{pmatrix}$ and $\mathbf{B} = \begin{pmatrix}2\\7\end{pmatrix}$ in the ratio 3 : 4.

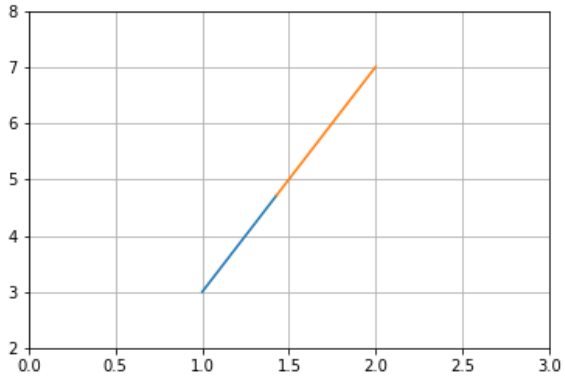


Fig. 1.1. Two lines representing given equations meet at point $\begin{pmatrix}2 & -1\end{pmatrix}$ .