Assignment - 2

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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

https://github.com/Padmanabhk1/Assignment−2/tree/main

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.

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

$$\frac{AP}{PB} = \frac{3}{4} = \frac{k}{1} \tag{1.1.2}$$

P is given by

$$\mathbf{P} = \left(\frac{k\mathbf{B}+\mathbf{A}}{k+1}\right) \tag{1.1.3}$$

$$= \frac{\frac{3}{4}\begin{pmatrix}2\\7\end{pmatrix} + \begin{pmatrix}1\\3\end{pmatrix}}{\frac{3}{4}+1} \tag{1.1.4}$$

$$= \frac{\begin{pmatrix}\frac{3}{2}\\\frac{21}{4}\end{pmatrix} + \begin{pmatrix}1\\3\end{pmatrix}}{\frac{7}{4}} \tag{1.1.5}$$

$$= \begin{pmatrix}\frac{10}{7}\\\frac{33}{7}\end{pmatrix} \tag{1.1.6}$$

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.

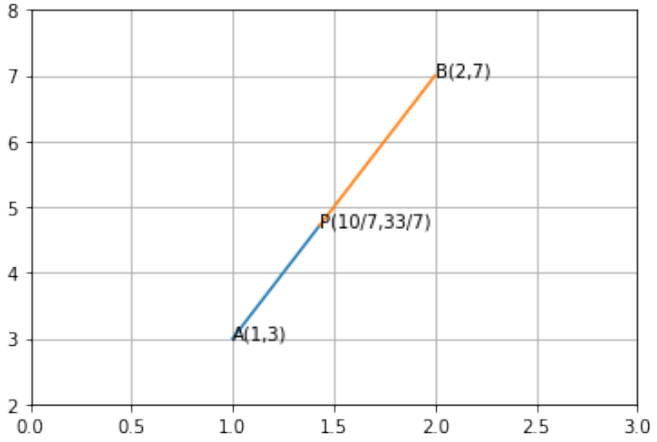

Fig. 1.1. Two lines representing given equations meet at point $\begin{pmatrix}2 & -1\end{pmatrix}$.