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

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 $\mathbf{P}$ divide the line in the desired ratio.

$$\mathbf{P} = \begin{pmatrix} x \\ y \end{pmatrix} \quad (1.1.1)$$

$$\frac{AP}{PB} = \frac{3}{4} = \frac{k}{1} \quad (1.1.2)$$

$\mathbf{P}$ is given by

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

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

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

$$= \begin{pmatrix} \frac{10}{7} \\ \frac{33}{7} \end{pmatrix} \quad (1.1.6)$$

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 $3 : 4$.
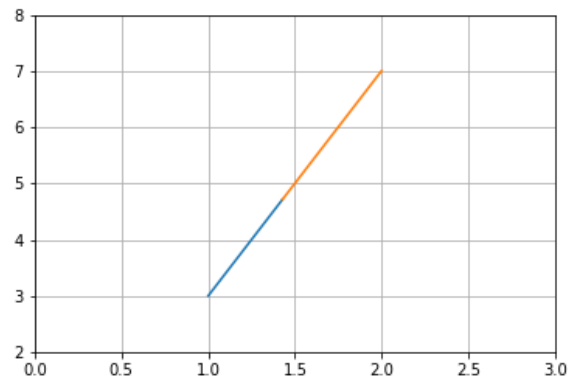

Fig. 1.1. Two lines representing given equations meet at point $\begin{pmatrix} 2 & -1 \end{pmatrix}$.