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

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svn co https://github.com/MVKKanth/Assignment
    -1
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1 Vectors (cbse/math/10/2008/qp-math-x-2008.pdf Code 30/2/1 - Q21)

1.1. If **P** divides the join of $\mathbf{A}\begin{pmatrix}-2\\-2\end{pmatrix}$ and $\mathbf{B}\begin{pmatrix}2\\-4\end{pmatrix}$ such that $\frac{\mathbf{AP}}{\mathbf{AB}} = \frac{3}{7}$, find the coordinates of P.

Solution:

a) Let

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

We have

$$\mathbf{A} = \begin{pmatrix}-2\\-2\end{pmatrix}, \mathbf{B} = \begin{pmatrix}2\\-4\end{pmatrix} \tag{1.1.2}$$

and

$$\frac{AP}{AB} = \frac{3}{7} \tag{1.1.3}$$

$$\mathbf{A} - \mathbf{P} = \begin{pmatrix}-2\\-2\end{pmatrix} - \begin{pmatrix}x\\y\end{pmatrix} \tag{1.1.4}$$

$$= \begin{pmatrix}-2-x\\-2-y\end{pmatrix} \tag{1.1.5}$$

$$\mathbf{A} - \mathbf{B} = \begin{pmatrix}-2\\-2\end{pmatrix} - \begin{pmatrix}2\\-4\end{pmatrix} \tag{1.1.6}$$

$$\tag{1.1.7}$$

We have below equation which is written in vector form:

$$\frac{\begin{pmatrix}-2-x\\-2-y\end{pmatrix}}{\begin{pmatrix}-2-2\\-2+4\end{pmatrix}} = \frac{3}{7} \tag{1.1.8}$$

Implies

$$\mathbf{7}\begin{pmatrix}-2-x\\-2-y\end{pmatrix} = \mathbf{3}\begin{pmatrix}-4\\2\end{pmatrix} \tag{1.1.9}$$

i.e,

$$\begin{pmatrix}-14-7x\\-14-7y\end{pmatrix} = \begin{pmatrix}-12\\6\end{pmatrix} \tag{1.1.10}$$

Hence,

$$\mathbf{-14-7x} = \mathbf{-12} \tag{1.1.11}$$

$$\mathbf{-14-7y} = \mathbf{6} \tag{1.1.12}$$

Therefore,

$$\mathbf{-7x} = 2 \tag{1.1.13}$$

$$\mathbf{-7y} = 20 \tag{1.1.14}$$

$$\mathbf{P}\begin{pmatrix}\frac{x}{y}\end{pmatrix} = \begin{pmatrix}\frac{-2}{7}\\\frac{-20}{7}\end{pmatrix} \tag{1.1.15}$$