

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/10/2008/QP-MATH-X-2008.PDF CODE
30/2/1 - Q21)

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

Solution:

a) Let

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

We have

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

and

$$\frac{AP}{AB} = \frac{3}{7} \quad (1.1.3)$$

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

$$= \begin{pmatrix} -2-x \\ -2-y \end{pmatrix} \quad (1.1.5)$$

$$\mathbf{A} - \mathbf{B} = \begin{pmatrix} -2 \\ -2 \end{pmatrix} - \begin{pmatrix} 2 \\ -4 \end{pmatrix} \quad (1.1.6)$$

$$(1.1.7)$$

We have below equation which is written in vector form:

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

Implies

$$7 \begin{pmatrix} -2-x \\ -2-y \end{pmatrix} = 3 \begin{pmatrix} -4 \\ 2 \end{pmatrix} \quad (1.1.9)$$

i.e,

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

Hence,

$$-14-7x = -12 \quad (1.1.11)$$

$$-14-7y = 6 \quad (1.1.12)$$

Therefore,

$$-7x = 2 \quad (1.1.13)$$

$$-7y = 20 \quad (1.1.14)$$

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