Assignment - 1

Saiteja Chandragiri
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Abstract—**This is a simple document to learn about vectors, matrices and constructions using latex, draw figures using Python, Latex.**

Download all python and latex-tikz codes from

svn co https://github.com/Chandragirisaiteja/
assignment−1.git

1 Vectors
CBSE-Math-10-2008-QP-Math-X-2008-30-2-2-Q.19

1.1. Find a relation between x and y if the points $\mathbf{A} = \begin{pmatrix} x \\ y \end{pmatrix}, \mathbf{B} = \begin{pmatrix} 1 \\ 2 \end{pmatrix} and \mathbf{C} = \begin{pmatrix} 7 \\ 0 \end{pmatrix}$ are collinear.

Solution: Let

$$\mathbf{X} = \begin{pmatrix} x \\ y \end{pmatrix}, \mathbf{B} = \begin{pmatrix} 1 \\ 2 \end{pmatrix} and \mathbf{C} = \begin{pmatrix} 7 \\ 0 \end{pmatrix} \qquad (1.1.1)$$

Then,

$$\mathbf{M} = \mathbf{B} - \mathbf{C} = \begin{pmatrix} -6 \\ 2 \end{pmatrix}, \qquad (1.1.2)$$

and

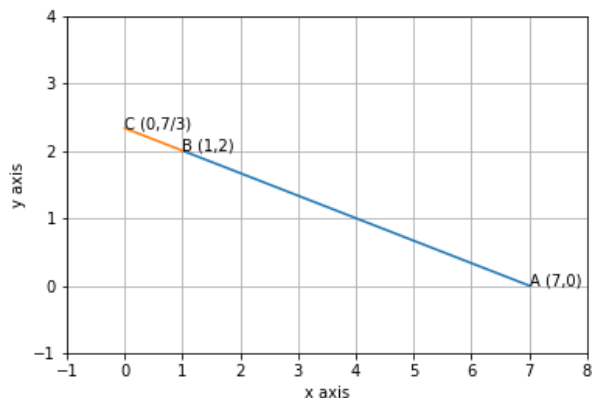$$\mathbf{N}^T \mathbf{M} = 0 \qquad (1.1.3)$$

Fig. 1.1. Three points $\mathbf{A}, \mathbf{B}, \mathbf{C}$ are collinear
.

$$\implies \mathbf{N}^T \begin{pmatrix} -6 \\ 2 \end{pmatrix} = 0 \implies \mathbf{N}^T = \begin{pmatrix} 2 & 6 \end{pmatrix} \qquad (1.1.4)$$

Equation of line is given by

$$\mathbf{N}^T(\mathbf{X} - \mathbf{B}) = 0 \implies \mathbf{N}^T(\mathbf{X} - \begin{pmatrix} 1 \\ 2 \end{pmatrix}) = 0 \qquad (1.1.5)$$

is the equation of the desired line.