Assignment 1

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Abstract— **This document explains the concept of Normal vector, Direction Vector and Y-intercept of a straight line by solving number of problems.**

I. PROBLEM

Find the direction vectors and and y-intercepts of the following lines

$$\begin{pmatrix} 1 & 7 \end{pmatrix} \vec{X} = 0 \tag{1}$$

$$\begin{pmatrix} 6 & 3 \end{pmatrix} \vec{X} = 5 \tag{2}$$

$$\begin{pmatrix} 0 & 1 \end{pmatrix} \vec{X} = 0 \tag{3}$$

Solution:

$$\vec{n} = \begin{pmatrix} a \\ b \end{pmatrix} \tag{4}$$

$$\vec{m} = \begin{pmatrix} b \\ -a \end{pmatrix} \tag{5}$$

1) Normal vector $\vec{n}$ is

$$\vec{n} = \begin{pmatrix} 1 \\ 7 \end{pmatrix} \tag{6}$$

Direction Vector

$$\vec{m} = \begin{pmatrix} 7 \\ -1 \end{pmatrix} \tag{7}$$

Y-intercept = 0

2) Normal vector $\vec{n}$ is

$$\vec{n} = \begin{pmatrix} 6 \\ 3 \end{pmatrix} \tag{8}$$

Direction Vector

$$\vec{m} = \begin{pmatrix} 3 \\ -6 \end{pmatrix} \tag{9}$$

Y-intercept = 5/3

3) Normal vector $\vec{n}$ is

$$\vec{n} = \begin{pmatrix} 0 \\ 1 \end{pmatrix} \tag{10}$$

Direction Vector

$$\vec{m} = \begin{pmatrix} 1 \\ 0 \end{pmatrix} \tag{11}$$

Y-intercept = 0