Quiz 4

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***Abstract*—This document contains the solution of the question from NCERT 11th standard chapter 10 exercise 10.2 problem 2**

1 Exercise 10.2

1) Find the equation of the line passing through the point (-4,3) and having slope $\frac{1}{2}$

Slope of line, $m = \frac{1}{2} \Rightarrow$ the direction vector of the line is,

$$\mathbf{m} = \begin{pmatrix} 1 \\ m \end{pmatrix} = \begin{pmatrix} 1 \\ \frac{1}{2} \end{pmatrix} \tag{1.0.1}$$

Hence the normal vector of the line is,

$$\mathbf{n} = \begin{pmatrix} 1 \\ -2 \end{pmatrix} \tag{1.0.2}$$

The equation of the line in normal form is,

$$\mathbf{n}^\top \left(\mathbf{x} - \begin{pmatrix} -4 \\ 3 \end{pmatrix} \right) = 0 \tag{1.0.3}$$

$$\begin{pmatrix} 1 & -2 \end{pmatrix} \left(\mathbf{x} - \begin{pmatrix} -4 \\ 3 \end{pmatrix} \right) = 0 \tag{1.0.4}$$

$$\begin{pmatrix} 1 & -2 \end{pmatrix} \mathbf{x} - \begin{pmatrix} 1 & -2 \end{pmatrix} \begin{pmatrix} -4 \\ 3 \end{pmatrix} = 0 \tag{1.0.5}$$

$$\begin{pmatrix} 1 & -2 \end{pmatrix} \mathbf{x} - (-4 - 6) = 0 \tag{1.0.6}$$

$$\begin{pmatrix} 1 & -2 \end{pmatrix} \mathbf{x} + 10 = 0 \tag{1.0.7}$$