Quiz 7

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***Abstract*—This document contains the solution of the question from NCERT 12th standard chapter 11 exercise 11.1 problem 3**

1 Exercise 11.1

1) If a line has direction ratios-18,12,-4 then what are its direction cosines?
The direction vector of the given line is,

$$\mathbf{m} = \begin{pmatrix} -18 \\ 12 \\ -4 \end{pmatrix} \tag{1.0.1}$$

The unit vector along the direction vector is,

$$\mathbf{n} = \frac{\mathbf{m}}{\|\mathbf{m}\|} \tag{1.0.2}$$

$$\mathbf{n} = \frac{1}{\sqrt{(-18)^2 + (12)^2 + (-4)^2}} \begin{pmatrix} -18 \\ 12 \\ -4 \end{pmatrix} \tag{1.0.3}$$

$$\mathbf{n} = \frac{1}{\sqrt{484}} \begin{pmatrix} -18 \\ 12 \\ -4 \end{pmatrix} \tag{1.0.4}$$

$$\mathbf{n} = \frac{1}{22} \begin{pmatrix} -18 \\ 12 \\ -4 \end{pmatrix} \tag{1.0.5}$$

$$\mathbf{n} = \begin{pmatrix} \frac{-9}{11} \\ \frac{6}{11} \\ \frac{-2}{11} \end{pmatrix} \tag{1.0.6}$$

$$\tag{1.0.7}$$

The elements in the vector $\mathbf{n}$ are the direction cosines of the line.
Hence the direction cosines of the line are,

$$\begin{pmatrix} \frac{-9}{11} & \frac{6}{11} & \frac{-2}{11} \end{pmatrix} \tag{1.0.8}$$