

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,

$$\mathbf{m} = \begin{pmatrix} -18 \\ 12 \\ -4 \end{pmatrix} \quad (1.0.1)$$

The unit vector along the direction vector is,

$$\mathbf{n} = \frac{\mathbf{m}}{\|\mathbf{m}\|} \quad (1.0.2)$$

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

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

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

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

$$(1.0.7)$$

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

Hence the direction cosines of the line are,

$$\left(\frac{-9}{11} \quad \frac{6}{11} \quad \frac{-2}{11} \right) \quad (1.0.8)$$