# Three Dimensional Geometry

## $12^{th}$ Maths - Chapter 11

This is Problem-3 from Exercise 11.1

1. If a line has the direction ratios –18, 12, –4, then what are its direction cosines ?

   **Solution:** let $\mathbf{A}$ be the given vector

   $$\mathbf{A} = \begin{pmatrix} -18 \\ 12 \\ -4 \end{pmatrix} \tag{1}$$

   Then $\mathbf{B}$ be the unit vector in the direction of $\mathbf{A}$ then directions cosines is given by

   $$\mathbf{B} = \frac{\mathbf{A}}{\|\mathbf{A}\|} \tag{2}$$

   The magnitude for $\mathbf{A}$ is

   $$\|\mathbf{A}\| = 22 \tag{3}$$

   Then direction cosines are

   $$\mathbf{B} = \left( \frac{-9}{11}, \frac{6}{11}, \frac{-2}{11} \right) \tag{4}$$