

Answer on Question #75326 – Math – Analytic Geometry

Question

1. Obtain the equation of the line passing through (1,-1,2) having direction ratios (2,0,1).

Solution

The symmetric form of the equation of a line passing through a point M (x_0, y_0, z_0) and having direction ratios a, b and c is:

$$\frac{x - x_0}{a} = \frac{y - y_0}{b} = \frac{z - z_0}{c} \quad (1)$$

The parametric form of the equation of a line passing through a point M (x_0, y_0, z_0) and having direction ratios a, b and c is:

$$\begin{cases} x = x_0 + at \\ y = y_0 + bt \\ z = z_0 + ct, \quad t \in R \end{cases} \quad (2)$$

Putting the values of x_0, y_0, z_0 and a, b, c in (1) and (2) we get the equation of the line passing through (1,-1,2) having direction ratios (2,0,1):

$$\frac{x - 1}{2} = \frac{y + 1}{0} = \frac{z - 2}{1} \leftrightarrow \begin{cases} x = 1 + 2t \\ y = -1 \\ z = 2 + t \end{cases}, \quad t \in R$$

Answer:

$$\frac{x - 1}{2} = \frac{y + 1}{0} = \frac{z - 2}{1} \leftrightarrow \begin{cases} x = 1 + 2t \\ y = -1 \\ z = 2 + t \end{cases}, \quad t \in R$$