

8.3 Lines in Three Space

As in \mathbb{R}^2 , to get an **equation for a line** we will need **two bits of information**. We need either:

- A) A known point and a direction vector.
- B) Two known points (from which we get a direction vector).

Note: “Slope” has no real meaning in \mathbb{R}^3 , and so there are **no scalar equations in 3-Space!**

Vector Equation

A line L passes through the point $P_0(x_0, y_0, z_0)$ and has direction vector $\vec{m} = (a, b, c)$ determine a vector equation of L .

Parametric Equations

Symmetric Equations

Example 8.3.1

From your text: Pg. 449 #5f

Determine the vector, parametric and symmetric equations for the line passing through the point $Q(1, 2, 4)$ and which is parallel to the z -axis.

Class/Homework for Section 8.3

KNOW the equations for line in 3-Space

Pg. 449 – 450 #1, 2, 4 – 6, 8 – 11