VECTORS

Chapter 8 –Equations of Lines and Planes

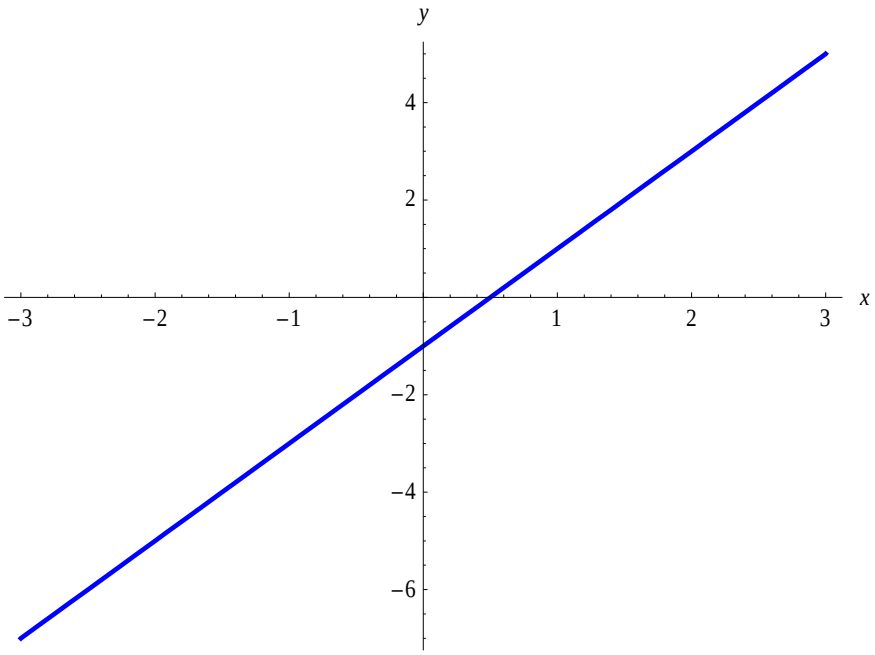
(*Material adapted from Chapter 8 of your text*)

A∞Ω
MATH@TD

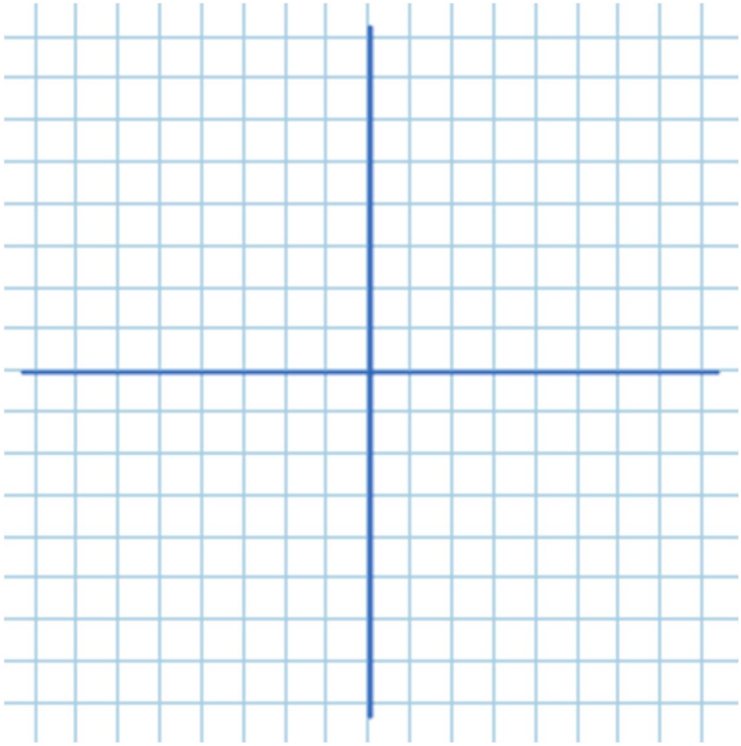
8.1 Vector and Parametric Equations of Lines (1)

Recall: A line is a **set of points** $\{(x, y) \mid y = mx + b\}$ where $y = mx + b$ is a functional relationship between domain and range values.

Consider the sketch of $y = 2x - 1$:

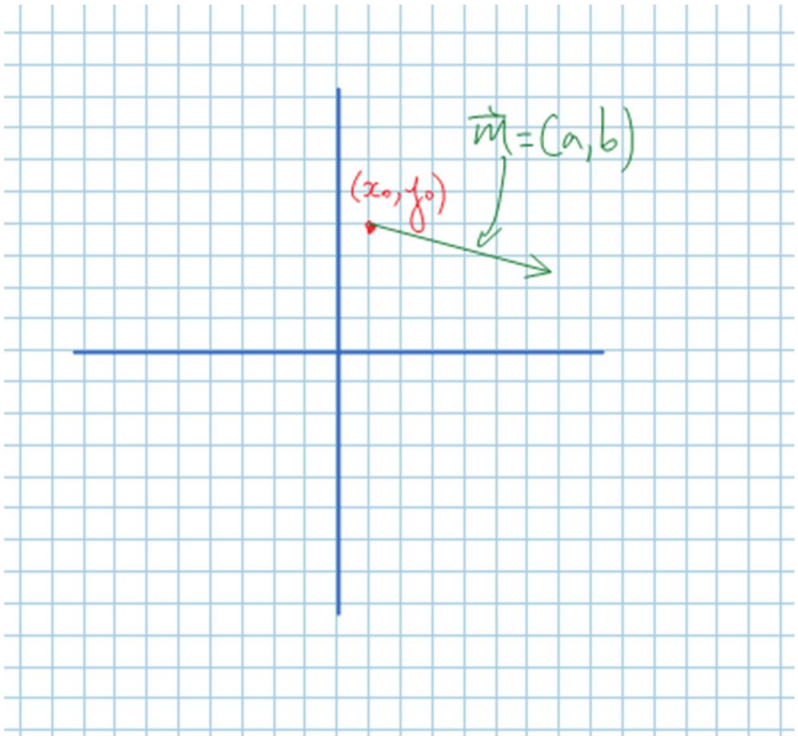


Problem: Consider a line with a direction vector $\vec{m} = (1, 2)$



Vector Equation of a Line

Consider the sketch of a line through the **known** point (x_0, y_0) with **direction vector** $\vec{m} = (a, b)$.



Example 8.1.1

Determine a vector equation of the line through $A(-1,4)$ with direction $\vec{m}=(4,1)$.

We can also write this as:

Note:

Q. Is the point $B(5,9)$ on our line?

Q. Is the vector equation of a line **unique**?

Example 8.1.2

Obtain a vector equation (and parametric equations) for the line passing through the points $A(2,5)$ and $B(-1,2)$.

Example 8.1.3

Determine vector and parametric equations for the line through $A(-1,3)$ and which is perpendicular to the line with vector equation $\vec{r} = (2,1) + t(-2,3)$.

Class/Homework for Section 8.1

Pg. 432 Investigation (smile as you do it)
Pg. 433 – 434 #1 – 3, 5, 6, 9 – 12