# VECTORS

## *Chapter 8 –Equations of Lines and Planes*

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

A∞Ω
MATH@TD

# Chapter 8 – Equations of Lines and Planes

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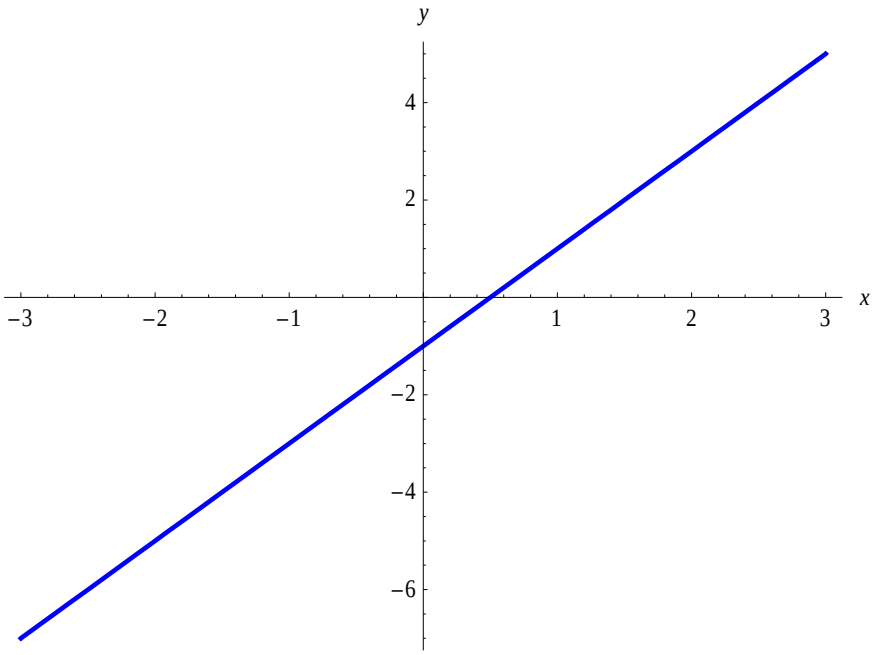
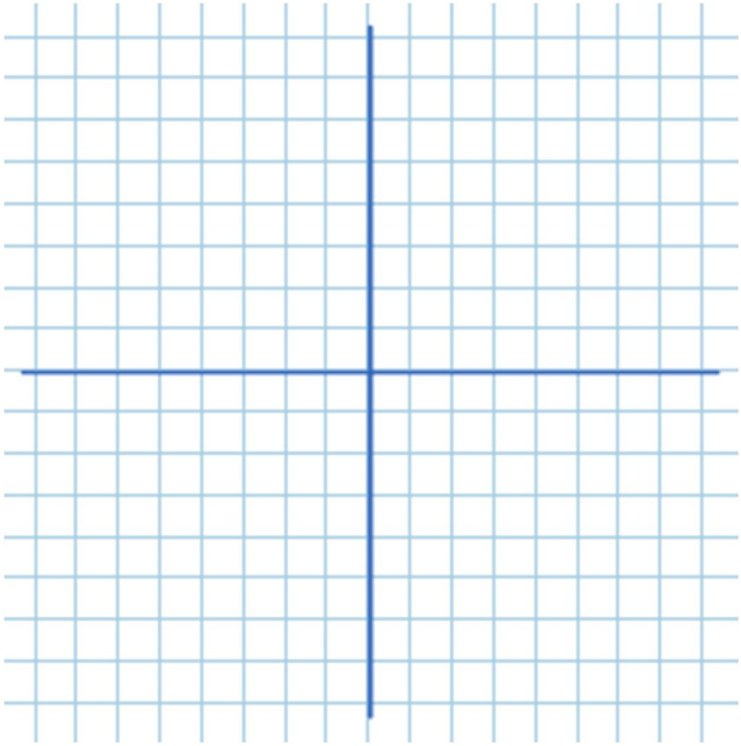
# 8.1 Vector and Parametric Equations of Lines (1)

**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 $y = 2x - 1$:

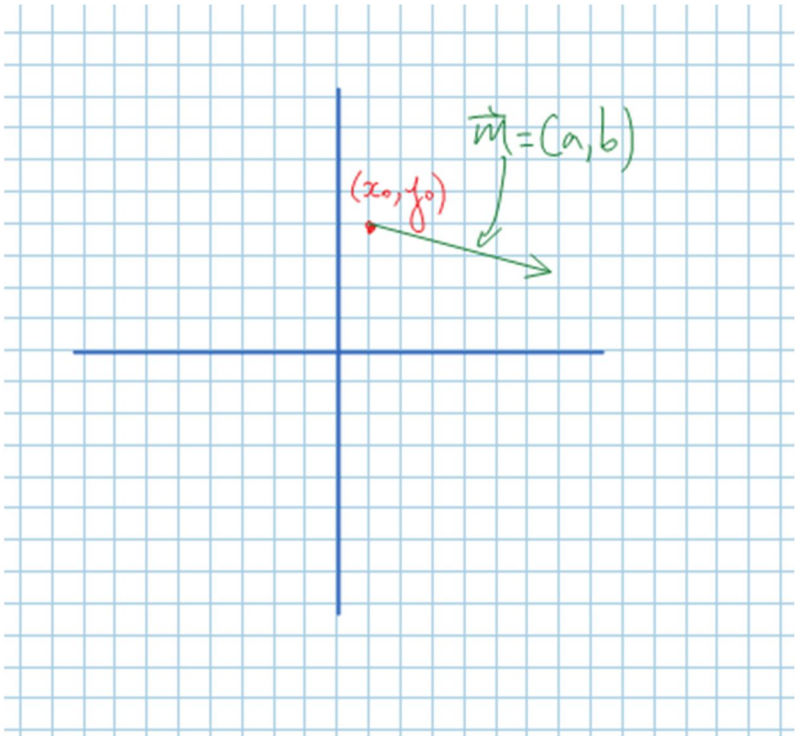


**Problem**: Consider a line with a direction vector $\vec{m} = (1, 2)$



# 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*