Introduce Cartesian Coordinate System (Named after French Philosopher & Math guy Rene Descartes):

* Describes 2-D space
* X & y Axis
* Points as ordered pairs (Show examples)
* Origin (0,0)
* Quadrants

Often there are more than one way to conceptualize a math topic.

Consider equation: $y=2x$

What is this equation?

(relationship between x and y; a line w/ slope 2)

What are solutions to this?

What are the set of all solutions to this?

We can view this as a bunch of ordered pairs and if we plot them we have a geometric representation.

Def: A **solution** to an equation is the value of the unknowns that makes the equation true.

Graphs are the collection of all solutions to equations!

Ex: (2.1.22) Are the points $\left(1,4\right)\& (0,1)$ solutions to the equation $y=5x-1$? YES & NO

Methods for graphing:

1. Plot points, connect the dots
2. Recognize the equation and plot reference points, then sketch

Types of graphs:

## Linear Equations

Ex: Graph the equations

1. $y=-3x$
2. $y=2x-3$
3. $-2y+3x=8$

1. Show T-table

2. Talk about slope-intercept form

These are all examples of linear equations.

Def: Any polynomial equation of degree one is called a **linear equation.**

I.E. Any equation whose graph is a straight line is a linear equation.

## Non-Linear Equations

Def: Any equation whose graph is not a straight line is called **a Non-Linear Equation.**

Examples:

1. $y=\left|x\right|$
2. $y=x^{2}$
3. Students come up with any more?

Def: The Absolute value of x, $y=\left|x\right|$, is defined by $f\left(x\right)=\left\{\begin{array}{c}-x, \&x<0\\x, \&x\geq 0\end{array}\right.$

Ex: Graph the equations

1. $y=\left|x\right|+1$
2. $y=\left|x\right|-2$
3. $y=x^{2}$
4. $y=x^{2}+1$
5. $y=x^{2}-2$