Today, we're in Chapter 3.

Relation - A set of ordered pairs.

Function - A relation in which the first components are paired with only one 2nd component.

$R = \{(0,1), (1,-1), (2,1)\}$

D = Domain = $\{0,1,2\}$ = The set of 1st components (x,y)

R = Range = $\{-1,1\}$ = The set of 2nd components (x,y)

R is a function.

If it's a function, then knowing x means we know the corresponding y.

$R: 0 \longrightarrow 1$ R sends 0 to 1

x is the input
y is the output, and it's unambiguous.

We say that y is a function of x, then.

$y = f(x)$

y is f of x.

Our favorite functions: Linear Functions

$y = 3x+2$ is a linear function.

Function Notation:

$f(x) = 3x+2$

$y = f(x)$

y depends on x.

y is dependent variable.

x is independent variable.

How'd we jump from a few points in set brackets to ordered pairs

$f(x) = 3x+2$?

$3x+2$ is the rule by which y is obtained from x. It's easier to work with the rule $y=3x+2$, than it is to list every point (ordered pair) on the line.

x	$y = 3x+2$
-1	-1
0	2
1	5
2	8

$3(-1)+2 = -3+2 = -1$

$3(1)+2 = 5$

A selection of ordered pairs in this relation.

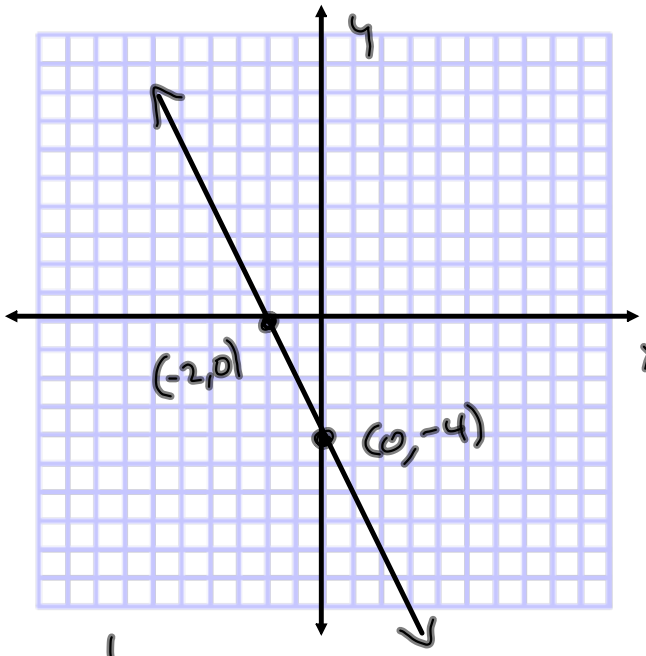
$\{(-1,-1), (0,2), (1,5), (2,8)\}$

$Ax+By=C$ is STANDARD FORM.

$y = mx+b$ is Slope-Intercept form Coming Soon!

$y-y_1 = m(x-x_1)$ is Point-Slope form

$y = m(x-x_1)+y_1$ is my preferred version of point-slope.



Graphing Lines

Intercepts are best points of all!

$y = -2x - 4$

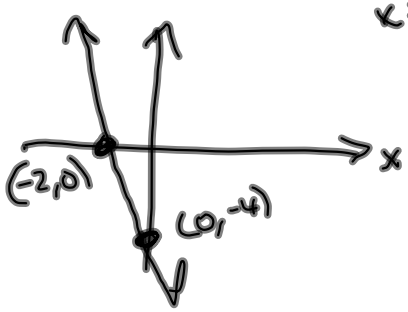
x	y
0	-4
-2	0

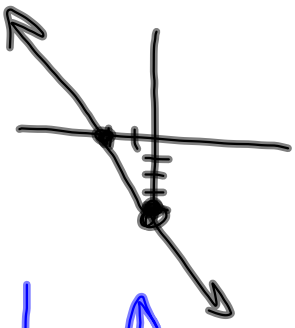
$0 = -2x - 4$

$-2x - 4 = 0$

$-2x = 4$

$x = \frac{4}{-2} = -2$

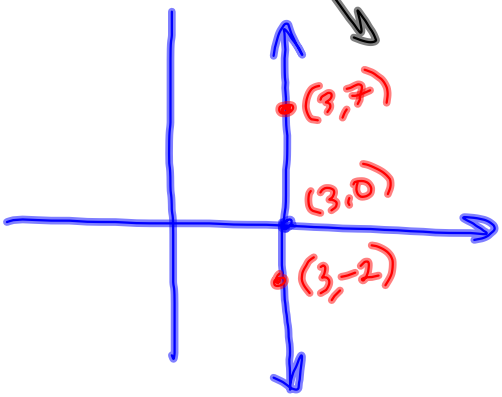




All lines are functions, except vertical lines

$x = 3$

↳ Puts No restriction on y.



All lines have BOTH an x-intercept and a y-intercept, EXCEPT

Vertical Lines and

Horizontal Lines

(y=0 & x=0 have both, but none of the others do)