35 $\left(-2, \frac{1}{2}\right), \left(-4, \frac{1}{3}\right)$

$(x_1, y_1), (x_2, y_2)$

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{\frac{1}{3} - \frac{1}{2}}{-4-(-2)} = \frac{\frac{1}{3}\cdot\frac{2}{2} - \frac{1}{2}\cdot\frac{3}{3}}{-4+2} = \frac{\frac{2-3}{6}}{-2}$$

$$= \frac{-\frac{1}{6}}{-2} = \frac{-\frac{1}{6}}{-\frac{2}{1}} = \left(-\frac{1}{6}\right)\left(-\frac{1}{2}\right) = \frac{1}{12} = m$$

11 $2x+5y=-11$

$$3x+7y=5$$
$$-3x \qquad = -3x$$

$$7y = -3x+5$$

m = coefficient of x

$$y = \frac{-3x+5}{7} = \frac{-3x}{7} + \frac{5}{7} = -\frac{3}{7}x + \frac{5}{7}$$

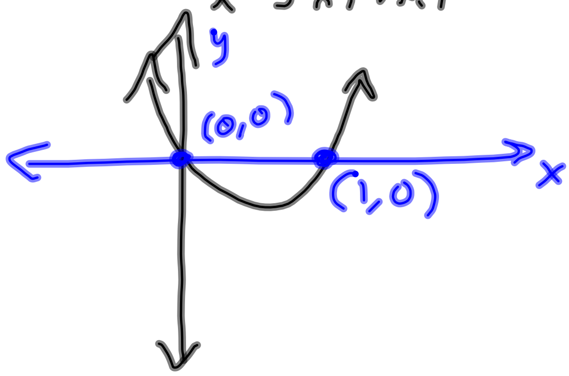
$$\longrightarrow m = -\frac{3}{7}$$

$Ax+By=C$

$$m = -\frac{A}{B}$$

x^2

$x^2-5x+17.1$



$y = x^2 - x$ SET $= 0$

$\Longrightarrow \quad x(x-1) = 0$

$\underline{x=0}$ or $x-1=0$

$\underline{x=1}$

$y = x^2 - x = 0$

$= x^2 - x + 0$

$a=1,\ b=-1,\ c=0$

$b^2-4ac = (-1)^2 - 4(1)(0)$

$= 1$

$$x = \frac{-b \pm \sqrt{b^2-4ac}}{2a} = \frac{+1 \pm 1}{2(1)} = \frac{1\pm 1}{2}$$

$\frac{1+1}{2} = 1$

$\frac{1-1}{2} = 0$

x-ints: $(0,0)$, $(1,0)$

$3x^2+2x-5$

$a=3,\ b=2,\ c=-5$

$y = mx + \underline{b}$

$(0, b)$

y-int: $x = 0$ $\qquad y = m(0) + b \Longrightarrow y = b \rightsquigarrow (0, b)$

x-int: $y = 0$ $\qquad 0 = mx + b$ & solve for x.

$\rightsquigarrow \left(-\frac{b}{m}, 0\right)$ is the point on the graph.

$$mx + b = 0$$
$$mx = -b$$
$$x = -\frac{b}{m}$$

§3.4 Linear Inequalities

Scratch out the bad stuff!

§3.4 #s 1-15, 21-39

Wed

§3.5 Functions

$$\frac{Gm_1m_2}{r^2}$$

§3.5 #s 1-17, $\underset{\text{ALL}}{\underline{19-22}}$, 23-29, 33

Draw the pictures!

§3.6 #s 1-45, 53 Function Notation

$f(x)$

§3.7 Variation

#s 1-21, 24, 26

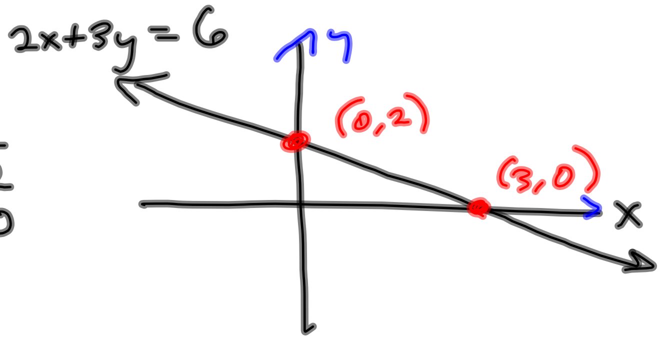
§3.8 #s 1-21, 27-37, $\underset{\text{ALL}}{\underline{39-44}}$

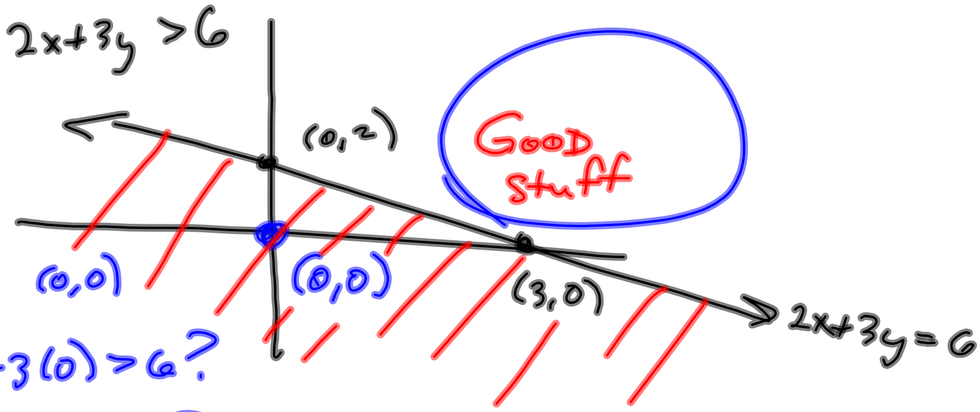
Operations on Functions

§3.4 Linear Inequalities.

A line divides the plane into 2 half-planes

x	y
0	2
3	0





Test: (0,0)

$2(0)+3(0)>6?$

$0>6?$

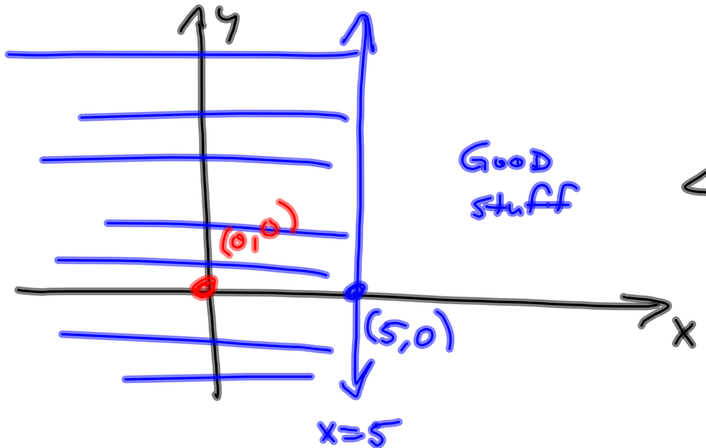
No.

(0,0) is bad

Scratch it out

<u>Label</u> the Good Stuff

$x \geq 5$



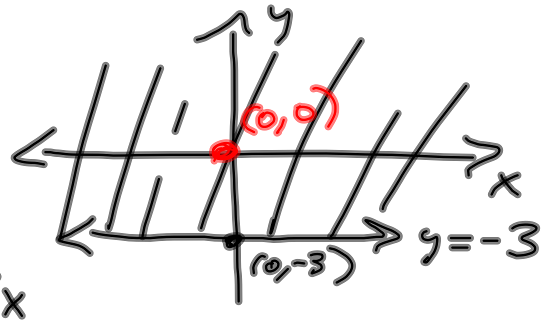
(0,0) Good?

$0 \geq 5$?

No

(0,0) Bad

$y < -3$



(0,0) Good?

$0 < -3$?

No.

(0,0) Bad

0, 1, 2, 3, 4, 5, 6, 7, 8, 9 A, B, C, D, E, F

#40 $\frac{x}{2} + \frac{y}{3} < 1$

x	y
0	3
2	0

$\frac{y}{3} = 1 \longrightarrow \frac{y}{3} = \frac{3}{3} \longrightarrow y = 3$

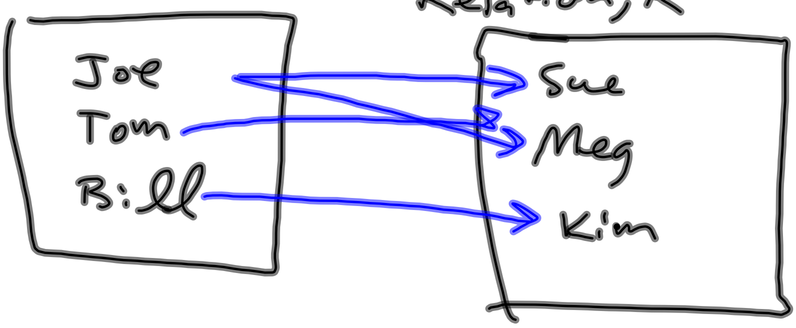
§3.5 Functions

A relation is a rule for sending <u>things from one place</u> to <u>things in another place</u>

Inputs = Domain x's

outputs = Range y's

Relation, R



$R = \{(\text{Joe}, \text{Sue}), (\text{Joe}, \text{Meg}), (\text{Tom}, \text{meg}), (\text{Bill}, \text{Kim})\}$

A <u>function</u> is a relation that only has one output for one input.

Guys can't fool around!

The relation, above, is NOT a function.

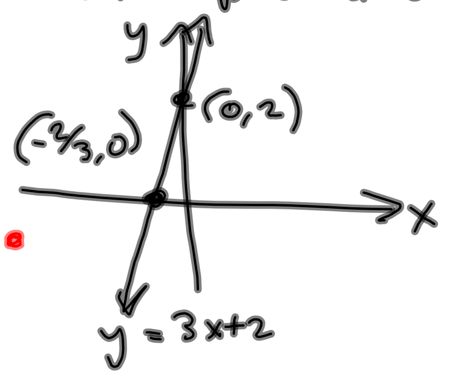
We generally consider y as a function of x.

$$y = 3x + 2$$

x is the input.

y is what we did to x.

Here's a picture of that rule:



$$y = 3x+2 \overset{\text{SET}}{=} 0$$

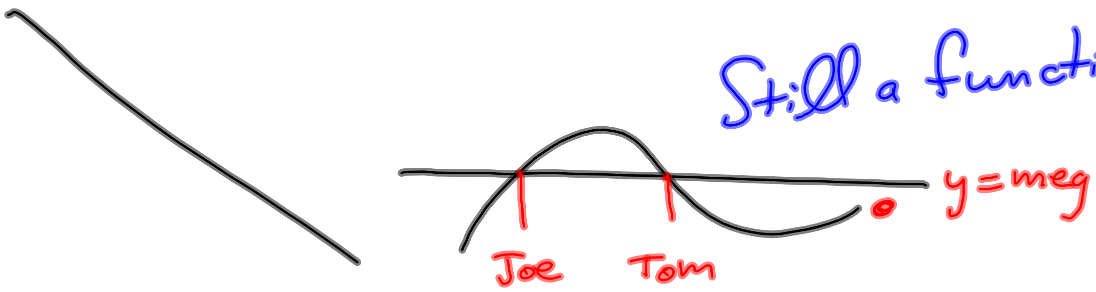
$$3x = -2$$

$$x = -\frac{2}{3}$$

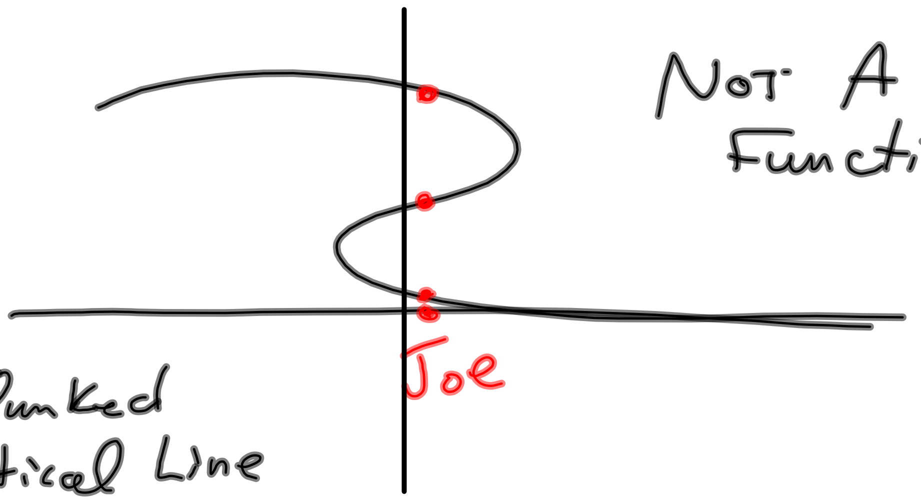
Pretty much ANYTHING with y all by itself and any expression in the variable x is a function.
Just can't have " $\pm$ " in the expression $\pm$

$$y = \sqrt{x} \qquad y = \frac{x^2 - 5x + 7}{\sqrt{x-1} + 11}$$

pictures of $y =$ function of x



Still a function.



Not A Function!

Flunked Vertical Line Test.

When y is a function of x,

we write $y = f(x)$

$y = 3x+2 \iff f(x) = 3x+2$

we say "$y = f$ of x"

This x is an input

It is NOT f times x.

If $f(x) = 3x+2$, what's $f(7)$?

"f of 7"

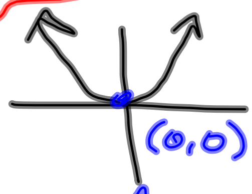
$f(7) = 3(7)+2$

$= 21+2 = 23$

$f(☺) = 3☺+2$

$f(\square) = 3\square+2$

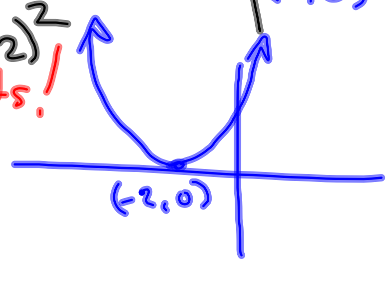
$f(a+b) = 3(a+b)+2$



$f(x) = x^2$

$f(x+2) = (x+2)^2$

Shift left 2 units!



§3.6 #5 13–24

$f(x) = 2x - 5$, $g(x) = x^2 + 3x + 4$

24 $g(a+2)$

$$\boxed{= (a+2)^2 + 3(a+2) + 4}$$

$= a^2 + 4a + 4 + 3a + 6 + 4$

$= a^2 + 7a + 14$

$(x+y)^2 =$

$x^2 + 2xy + y^2$

$g(a) + 2 = (a^2 + 3a + 4) + 2$

$= a^2 + 3a + 6$

Be SURE you know the difference

$\cancel{+}525-30$

$f = \{ (1,4), (-2,0), (3, \frac{1}{2}), (\pi, 0) \}$

$f(1) = 4$

$f(\pi) = 0$

Let $f(x) = x^2 + 2x - 1$

Simplify $f(x+h)$

Standard Test Question Build-up.

$= x^2 + 2x + 2xh + h^2 + 2h - 1$

$(x+h)^2 + 2(x+h) - 1 = x^2 + 2xh + h^2 + 2x + 2h - 1$

Simplify $\dfrac{f(x+h) - f(x)}{h}$ = Difference Quotient

$$= \frac{x^2 + 2xh + h^2 + 2x + 2h - 1 - (x^2 + 2x - 1)}{h}$$

$$= \frac{x^2 + 2xh + h^2 + 2x + 2h - 1 - x^2 - 2x + 1}{h}$$

$$= \frac{2xh + h^2 + 2h}{h}$$

$$= \frac{h(2x + h + 2)}{h} = 2x \cancel{+h} + 2$$