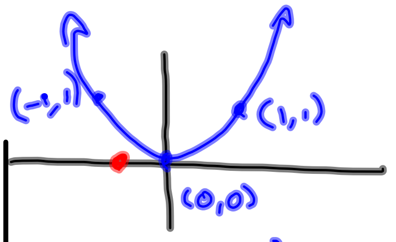
Recall : we graphed $f(x) = x^2$



$f(x) = x^2$

$f(\square) = \square^2$

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

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

$f(x) = x^2$

$\boxed{y = f(x)}$

y is UNIQUELY DETERMINED by x.

$f(x) = x^2$

what x-values make the output real?

$x \cdot x$ is real.

Domain $= \mathbb{R} = (-\infty, \infty)$

Range $= [0, \infty)$

squayah bracket

$f(x) = \sqrt{x}$

x	$f(x) = \sqrt{x}$
-3	$i\sqrt{3}$
0	0
1	1
4	2
9	3

$f(-3) = \sqrt{-3} = i\sqrt{3}$ is imaginary (It ain't real)

b/c $0^2 = 0$

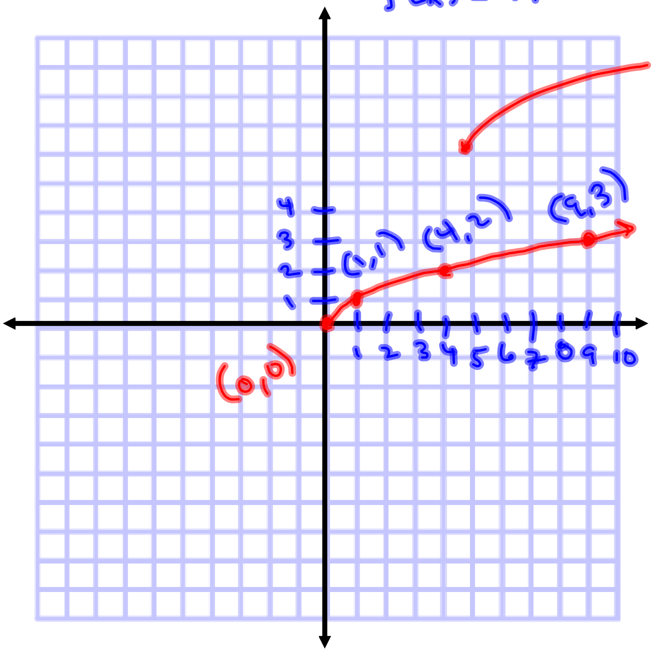
b/c $1^2 = 1$

b/c $2^2 = 4$

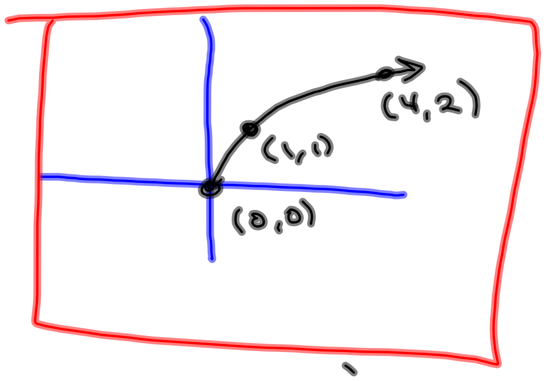
We want $f(x)$ to be real. We need to be careful about the x's we feed it

Perfect squares are NICE to feed $\sqrt{x}$

$f(x) = \sqrt{x}$



THE ESSENCE:

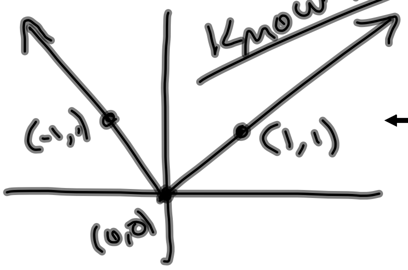


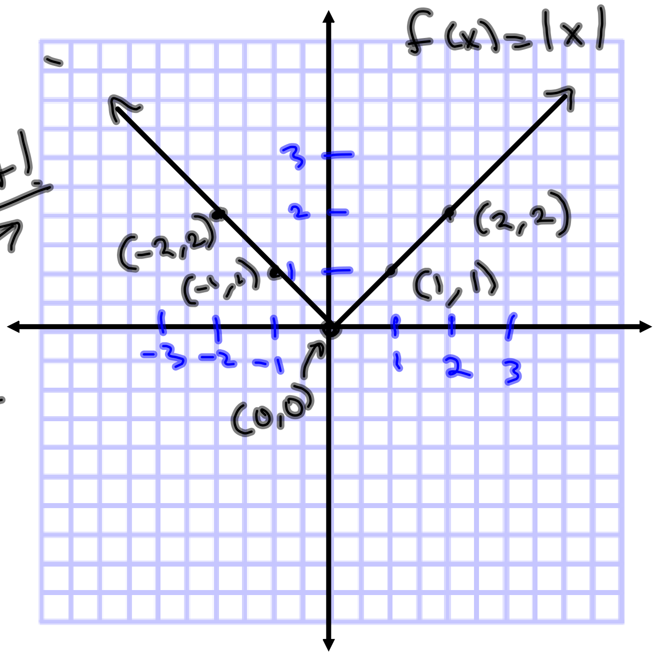
$$f(x) = |x| = \begin{cases} x & \text{if } x \geq 0 \\ -x & \text{if } x < 0 \end{cases}$$

x	$f(x) = \lvert x \rvert$
-2	2
-1	1
0	0
1	1
2	2

$f(-2) = 2 \quad (= -(-2))$

Know it!





$f(x) = \sqrt{x}$

$f(x-5) = \sqrt{x-5}$

$x-5$ inside

$x-5$ is the argument.

When I replace x by $x-5$, what does that do to $f(x)$?

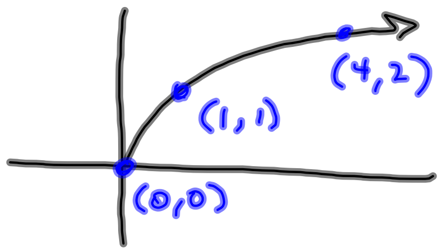
$g(x) = \sqrt{x-5}$

x	$g(x) = f(x-5)$
-1	$\sqrt{-1-5} = \sqrt{-6}$ Nah!
0	$\sqrt{-5}$ Nope
1	$\sqrt{1-5} = \sqrt{-4} = i\sqrt{4} = 2i$
$\vdots$	
5	$\sqrt{5-5} = 0$

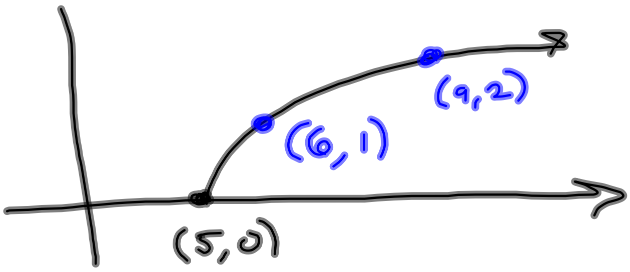
$\mathcal{D}(f(x)) = \{x \mid x \geq 0\} = [0, \infty)$

$\mathcal{D}(f(x-5)) = \{x \mid x-5 \geq 0\} = \{x \mid x \geq 5\} = [5, \infty)$

Have to <u>wait</u> 5 units (minutes?) for it to kick in.



$f(x) = \sqrt{x}$



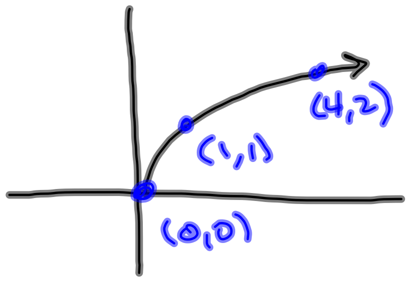
$f(x) = \sqrt{x-5} = g(x)$

$f(x-5)$ is $f(x)$ moved RIGHT 5.

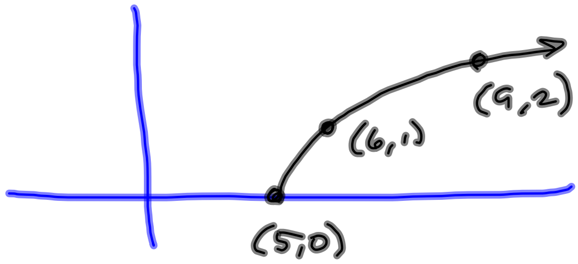
$(x, y) \longrightarrow (x+5, y)$

$\sqrt{x-5} + 7 = h(x)$

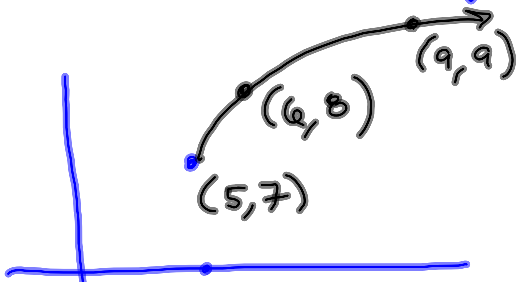
Take the last picture, move it up 7 (A plus 7 <u>outs</u>ide)



$f(x) = \sqrt{x}$



$f(x-5) = \sqrt{x-5} = g(x)$



$f(x-5)+7 = \sqrt{x-5} + 7$

I will post a homework in the next 24 hours.

Today was § 3.6 stuff.