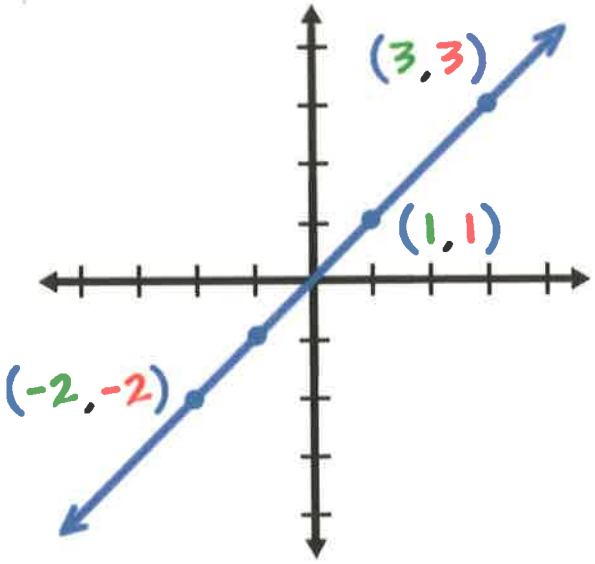
The following is taken from http://www.coolmath.com/precalculus-review-calculus-intro.

First, here's a special line guy that you've probably seen before... I call him

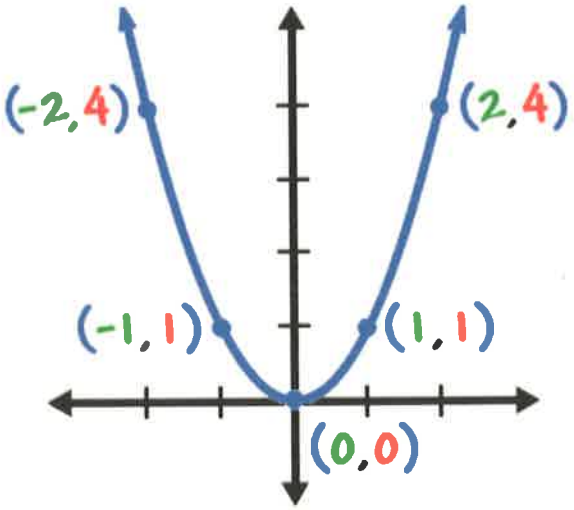
45° Line Guy:

$y = x$



And you probably already love Standard Parabola Guy:

$y = x^2$

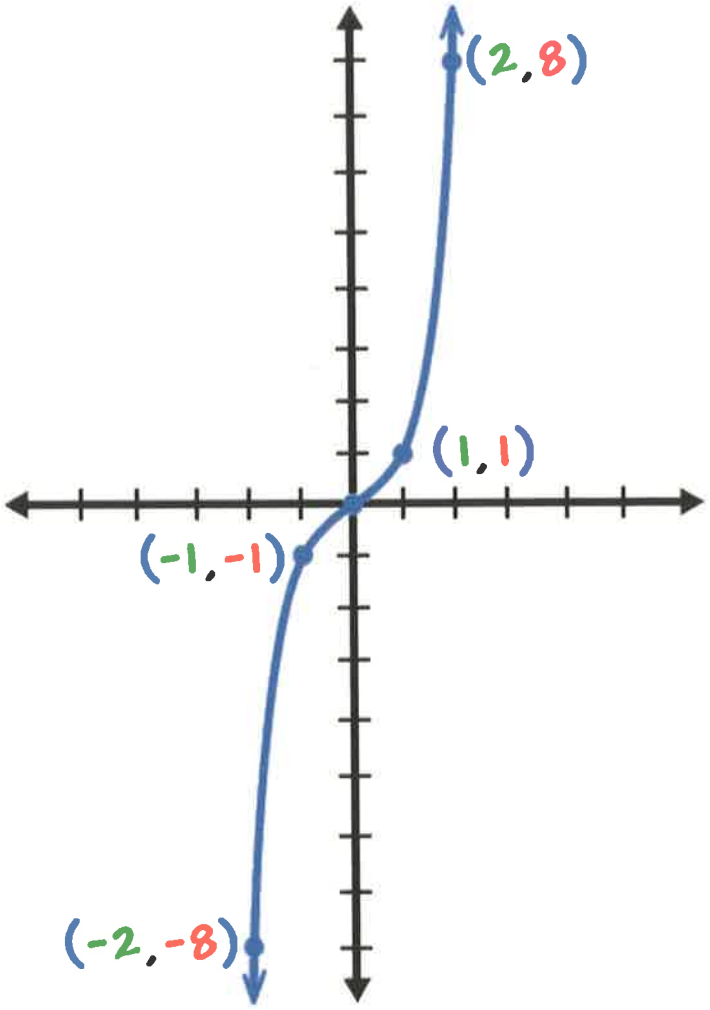


Here are some that may be new to you:

The Disco Graph:

$y = x^3$

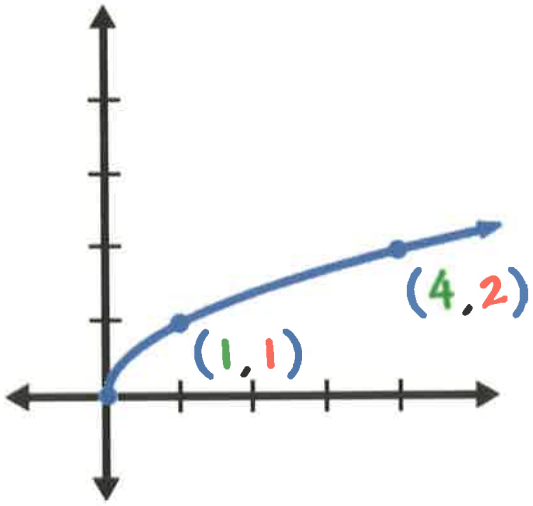
You know...
John Travolta?
That pose?



Square Root Guy:

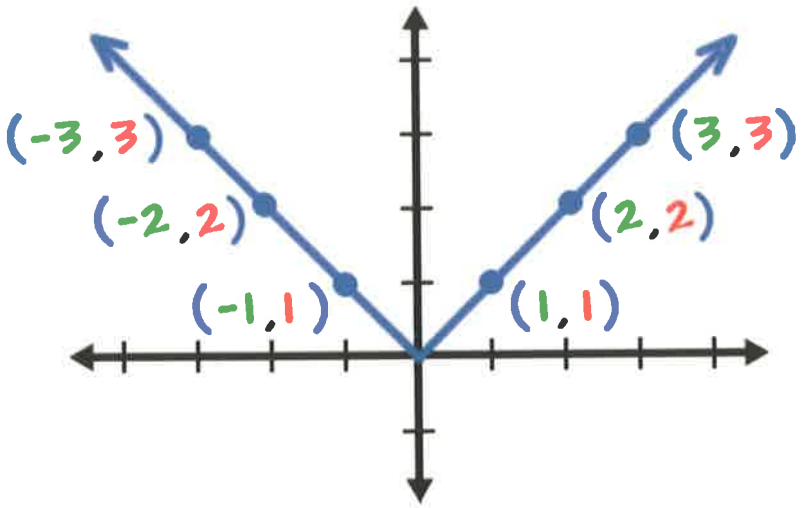
$y = \sqrt{x}$

It's just half of
a parabola lying
on its side.



Absolute Value Guy (or V guy):

$y = |x|$



Piece-Wise Functions

Up till now, we've been graphing things like

$$y = x^2$$

$$y = 3x - 5$$

$$y = -2|x - 1|$$

Now, we're going to graph something that comes in more than one chunk. You'll see.

Let's just dive in and do one:

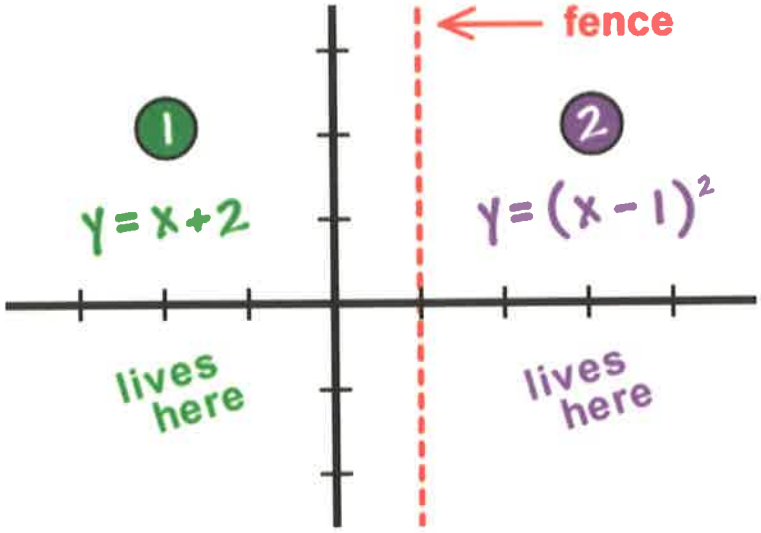
Graph

$$y = \begin{cases} x + 2 \; ; \; x < 1 & \leftarrow (1) \\ (x-1)^2 \; ; \; x \geq 1 & \leftarrow (2) \end{cases}$$

It's in two pieces!

Each piece must live ONLY in its own neighborhood.

Let's put up a fence, so we don't make any mistakes:

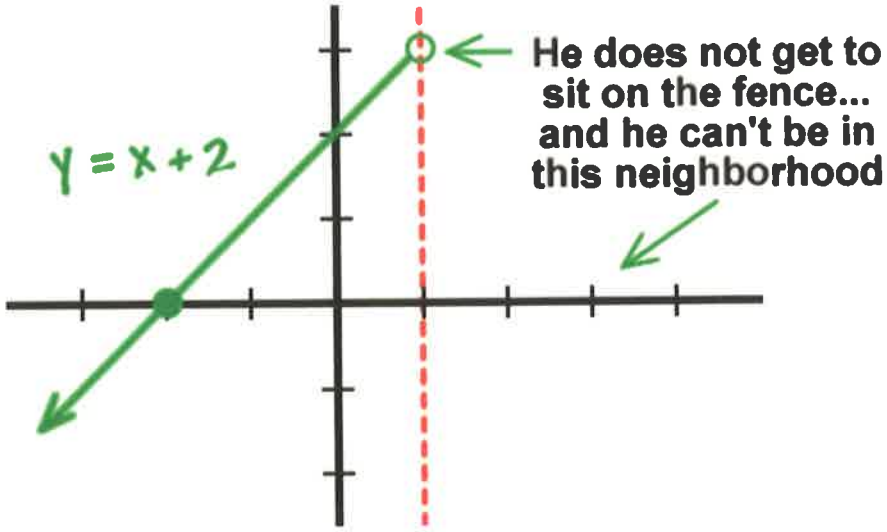


Now, we just need to figure out who the fence owner is...

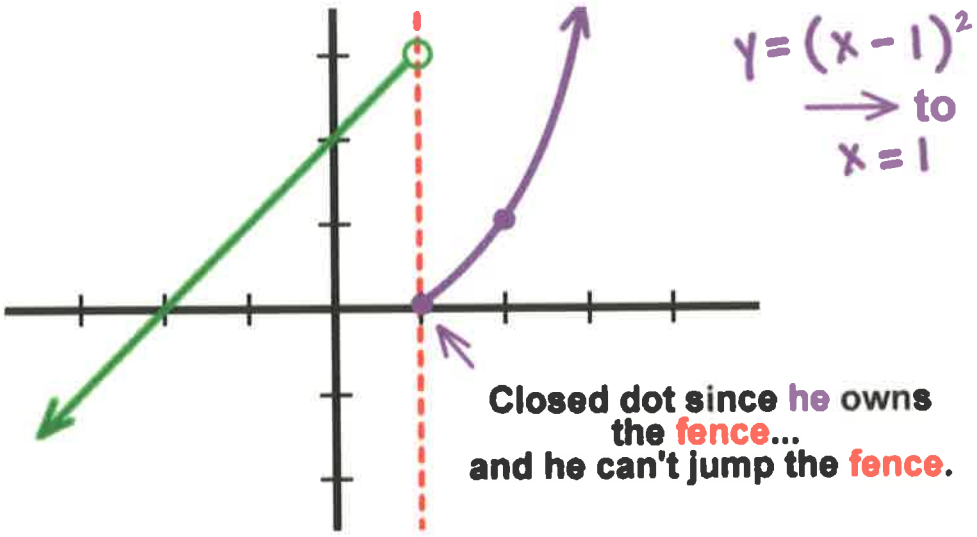
$$y = \begin{cases} x+2 & ; \ x < 1 \\ (x-1)^2 & ; \ x \geq 1 \end{cases}$$

← This guy has the "=", so he gets to live ON the fence.

Let's graph part 1 **:**



Let's graph ② **part** :



Done!

TRY ONE:

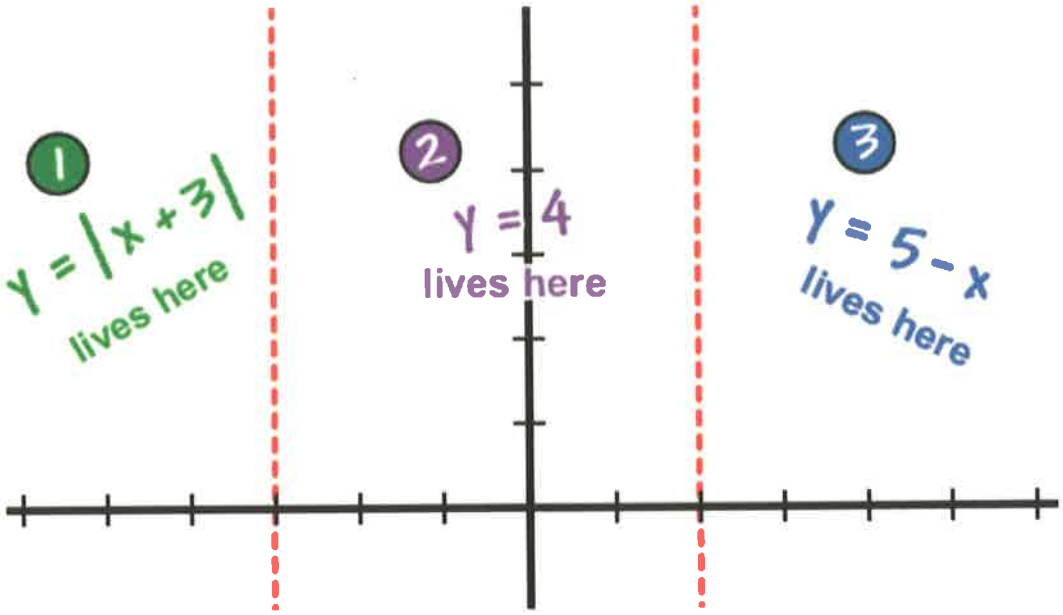
Graph $y=\begin{cases} -3 & ; x \le -1 \\ -x^2+4 & ; x > -1 \end{cases}$

Let's do one with three pieces...

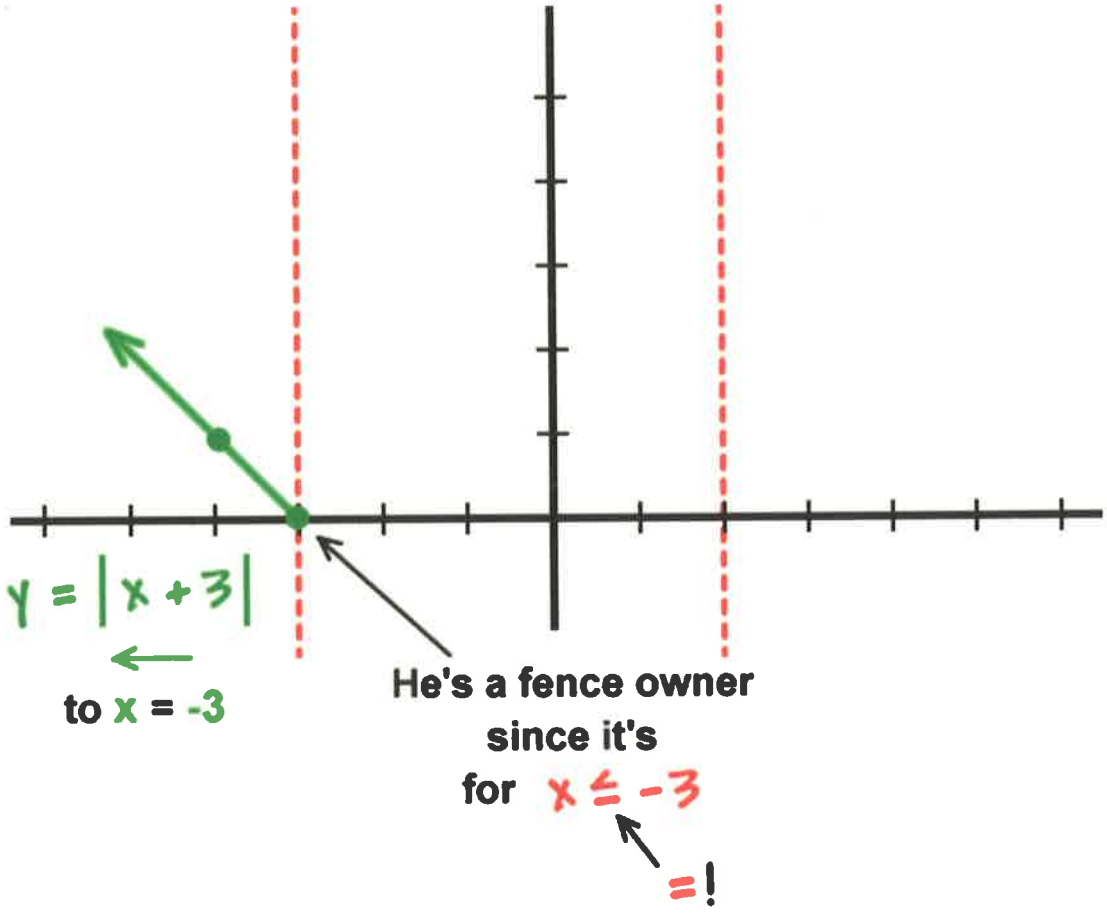
Graph

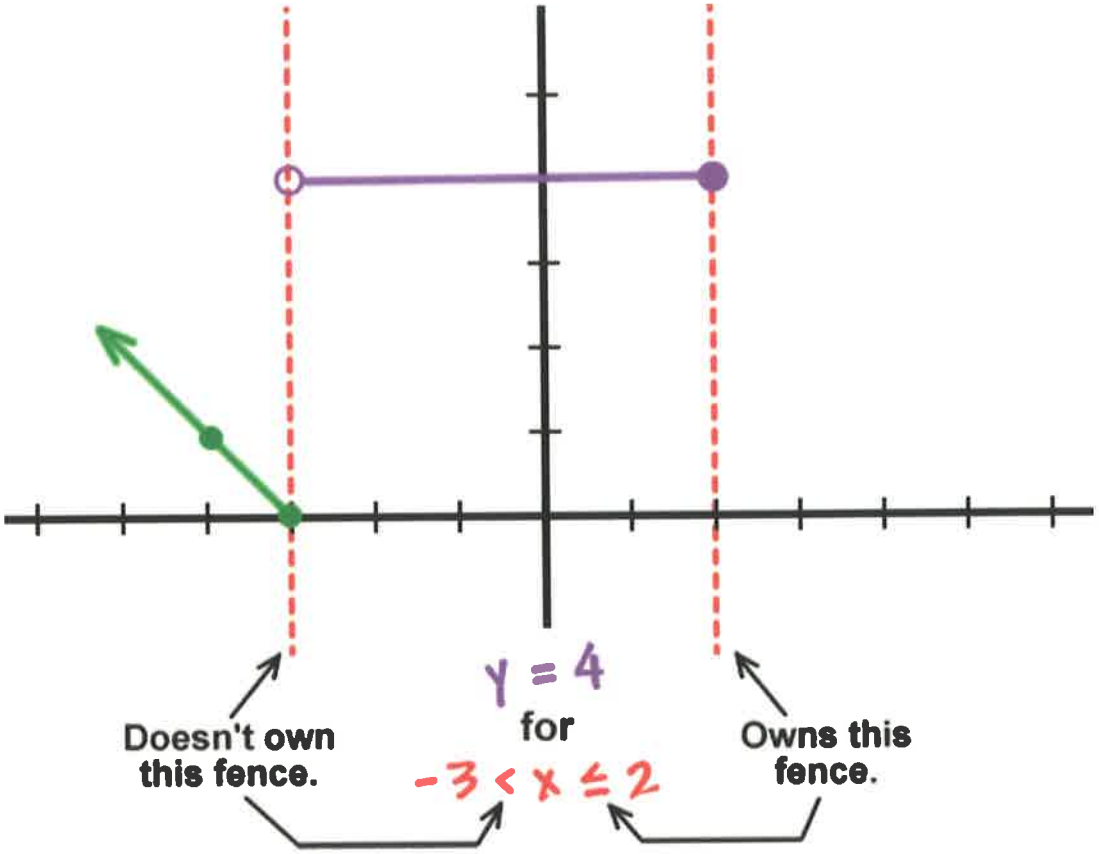
$$y=\begin{cases} |x+3| & ; x \le -3 \quad \leftarrow ① \\ 4 & ; -3 < x \le 2 \quad \leftarrow ② \\ 5-x & ; x > 2 \quad \leftarrow ③ \end{cases}$$

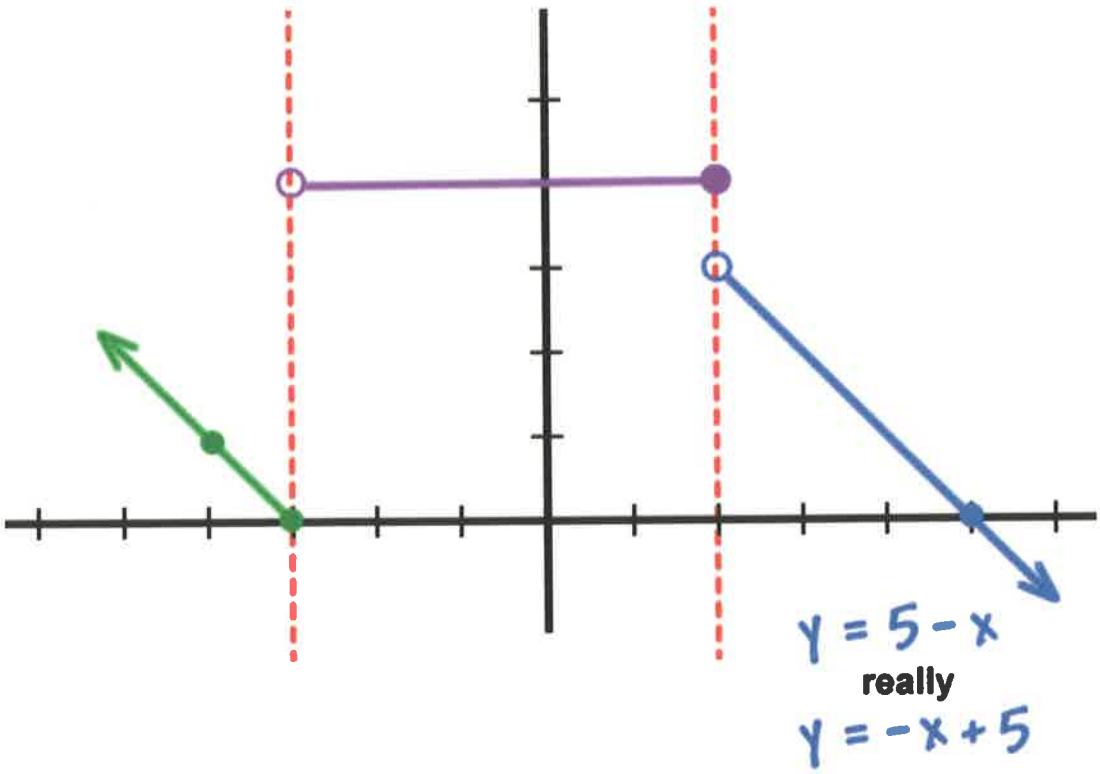
Let's put up the fencing:



Remember that they can't cross over into the other neighborhoods!







OK, so why are we being so careful about not crossing the fences into the other neighborhoods?

Because these guys are functions! Remember that functions have to pass the vertical line test.

TRY ONE:

Graph

$$y = \begin{cases} 3 & ; x < -1 \\ (x+1)^2 - 2 & ; -1 \le x \le 1 \\ x - 4 & ; x > 1 \end{cases}$$
