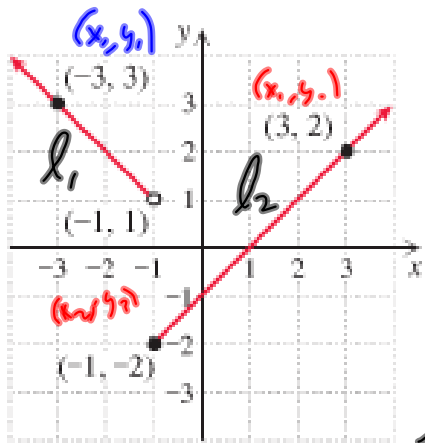


§2.2 #571-73

Domains / Pieces



$$f(x) = \begin{cases} l_1 & \text{if } x < -1 \\ l_2 & \text{if } x \geq -1 \end{cases}$$

$$l_1: m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{1 - 3}{-1 - (-3)} = \frac{-2}{2} = -1$$

$$y = \frac{m(x - x_1) + y_1}{x_2 - x_1}$$

$$l_2: m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{-2 - 2}{-1 - 3} = \frac{-4}{-4} = 1 = m$$

$$f(x) = \begin{cases} -1(x+3)+3 & \text{if } x < -1 \\ 1(x-3)+2 & \text{if } x \geq -1 \end{cases} \quad \begin{array}{l} \text{Steve's tickled} \\ \text{to see this.} \end{array}$$

$$= \begin{cases} -x - 3 + 3 & \dots \\ x - 3 + 2 & \dots \end{cases} = \begin{cases} -x & \text{if } x < -1 \\ x - 1 & \text{if } x \geq -1 \end{cases}$$

§ 2.3 doesn't do horizontal stretching or shrinking, which will come up in trig. But if you nail 2.3, this will come quickly.

$f(x)$  = BASIC FUNCTION  $x$

$f(x)+k$  up  $k$  units.  $x+3$   
 $(x,y) \mapsto (x, y+k)$

$f(x+h)$   $(x,y) \mapsto (x-h, y)$   $x^2 \mapsto (x+5)^2$

$af(x)$   $(x,y) \mapsto (x, ay)$   $|x| \mapsto 3|x|$

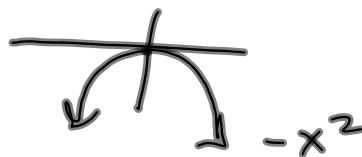
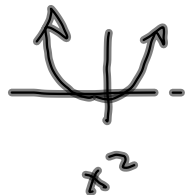
Bonus Don't Panic.

$f(ax)$   $(x,y) \mapsto (\frac{1}{a}x, y)$   $\sqrt{x} \mapsto \sqrt{5x}$   
 $(4,2) \rightarrow (\frac{4}{5}, 2)$

Reflections - Do these 1st, before other moves.

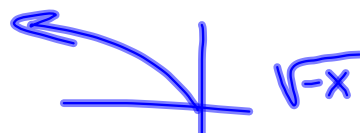
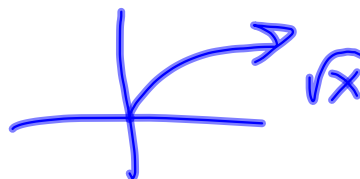
$-f(x)$   $(x,y) \mapsto (x, -y)$  Vertical reflection

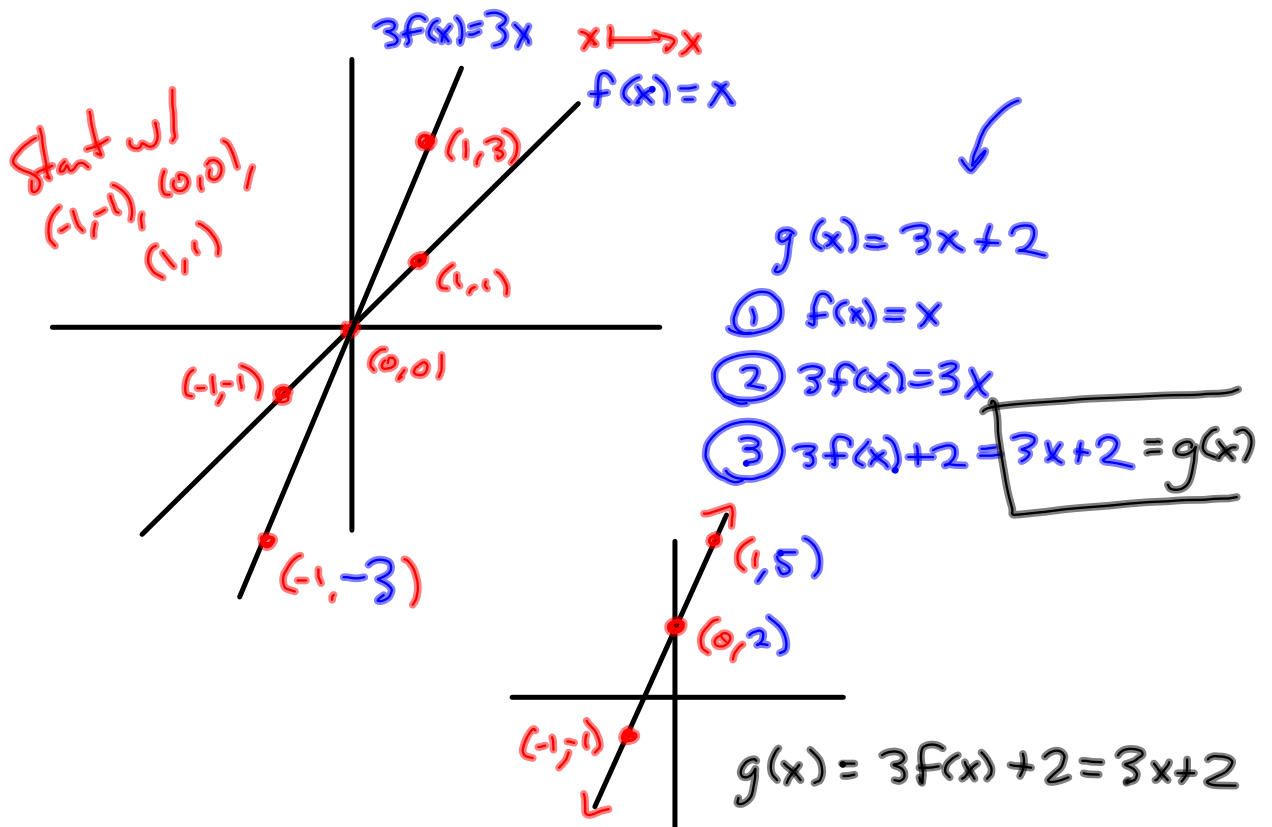
Reflect  
across x-axis

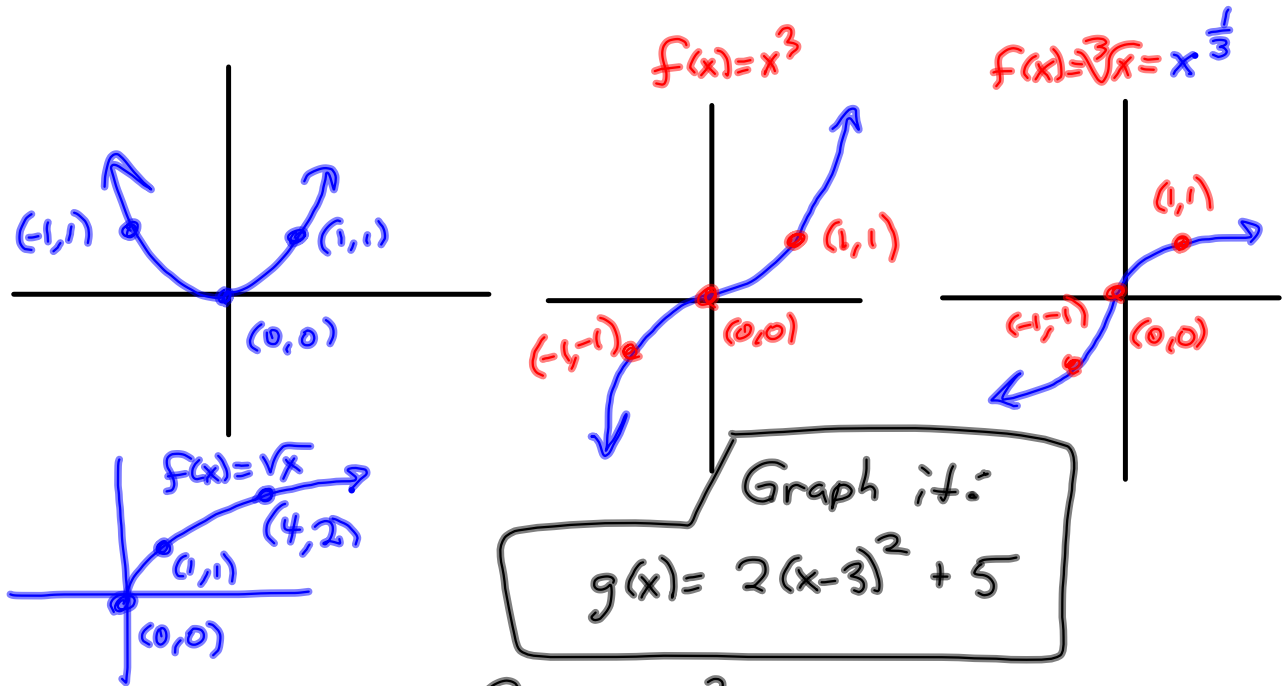


$f(-x)$   $(x,y) \mapsto (-x, y)$

Reflect  
across y-axis

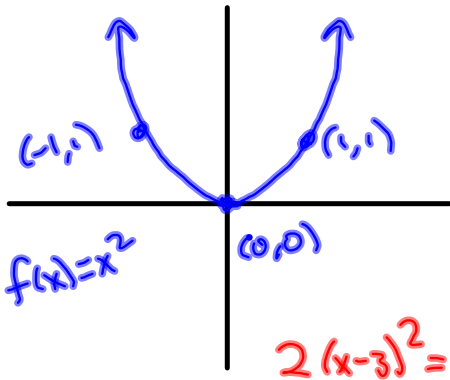




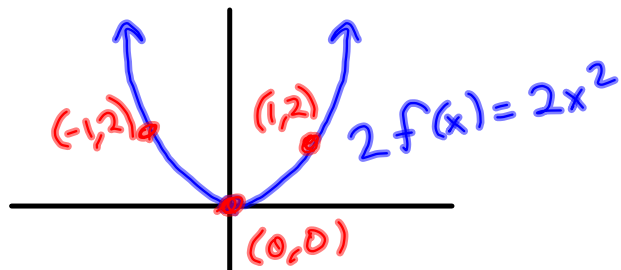
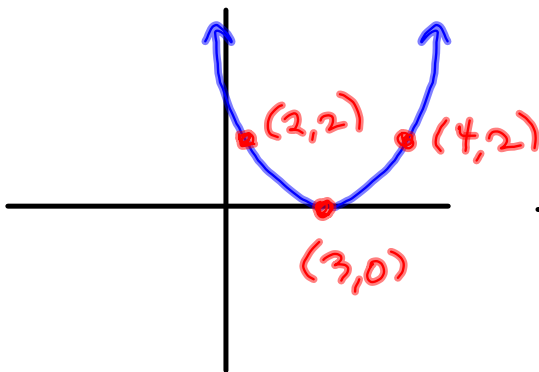


- ①  $f(x) = x^2$
- ②  $2x^2 = 2f(x)$
- ③  $2(x-3)^2 = 2f(x-3)$
- ④  $2(x-3)^2 + 5 = 2f(x-3) + 5$

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



$$2(x-3)^2 = 2f(x-3)$$



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

