

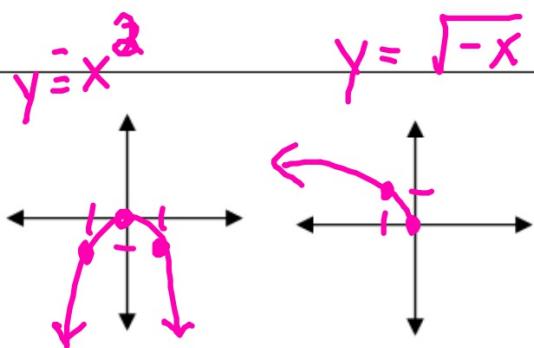
Reflections

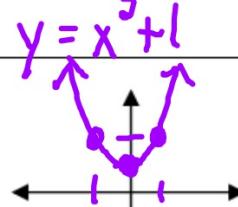
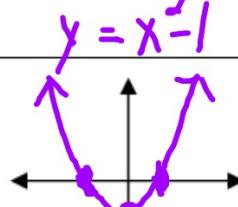
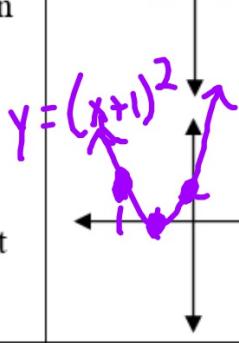
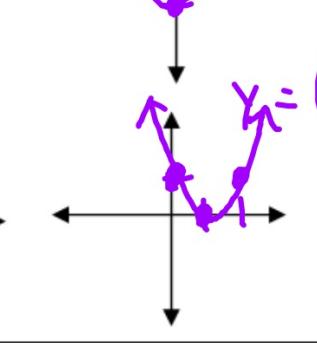
$$y = -f(x)$$

Is reflected over the x-axis

$$y = f(-x)$$

Is reflected over the y-axis



Translations		$y = x^3 + l$	$y = x^3 - l$
$y = f(x) + c$	Translates the graph c units up		
$y = f(x) - c$	Translates the graph c units down		
$y = f(x + c)$	Translates the graph c units left		
$y = f(x - c)$	Translates the graph c units right		

Dilations

$$c \cdot f(x), c > 1$$

$$\bullet f(x), 0 < c < 1$$

Stretches the graph vertically

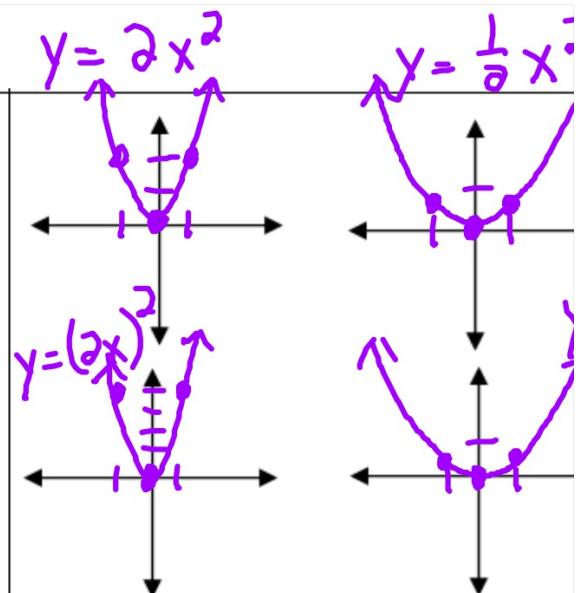
Shrinks the graph vertically

$$f(cx), c > 1$$

$$f(cx), 0 < c < 1$$

Shrinks the graph horizontally

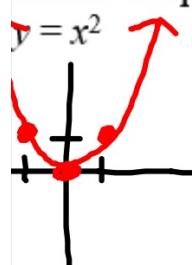
Stretches the graph horizontally



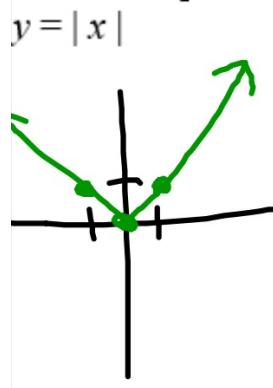
ctice

he parent graph, describe the changes to the graph:

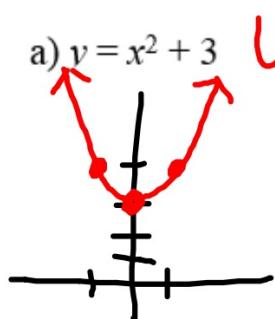
Parent Graph



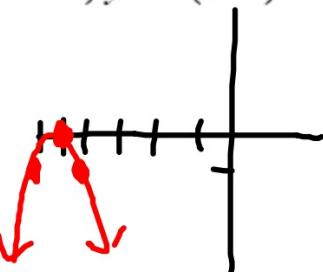
Parent Graph



a) $y = x^2 + 3$ U3



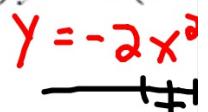
b) $y = -(x+5)^2$



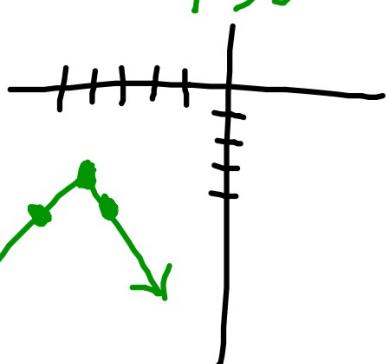
Refl. x-axis
L5

Refl. x-axis
Vert.S

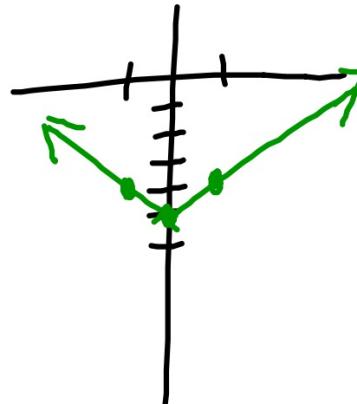
c) $y = -2(x^2 + 1)$



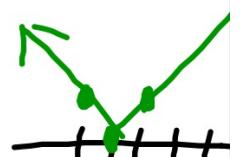
a) $y = -|x+4| - 3$
Refl x-axis
L4, D3



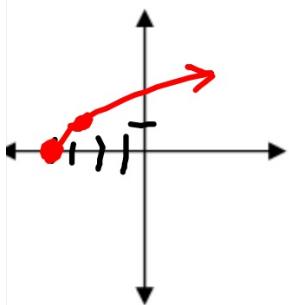
b) $y = |x| - 5$ D5



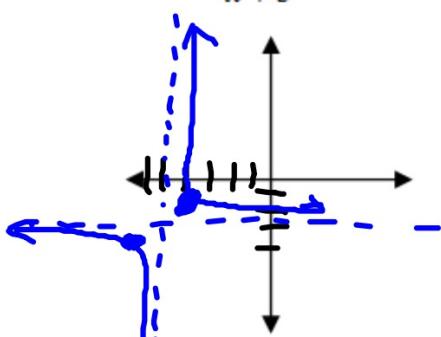
c) $y = |x+5|$
L5



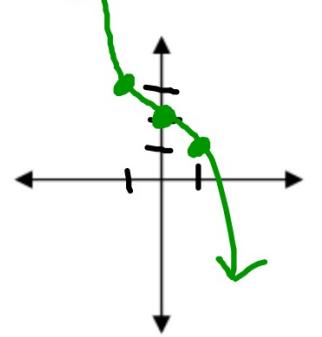
$$y = \sqrt{x+4} \quad L^4$$



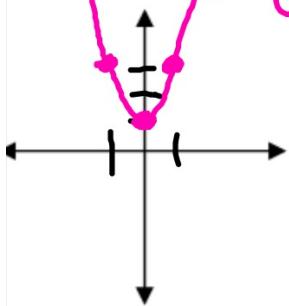
$$4. y = \frac{1}{x+5} - 3 \quad L^5 D_3$$



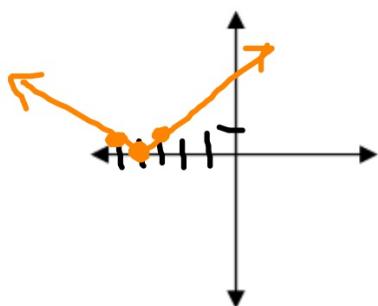
$$5. y = x^3 + 2 \quad \text{Refl. } f$$



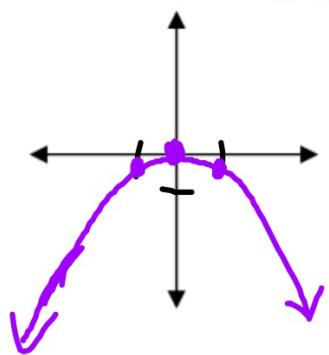
$$y = 2x^2 + 1 \quad \text{vert. stretch } U_1$$



$$7. y = \frac{1}{2} |x+4| \quad \text{vert. shrink } L^4$$

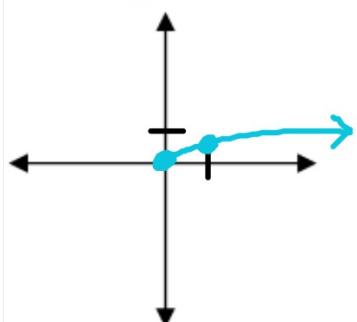


$$8. y = -\frac{1}{5} x^2 \quad \text{Refl. } x \text{ vert. s}$$



$$y = \frac{1}{3}\sqrt{x}$$

Vert. shrink



$$= |x+2| - 1$$

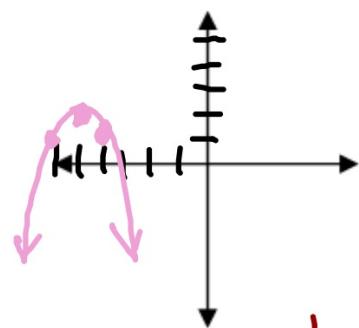
$$= \sqrt{x+2} + 1$$

$$= (x-1)^3 - 2$$

10.

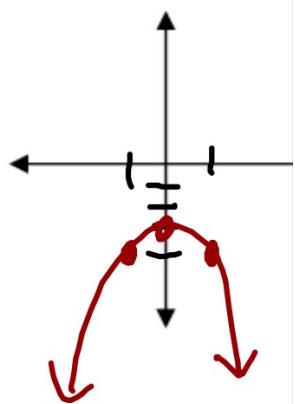
$$y = -(x+5)^2 + 2$$

Refl. x-axis's
w/ 2



$$11. y = -x^2 - 3$$

Refl



$$\textcircled{56} \quad y = \frac{1}{x} - 2$$

$$\textcircled{57} \quad y = 2$$

$$\textcircled{58} \quad y = -(x+2)^2 + 1$$

$$\textcircled{59} \quad y = x - 2$$