

1-2 Transformations

Objectives:

- I can identify transformation from an equation and graph
- I can graph a transformed parent function

Domain changes

Range changes

$$y = \pm a f(\pm b(x \pm h)) \pm k$$

| | Vertical | Horizontal |
|----------------------|--------------|--------------|
| Shift (+ or -) | $f(x) \pm k$ | $f(x \pm h)$ |
| Stretch/Compress (x) | $af(x)$ | ----- |
| Reflection | $-f(x)$ | $f(-x)$ |
| | OVER X | OVER Y |

*Teacher note: [desmos.com](https://www.desmos.com)

Information to remember about
transformations....

x's lie

any change to the x's is opposite of what
appears in the equation

Ex. 1 State the parent function and transformations:

$$f(x) = \sqrt{x} - 2 \quad y = \sqrt{x}$$

down 2

$$f(x) = \sqrt{x+3}$$

Left 3

$$f(x) = 2\sqrt{x}$$

STRETCH by 2

$$f(x) = \frac{1}{3}\sqrt{x}$$

Compress by 3

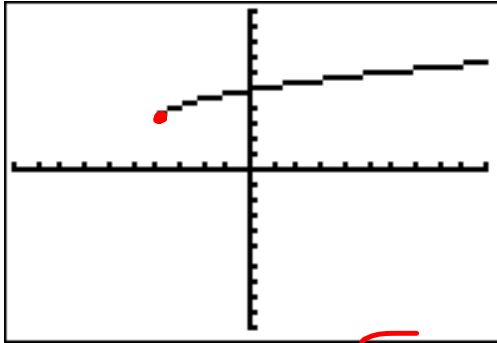
$$f(x) = -\sqrt{x}$$

flip over x

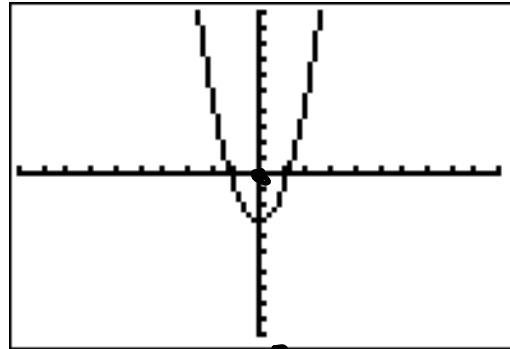
$$f(x) = \sqrt{-x}$$

flip over y

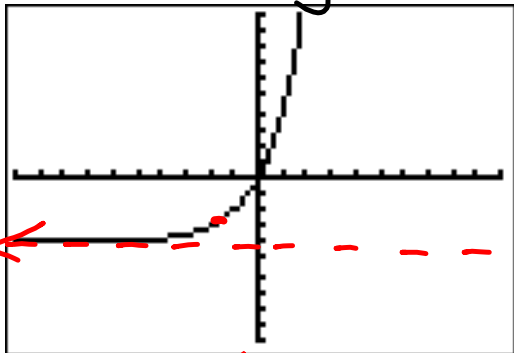
Identify the transformations from the following graphs



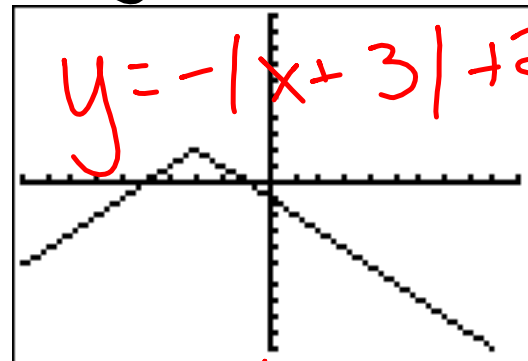
- parent $y = \sqrt{x}$
 - UP 4 ✓
 - Left 4
 $y = \sqrt{x+4} + 4$



$y = x^2$ down 3
 $y = x^2 - 3$



$y = 2^x$ down 4
 $y = 2^x - 4$



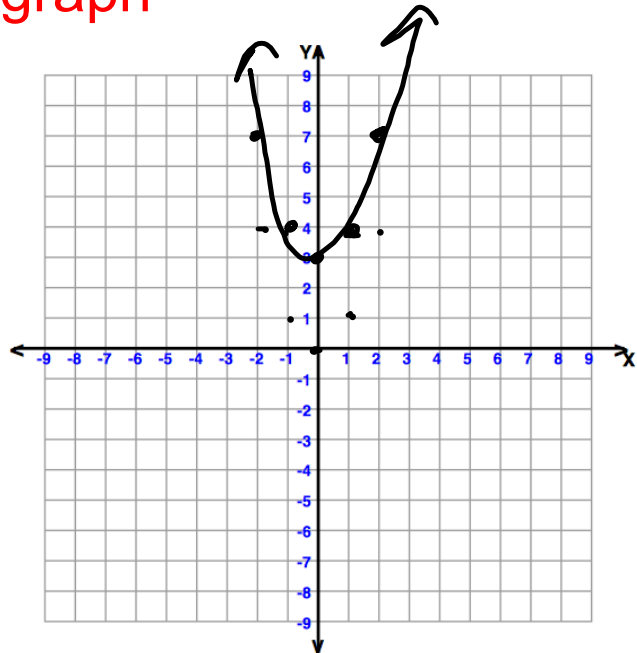
$y = -|x+3| + 2$
 $y = |x|$
 - flip over x $y = -|x|$
 - left + 3 $y = -|x+3|$
 - UP 2 $y = -|x+3| + 2$

State the parent function and identify the transformations and graph

$$y = x^2 + 3$$

Parent: $y = x^2$

• Up 3



State the parent function and identify the transformations and graph

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

Parent: $y = x^2$

• Right 2

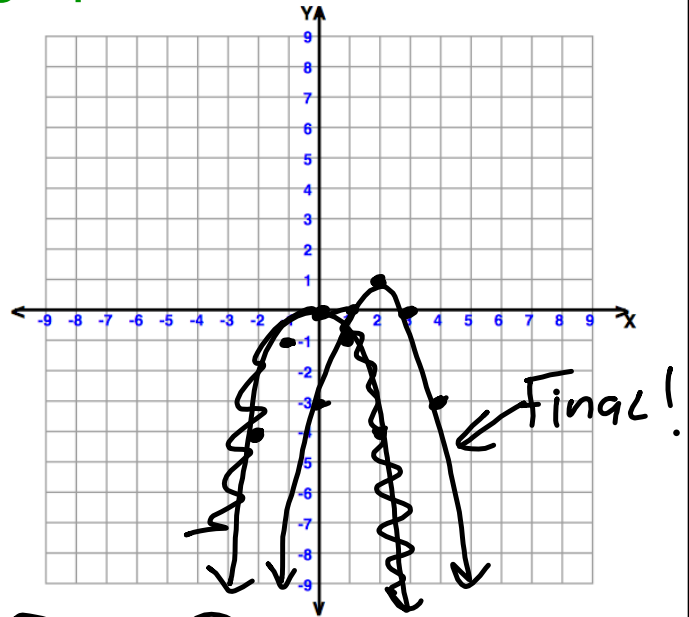
• Up 1

• flip

| OVER | |
|------|----|
| x | y |
| 0 | 0 |
| -1 | -1 |
| 1 | -1 |

x ✓

*DO REFLECTION FIRST!



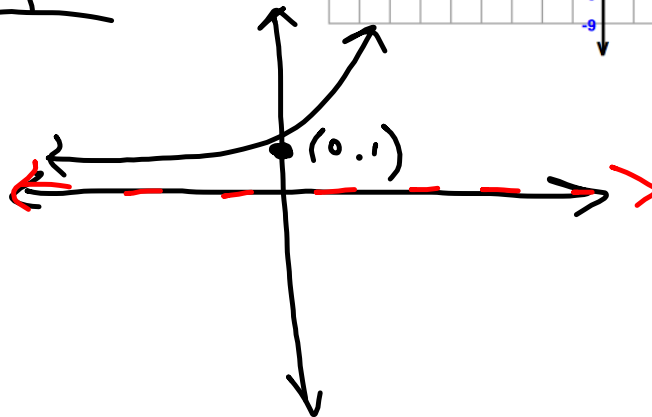
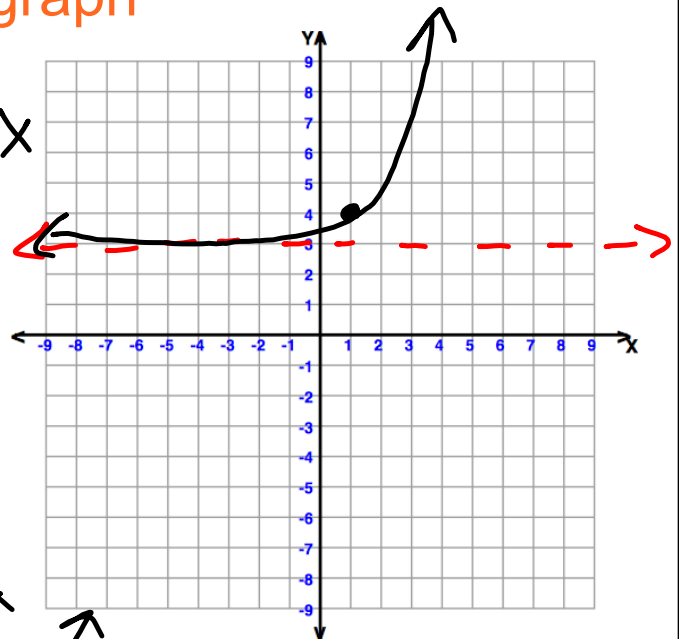
State the parent function and identify the transformations and graph

$$y = 2^{x-1} + 3$$

Parent: $y = 2^x$

• Up 3

• Right 1



State the parent function and identify the transformations and graph

$$y = 3|x| + 2$$

Parent: $y = |x|$

- Up 2 ✓

• STRETCH 3

3 UP
| OVER

