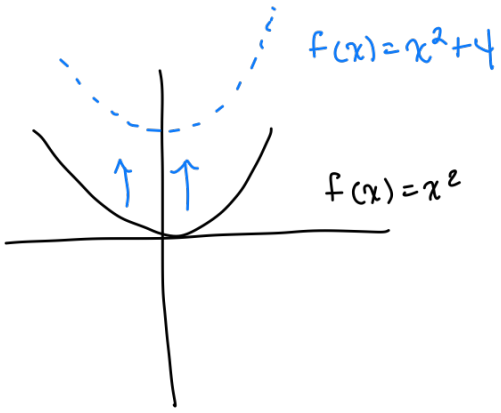
Transformations

Vertical shift up:

- raise graph up by a certain number of units
- just a number added to the end.

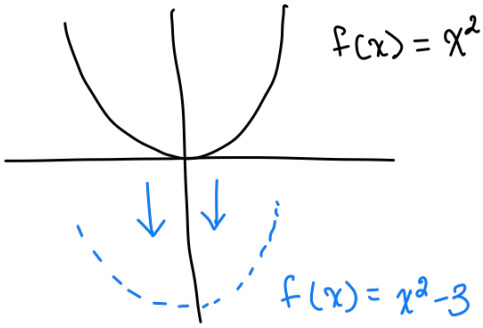
ex.) x^2+3 , $\sqrt{x}+4$, $|x|+2$



Vertical shift down:

- Lower the graph by a certain number of units
- just subtract a number from the end

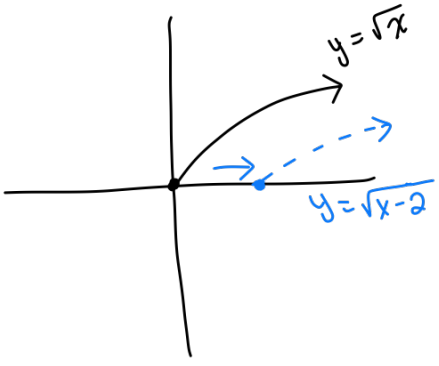
ex.) x^2-2 , $\sqrt{x}-4$, $|x|-3$



Horizontal shift to the right:

- move graph a certain number of units to the right.
- Replace x by $x-h$.

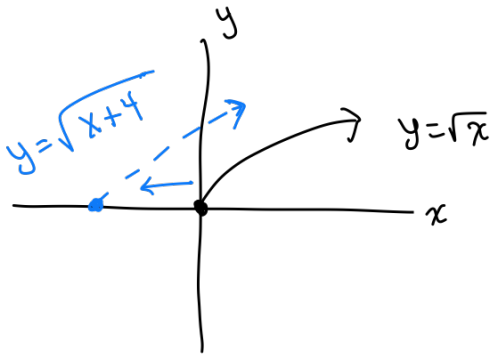
ex.) $(x-3)^2$, $\sqrt{x-4}$, $|x-2|$



Horizontal shift to the left:

- move the graph a certain number of units to the left
- Replace x with $x+h$

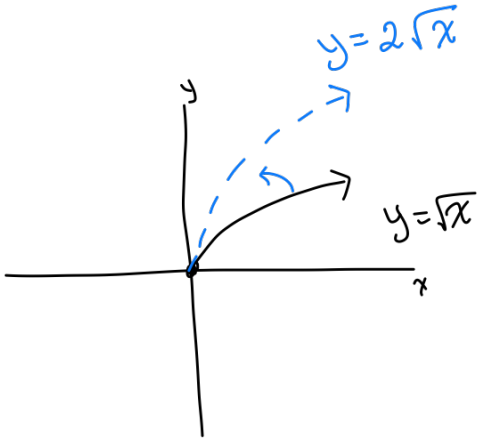
ex.) $(x+4)^2$, $\sqrt{x+3}$, $|x+2|$



Vertical stretch:

- will stretch the graph closer to the y axis
- will usually make it look skinnier than original

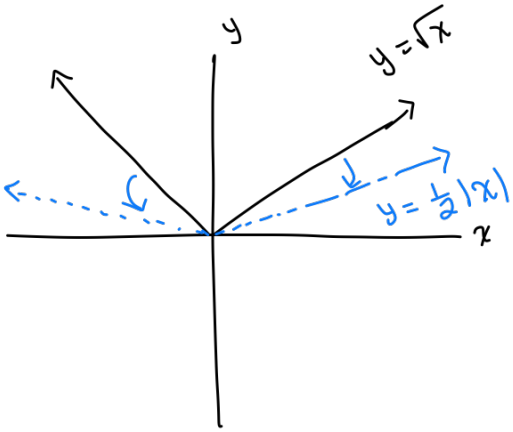
ex.) $2x^2$, $3\sqrt{x}$, $2|x|$



Vertical compression:

- will compress the graph closer to the x axis.
- will make it look flatter than original.

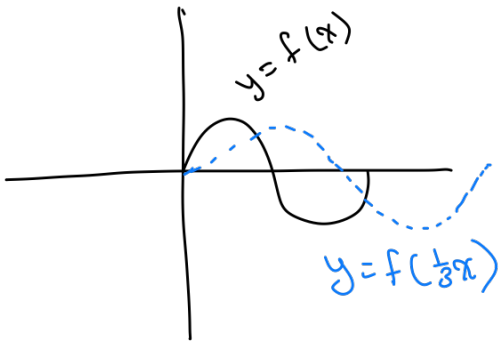
ex.) $\frac{1}{4}x^2$, $\frac{1}{2}\sqrt{x}$, $\frac{1}{2}|x|$



Horizontal stretch :

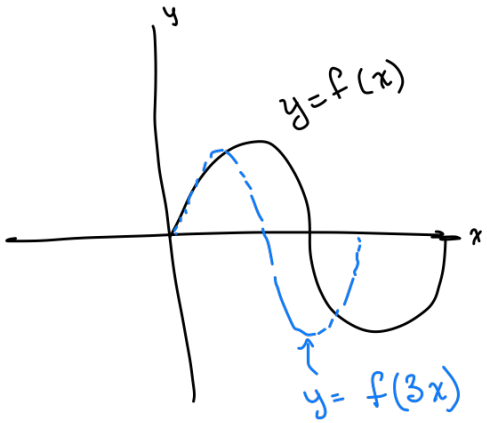
- will stretch graph horizontally
- will make it longer down the x-axis

ex.) $\left(\frac{1}{3}x^2\right)$, $\sqrt{\frac{1}{2}x}$, $\left|\frac{1}{2}x\right|$



Horizontal compression :

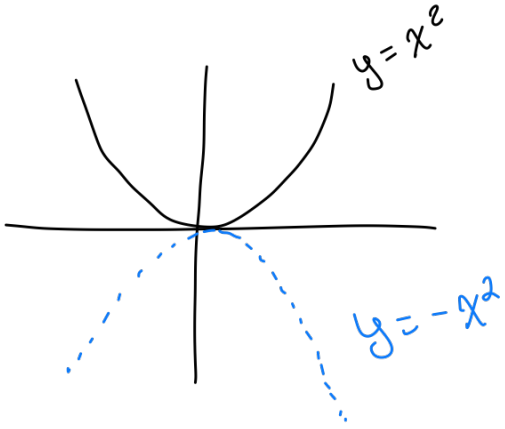
- Will compress the graph horizontally.
- Will make it shorter on the x-axis
- ex) $(3x^2)$, $\sqrt{3x}$, $|2x|$



Reflection about the x-axis:

- Will reflect graph over x-axis
- Place a (-) sign in front of everything

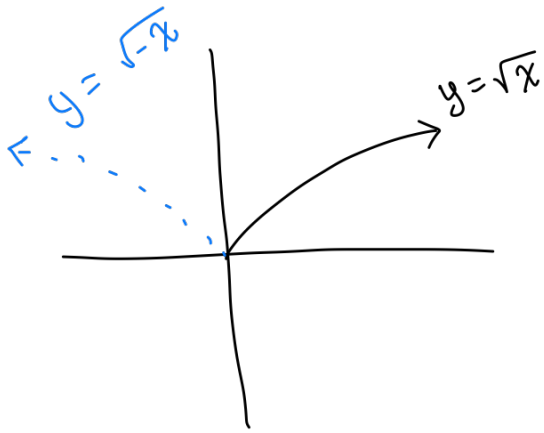
ex.) $-x^2$, $-\sqrt{x}$, $-|x|$



Reflection about the y-axis:

- will reflect graph over y-axis.
- place (-) sign inside ( ) or under $\sqrt{\ }$

ex.) $(-x)^2$, $\sqrt{-x}$, $|-x|$



Functions

Square function

$y = x^2$

Absolute value function

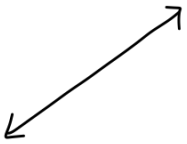
$y = |x|$

Constant function

$y = b$

Identity function

$y = x$



Square root function

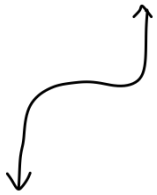
$y = \sqrt{x}$

Cube root function

$y = \sqrt[3]{x}$

Cube function

$y = x^3$



Reciprocal function

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