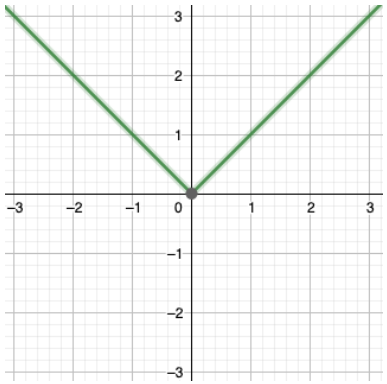
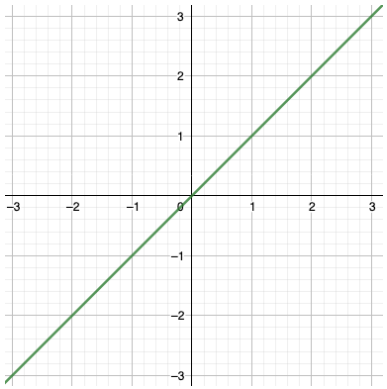
Chapter 1
Linear Functions

1. **Parent Functions and Transformations**
2. Transformations of Linear and Absolute Value Functions
3. Modeling with Linear Functions
4. Solving Linear Systems

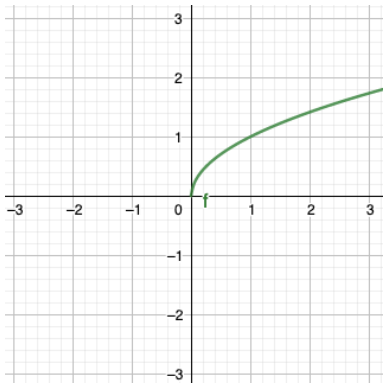
1.1 - Parent Functions and Transformations



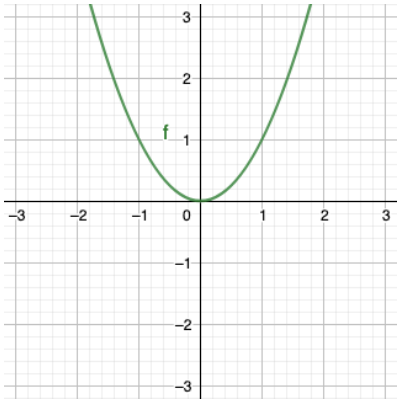
$y = |x|$



$y = \sqrt{x}$

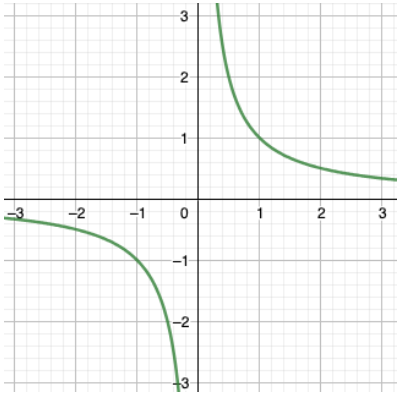


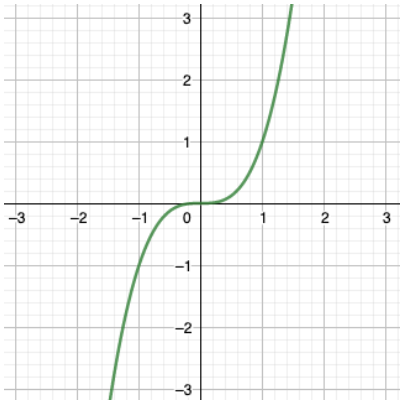
$y = x$



$y = x^2$

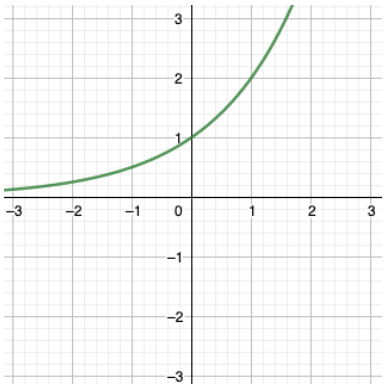
$y = \dfrac{1}{x}$



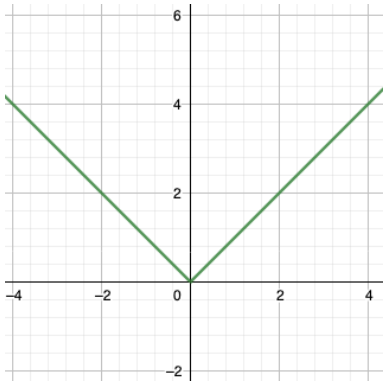


$y = x^3$

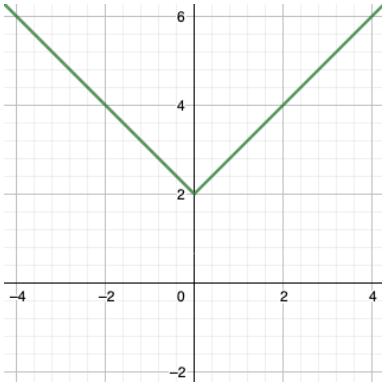
$y = 2^x$



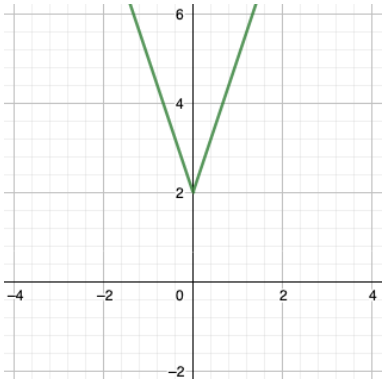
1.1 - Parent Functions and Transformations



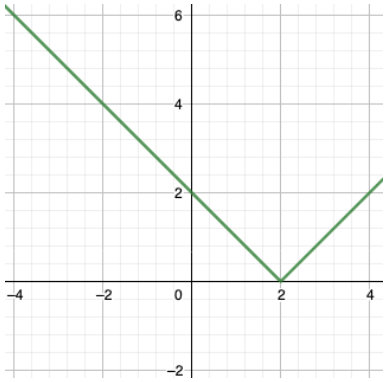
$y = |x|$



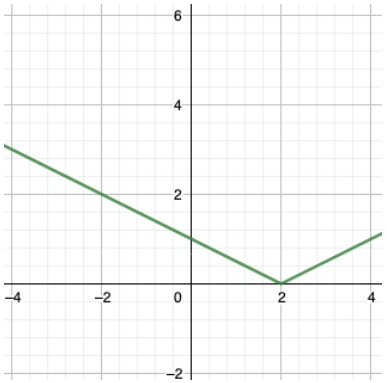
$y = |x| + 2$



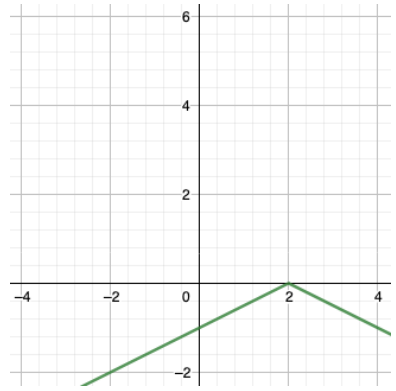
$y = 3|x| + 2$



$y = |x - 2|$



$y = 0.5|x - 2|$

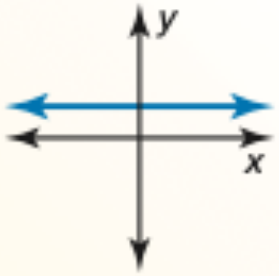
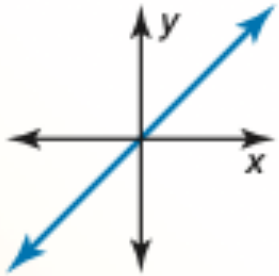
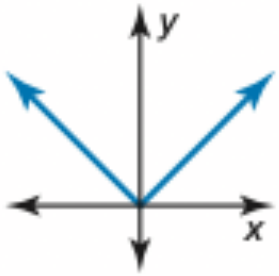
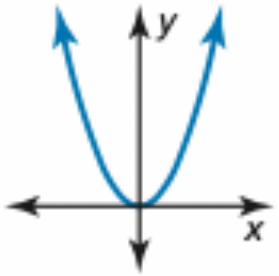


$y = -0.5|x - 2|$

1.1 - Parent Functions and Transformations

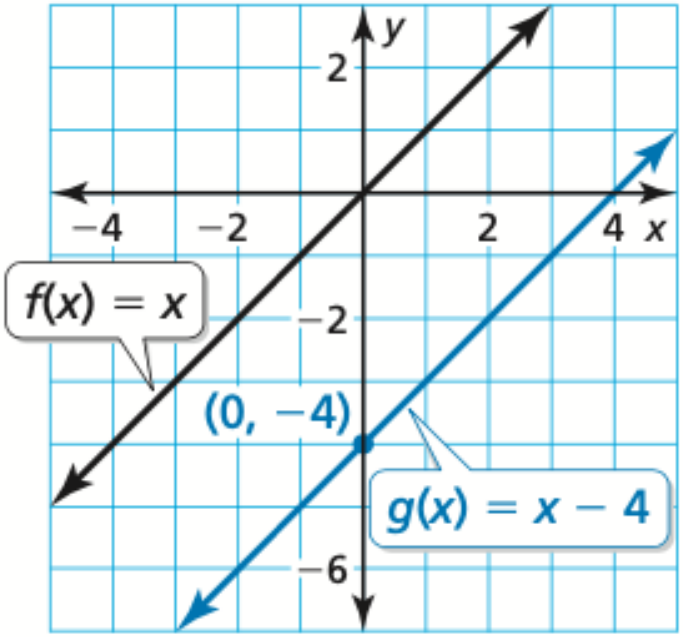
Parent Function - The most basic function in a family of functions. Functions in a family are *transformations* of the parent function.

Parent Functions

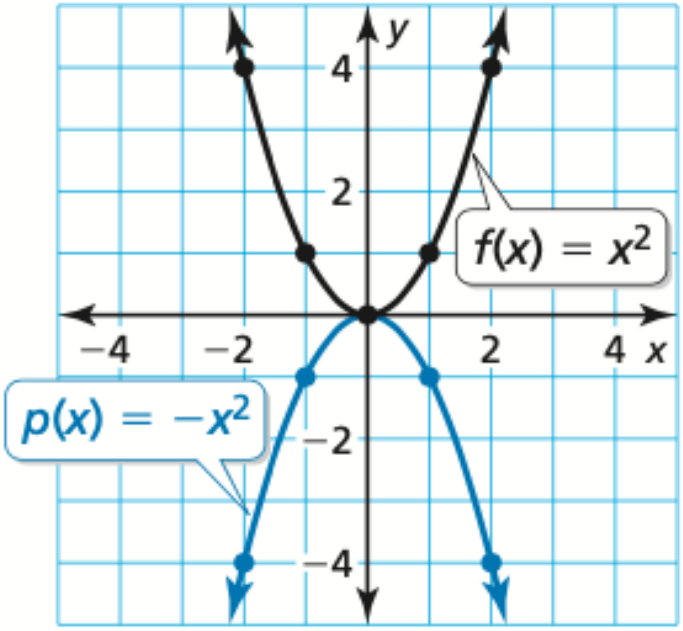
Family	Constant	Linear	Absolute Value	Quadratic
Rule	$f(x) = 1$	$f(x) = x$	$f(x) = \lvert x \rvert$	$f(x) = x^2$
Graph				
Domain	All real numbers	All real numbers	All real numbers	All real numbers
Range	$y = 1$	All real numbers	$y \geq 0$	$y \geq 0$

1.1 - Parent Functions and Transformations

Transformations - The change in size, shape, position or orientation of a graph.



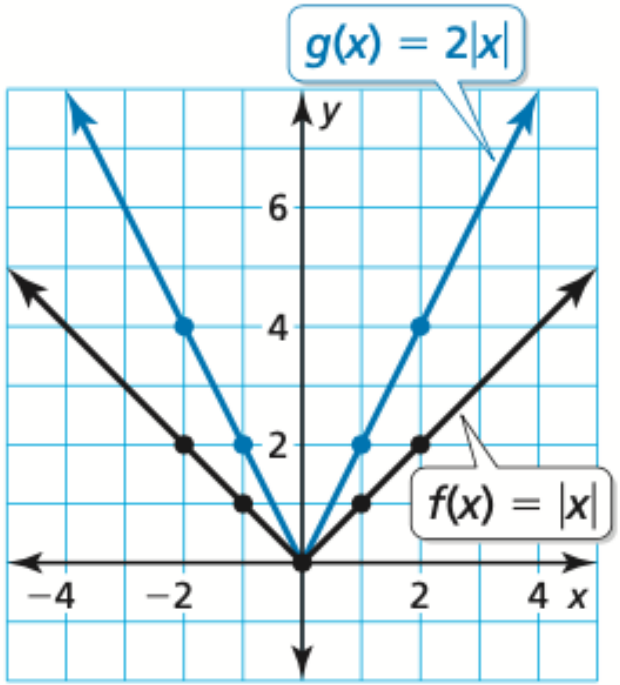
Translation



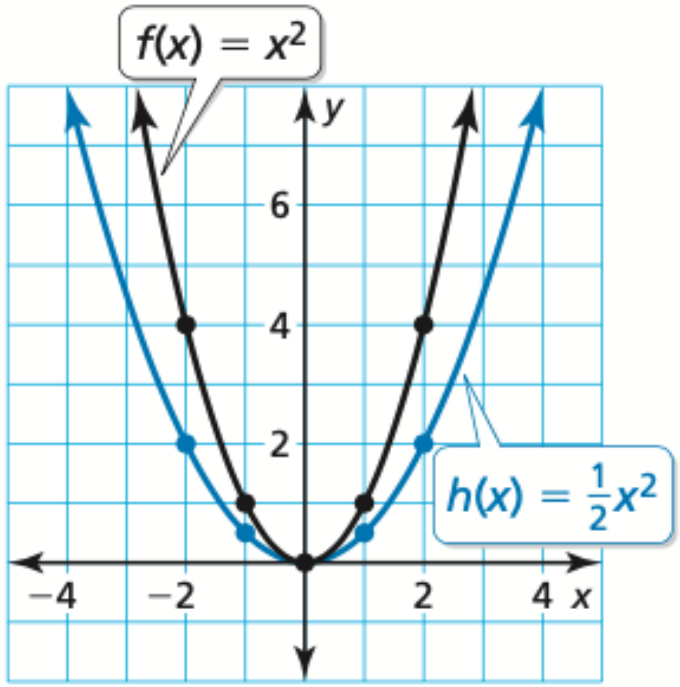
Reflection

1.1 - Parent Functions and Transformations

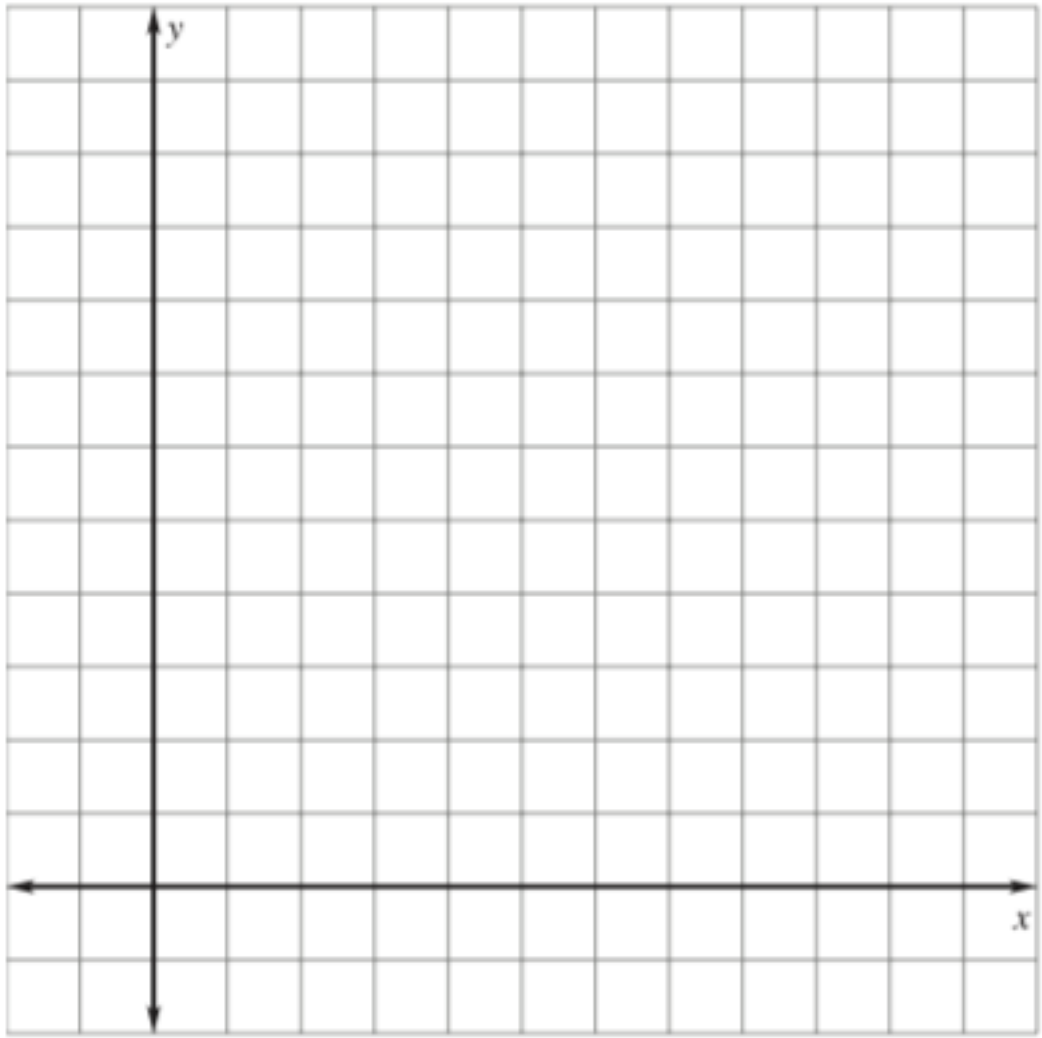
Dilation - Multiply y-coordinate by same positive factor (not 1).



Vertical Stretch



Vertical Shrink

1.1 - Parent Functions and Transformations

Describe the transformations $d(x) = 3(x-5)^2 - 1$