

2-7 Parent Functions & Transformations

previous assignment:
2-4 and 2-5 Quiz

- identify and use parent functions
- describe transformations of functions
- F.IF.4, F.BF.3

Family of Graphs: a group of graphs that display one or more similar characteristics. *Linear, quad, abs. value*

Parent Graph: the graph of the parent function - it's the simplest of the graphs in the family.

Linear
 $y = x$

Quadratic
 $y = x^2$

Abs. Value
 $y = |x|$

Transformations of Parent Graphs



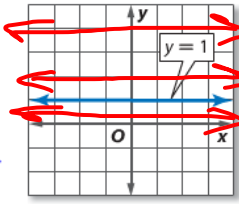
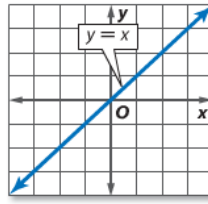
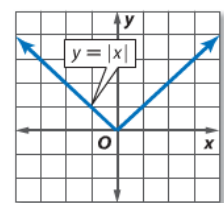
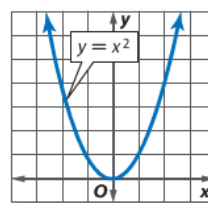
- **translation (slide, glide, or shift):** moves a figure up, down, left, or right. *h and k*
(horizontal) (vertical)
- **reflection (flip):** flips a figure over a line called the line of reflection. *- a reflection over x-axis*

- **dilation:** shrinks or enlarges a figure proportionally.

stretched vertically $a > 1$

compressed vertically $0 < a < 1$

KeyConcept Parent Functions

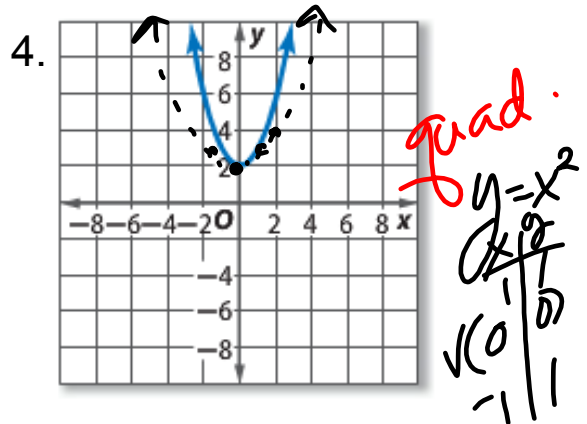
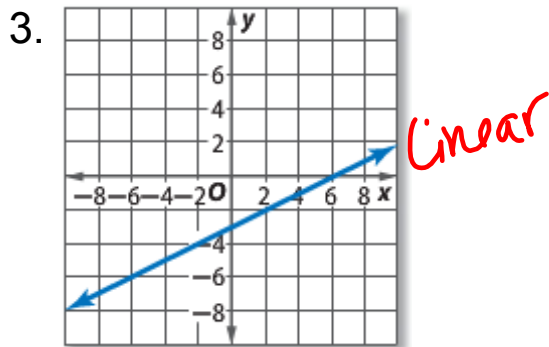
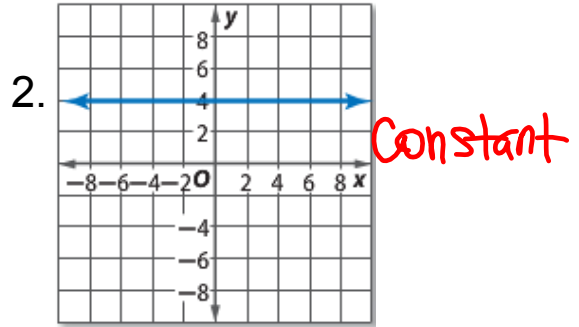
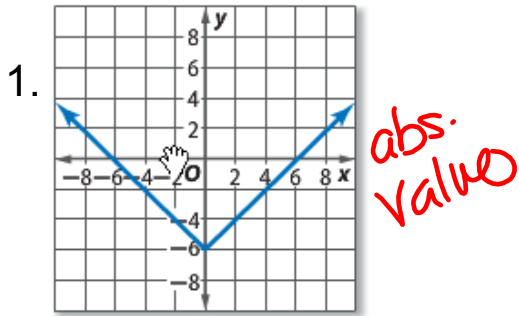
Constant Function	Identity Function
 <p>The general equation of a constant function is $f(x) = a$, where a is any number. The domain is all real numbers, and the range consists of a single real number a.</p>	 <p>The identity function $f(x) = x$ passes through all points with coordinates (a, a). It is the parent function of most linear functions. Its domain and range are all real numbers.</p>
Absolute Value Function	Quadratic Function
 <p>Recall that the parent function of absolute value functions is $f(x) = x$. The domain of $f(x) = x$ is the set of real numbers, and the range is the set of real numbers greater than or equal to 0.</p>	 <p>The parent function of quadratic functions is $f(x) = x^2$. The domain of $f(x) = x^2$ is the set of real numbers, and the range is the set of real numbers greater than or equal to 0.</p>

ConceptSummary Transformations of Functions

Transformation	Change to Parent Graph
<p>Translation</p> <p>$f(x + h), h > 0$</p> <p>$f(x - h), h > 0$</p> <p>$f(x) + k, k > 0$</p> <p>$f(x) - k, k > 0$</p>	<p>Translates graph h units left.</p> <p>Translates graph h units right.</p> <p>Translates graph k units up.</p> <p>Translates graph k units down.</p>
<p>Reflection</p> <p>$-f(x)$</p> <p>$f(-x)$</p>	<p>Reflects graph in the x-axis.</p> <p>Reflects graph in the y-axis.</p>
<p>Dilation</p> <p>$a \cdot f(x), a > 1$</p> <p>$a \cdot f(x), 0 < a < 1$</p> <p>$f(bx), b > 1$</p> <p>$f(bx), 0 < b < 1$</p>	<p>Stretches graph vertically.</p> <p>Compresses graph vertically</p> <p>Compresses graph horizontally.</p> <p>Stretches graph horizontally.</p>

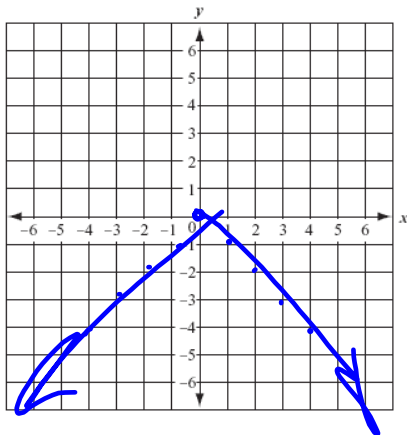
Handwritten notes:
 $y = |x+3|$ left 3
 $y = (x-3)^2$ right 3
 $y = |x|+3$ up 3
 $y = (x-0)^2 - 3$ down 3

Identify the type of functions below.

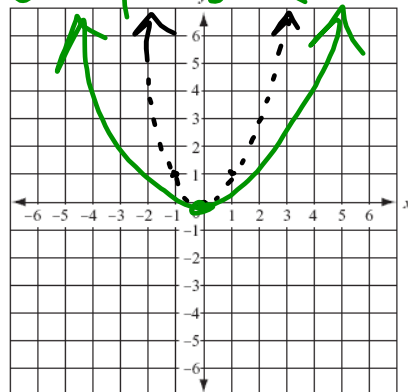


Identify the transformation and describe how it will change the graph of the parent function. Then sketch the graph.

4. $f(x) = -|x|$ *reflection over the x-axis*
Abs. Value



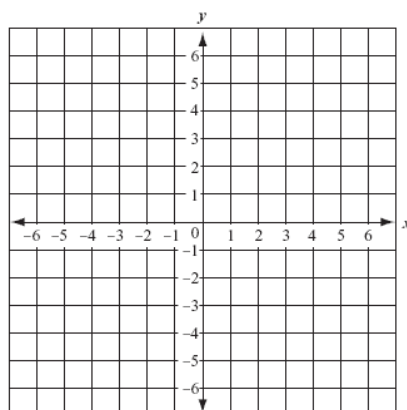
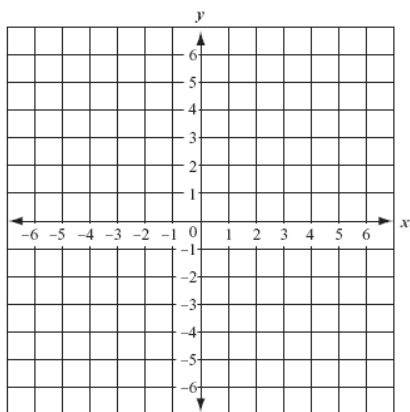
5. $g(x) = \frac{3}{4}x^2$ *quad*
Compressed vertically



Identify the transformation and describe how it will change the graph of the parent function. Then sketch the graph.

$$6. f(x) = 2|x|$$

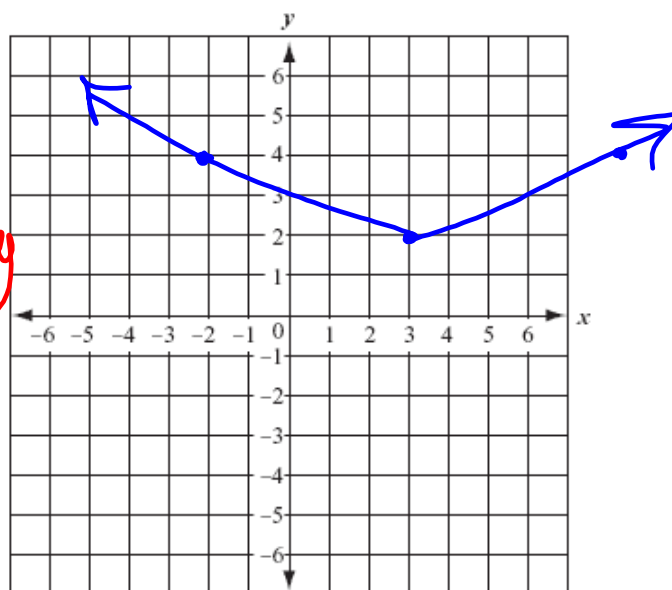
$$7. h(x) = x + 5$$



Identify the transformation and describe how it will change the graph of the parent function. Then sketch the graph.

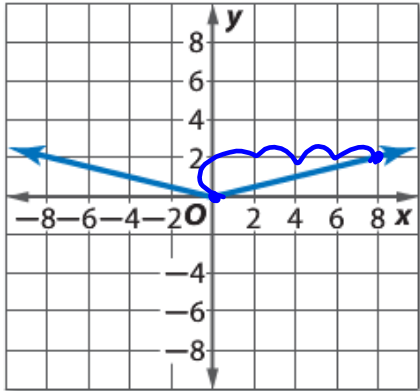
$$8. f(x) = \frac{2}{5}x - 3 + 2$$

compress vertically
translate 3 units
right and 2 units
up.



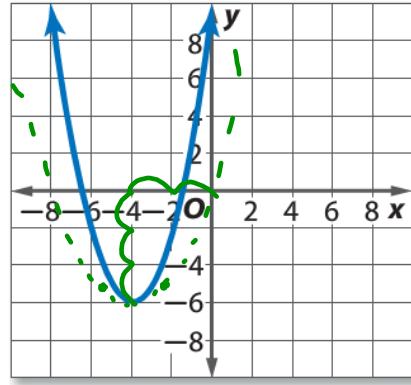
Write an equation for the following graphs.

9.



$$y = \frac{1}{4}|x|$$

10.



$$y = 2(x+4)^2 - 6$$



