Algebra 2 2.7

Identify and use parent functions

Describe transformations of functions

family of graphs — share characteristic

parent graph — original

y= f(x)

parent function

constant function

identity function

absolute value function

quadratic function

Transformation

reflection

line of reflection

dilation

activ: letters

Quiz 2.5-2.6 Thurs.

1 Parent Graphs A **family of graphs** is a group of graphs that display one or more similar characteristics. The **parent graph**, which is the graph of the **parent function**, is the simplest of the graphs in a family. This is the graph that is transformed to create other members in a family of graphs.

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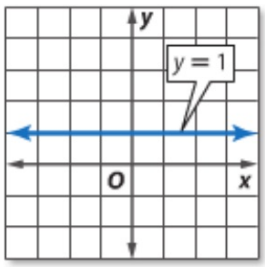
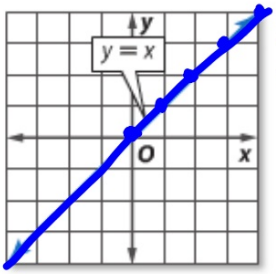
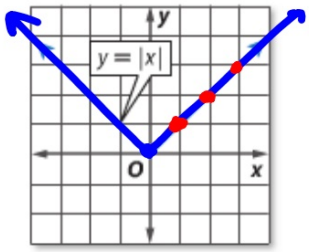
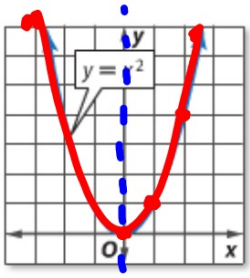
KeyConcept Parent Functions

Constant Function	Identity Function
	
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.	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.

y = Constant

y = x

(linea

Absolute Value Function	Quadratic Function
	
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.	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.

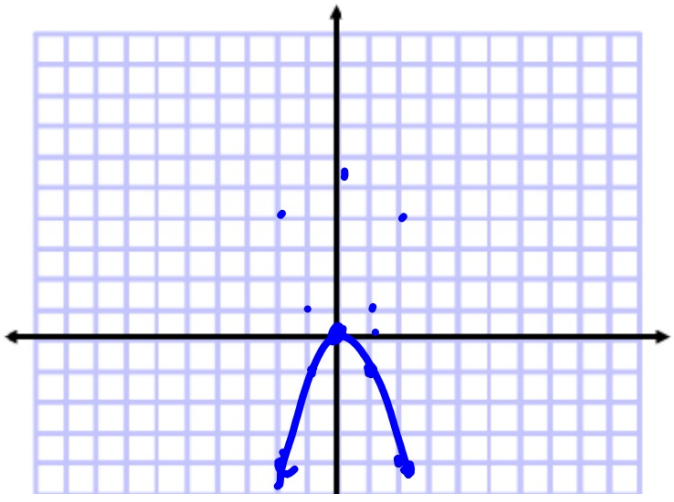
Multiply the whole thing -f(x)
vs.
multiply just the x f(-x)

A **reflection** flips a figure over a line called the **line of reflection**.

- When a parent function is multiplied by -1, the result $-f(x)$ is a reflection of the graph in the x-axis.
- When only the variable is multiplied by -1, the result $f(-x)$ is a reflection of the graph in the y-axis.

Example 3 Describe and Graph Reflections

Describe the reflection in $y = -x^2$. Then graph the function.

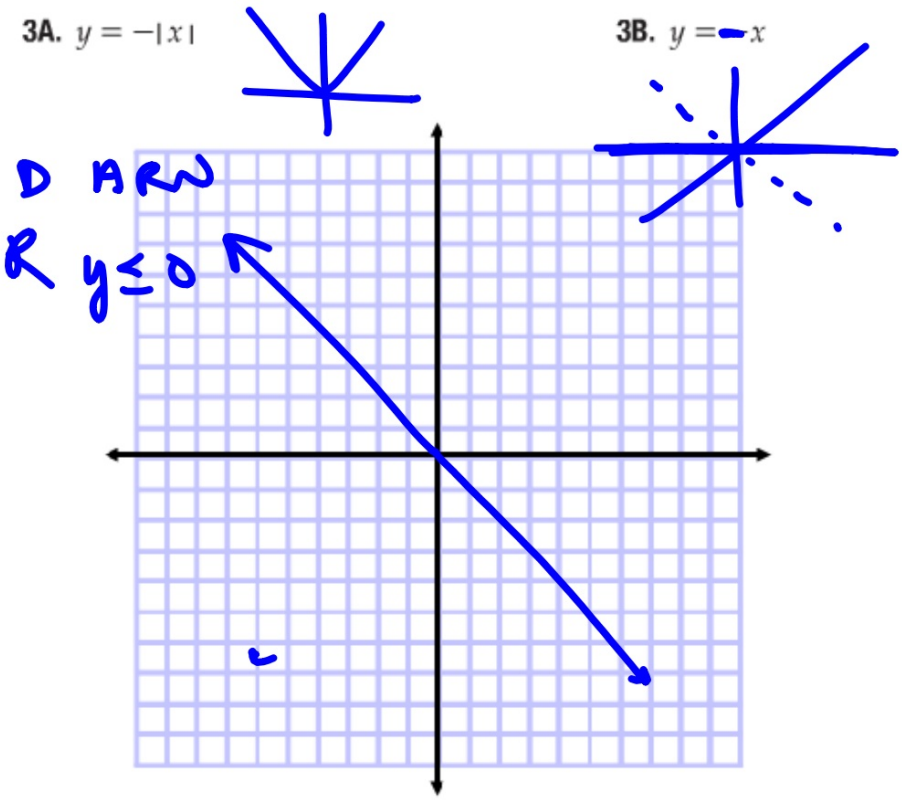


GuidedPractice

Describe the reflection in each function. Then graph the function.

3A. $y = -|x|$

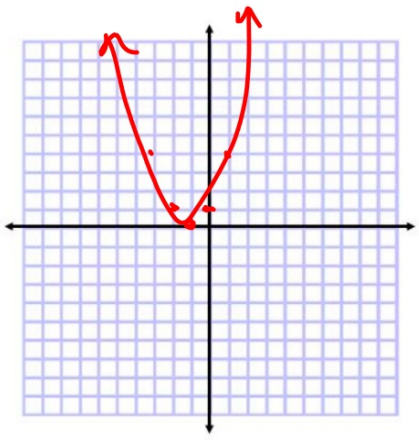
3B. $y = -x$



Did I multiply the whole thing?
(reflect across x-axis)
Or just the x?
(reflect across y-axis)

$y = (-x)^2$

$y = (x+1)^2$



Dilation must

2 x step

3 x step

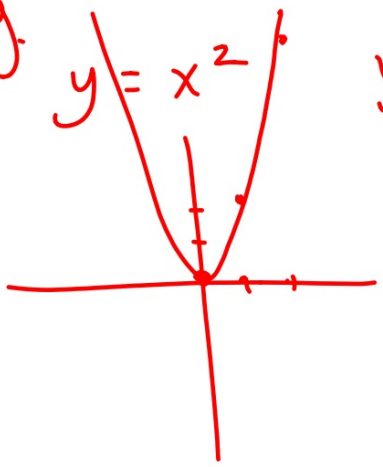
as p.y.

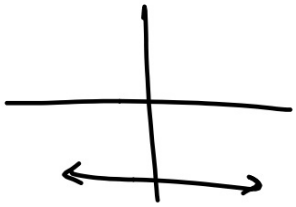
$y = x$

$y = 3x$

$y = x^2$

$y = 2x^2$





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