Algebra 2 2.7

Identify and use parent functions

Describe transformations of functions

family of graphs
parent graph
parent function
constant function
identity function
absolute value function
quadratic function

Transformation
reflection · flip (reversed)
line of reflection
dilation · SF
translation · slide
rotation - turn

activ: letters

Quiz 2.5-2.6

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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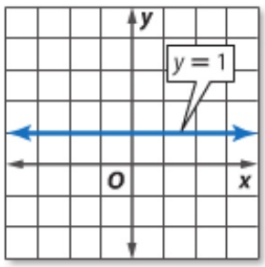
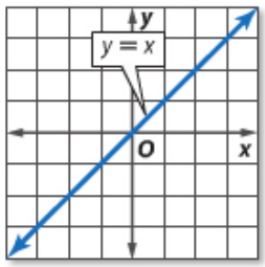
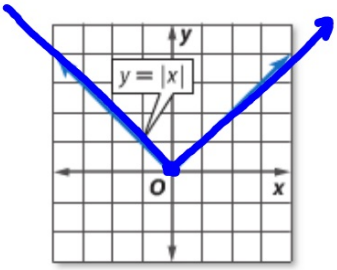
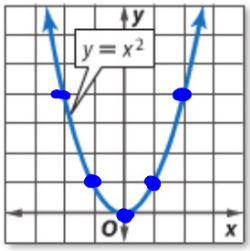
KeyConcept Parent Functions

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.

(linear)

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.

(symmetry)

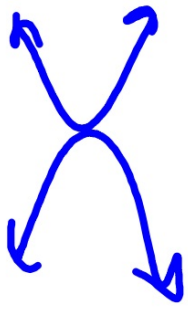
Multiply the whole thing -f(x)
vs
multiply just the x f(-x)

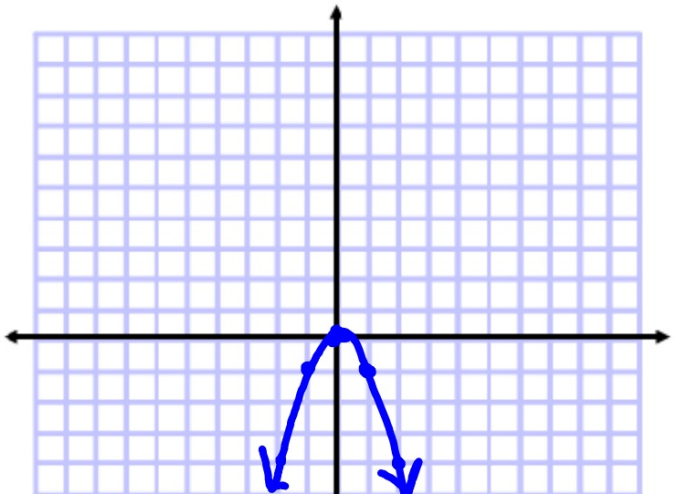
A **reflection** flips a figure over a line called the **line of reflection**.

- 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.



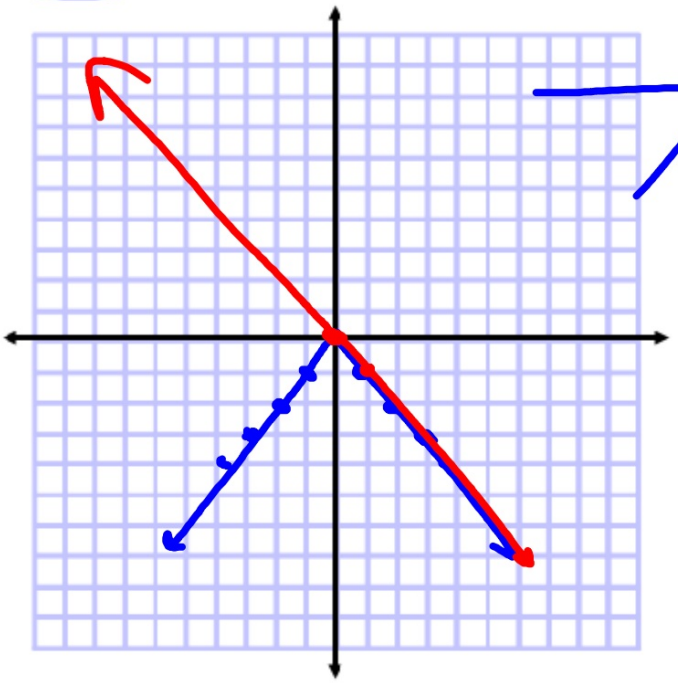


GuidedPractice

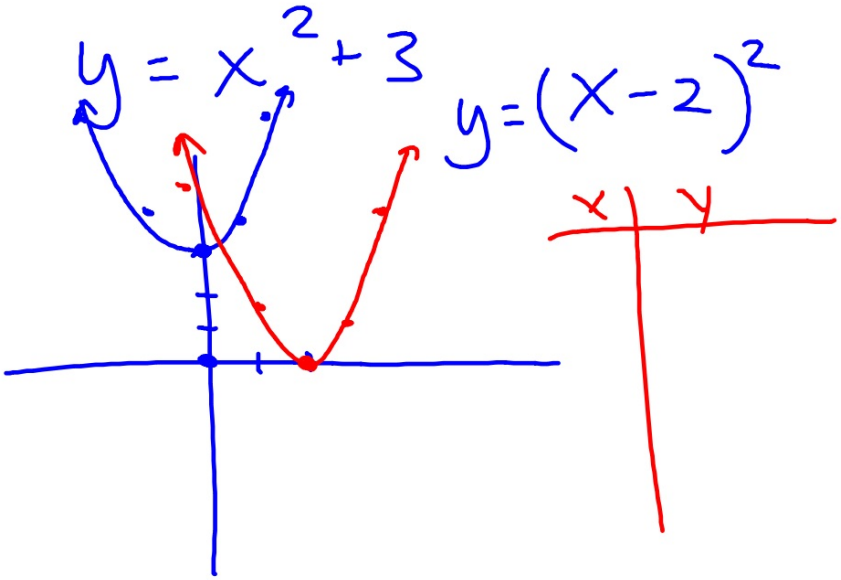
Describe the reflection in each function. Then graph the function.

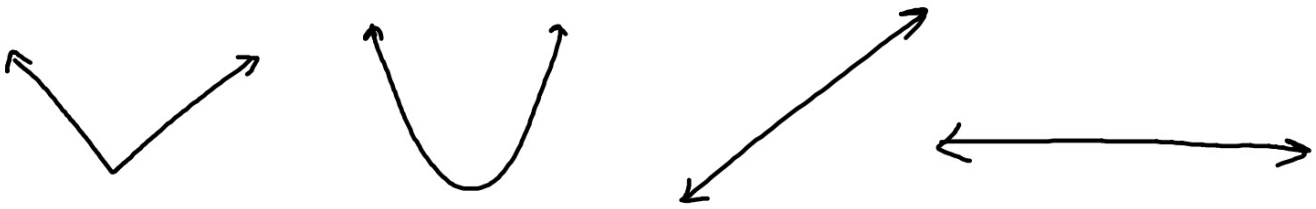
3A. $y = -|x|$

3B. $y = -x$



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


y = x² + 3
y=(x-2)²
x
y



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