

Transformations with Quadratics - Investigation:

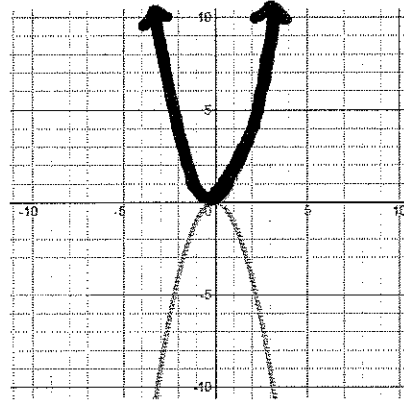
Name: _____

When transforming functions, you need to know where to “start.” The **parent graph** is the graph without any transformations (shifts or dilations). For Quadratic functions, the parent graph is $f(x) = x^2$.

1. A. Eq # 1 x^2
 Eq # 2 $-x^2$

B. What happened to the graph?

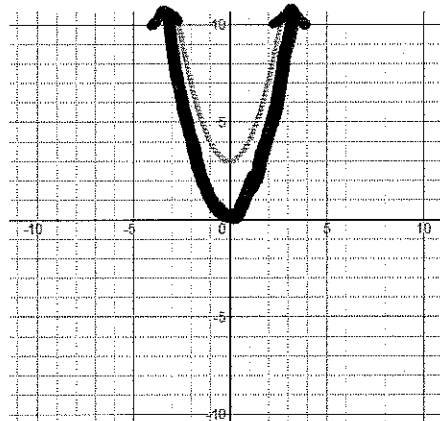
C. Graph it on the graph provided.



2. A. Eq # 1 x^2
 Eq # 2 $x^2 + 3$

B. What happened to the graph?

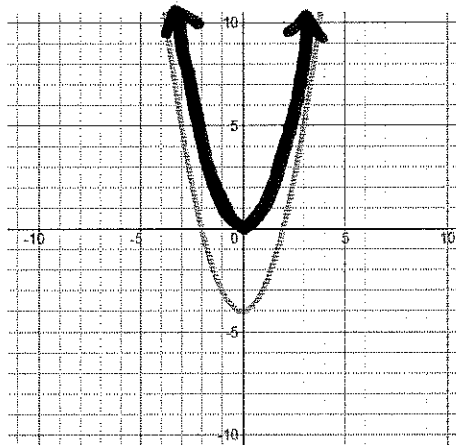
C. Graph it on the graph provided.



3. A. Eq # 1 x^2
 Eq # 2 $x^2 - 4$

B. What happened to the graph?

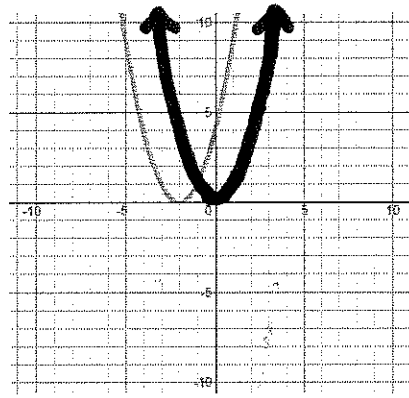
C. Graph it on the graph provided.



4. A. Eq # 1 x^2
Eq # 2 $(x + 2)^2$

B. What happened to the graph?

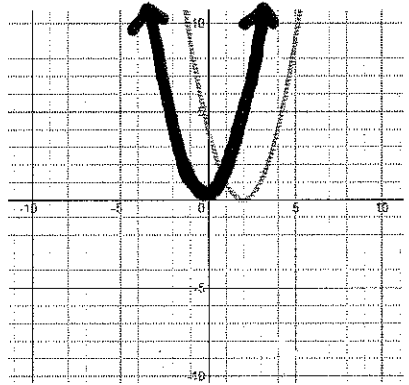
C. Graph it on the graph provided.



5. A. Eq # 1 x^2
Eq # 2 $(x - 2)^2$

B. What happened to the graph?

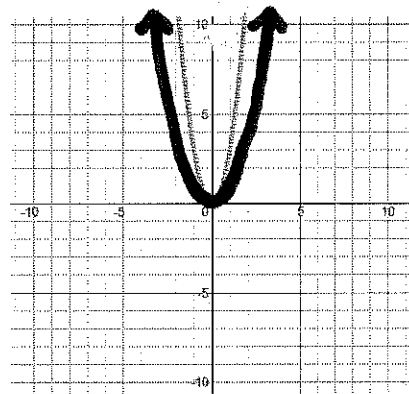
C. Graph it on the graph provided.



6. A. Eq # 1 x^2
Eq # 2 $3x^2$

B. What happened to the graph?

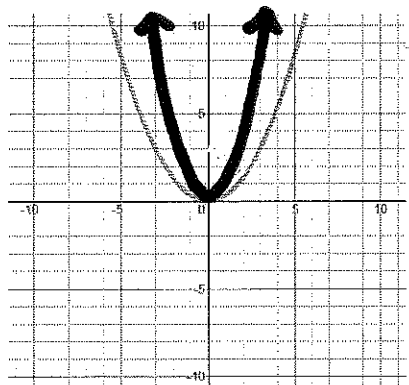
C. Graph it on the graph provided.



7. A. Eq # 1 x^2
Eq # 2 $1/3 x^2$

B. What happened to the graph?

C. Graph it on the graph provided.



Quadratic Transformations

$$f(x) = a(x - h)^2 + k$$

Shows 2 things:

- * If (-) graph reflects
- * If less than 1, graph will be wider. This is called a vertical shrink.
- * If greater than 1, graph will be thinner. This is called a vertical stretch.

Vertical Shift

- * If (-) move down
- * If (+) move up

Horizontal Shift

- * If (-) move right
- * If (+) move left

Example

$$f(x) = -5(x + 4)^2 - 6$$

$a = -5$, therefore...

- * The graph reflects
- * There is a vertical stretch meaning graph will get thinner.

$(x + 4)$ tells me:

- * Graph moves left 4

-6 on the end tells me:

- * Graph moves down 6

Identify the transformations for each of the following:

8. $f(x) = 2(x + 3)^2 - 4$

Reflection? Yes / No

V.S. ?

H.S. ?

Dilation?

9. $f(x) = -(x - 6)^2 - 7$

Reflection? Yes / No

V.S. ?

H.S. ?

Dilation?

10. $f(x) = \frac{1}{2}(x + 8)^2 + 5$

Reflection? Yes / No

V.S. ?

H.S. ?

Dilation?

11. $f(x) = -2(x - 5)^2 - 2$

Reflection? Yes / No

V.S. ?

H.S. ?

Dilation?

12. $f(x) = 4(x + 3)^2 + 3$

Reflection? Yes / No

V.S. ?

H.S. ?

Dilation?

13. $f(x) = -\frac{1}{2}(x - 8)^2 + 3$

Reflection? Yes / No

V.S. ?

H.S. ?

Dilation?