8-2: Transformations with Quadratic Functions

1. Quadratic transformation activity.
2. Vertex Form: $f(x) = a(x-h)^2 + k$
3. Vertex: $(h,k)$
4. Axis of symmetry: $x=h$
5. Parent Graph: $f(x) = x^2$

Blue: $-x^2$ reflection
Pink: $x^2-7$ moves down (V. Trans)
White: $x^2+2$ moves up (V. Trans)
Yellow: $(x-5)^2$ moves right (H. Trans)
Orange: $(x+5)^2$ moves left (H. Trans)
Green: $4x^2$ stretches (V. expan)
Red: $\frac{1}{2}x^2$ shrink (V. comp)

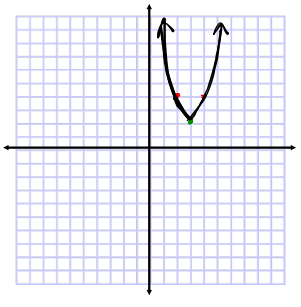
Use what you discovered during the activity to complete each of the following.

6. Compare $f(x) = x^2$ and $g(x) = 2(x - 3)^2 + 2$.

List all the transformations from f(x) to g(x).

Graph each.

H. Trans, right 3 +3
V. Trans, up 2 +2
V. expansion, 2
key points
(-1,1) (0,0) (1,1)
(-1,2) (0,0) (1,2)

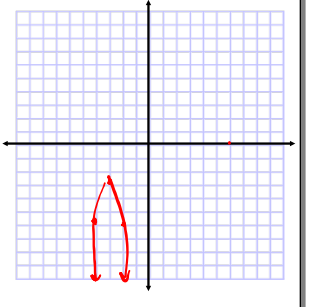


7. Compare $f(x) = x^2$ and $g(x) = -3(x+4)^2 - 3$.

List all the transformations from f(x) to g(x).

Graph each.

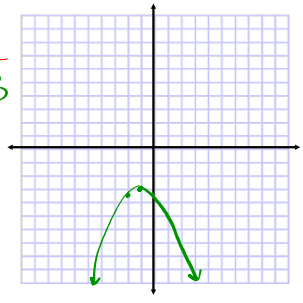
H. Translation left 4
V. Translation down 3
V. expansion 3
reflection (↓)
(-1,1) (0,0) (1,1)
(-1,-3) (0,0) (1,-3)



8. Compare $f(x) = x^2$ and $g(x) = -1/2(x+1)^2 - 3$
List all the transformations from f(x) to g(x).
Graph each.

H. Translation left 1
V. Translation down 3
V. compression $\frac{1}{2}$
reflects

Key points
(-1,1) (1,1)
$(-1, -\frac{1}{2})(1, -\frac{1}{2})$



9. The graph of the parent graph $f(x) = x^2$ has been transformed by the following:

Vertically ~~Horizontally~~ expanded by a factor of 1/4.

Vertically translated up 7.

Horizontally translated right 4.

Write the new equation for this graph.

$f(x) = \frac{1}{4}(x-4)^2 + 7$