Name _____ Date _____

Algebra 2 HW 4
Exploring Transformations

In this exploration, you will revisit transformations introduced in Algebra 1 using the quadratic and absolute value parent functions. You will work through the questions on this worksheet while completing an online activity.

To get started, visit the website student.desmos.com and enter the student code **42MZF**.

1. **Before you begin,** list any transformations you remember from Algebra 1 and Geometry. If you don't remember the formal names, list what you remember.

Use the quadratic parent function, $y = x^2$, shown in slide 3, to answer questions 2-5.

2. The parent quadratic function is symmetric across the _____ (*x* or *y* axis).

3. The parent quadratic function has a domain of _____ and a range of _____.

4. The parent quadratic function has an axis/line of symmetry equation of _____.

5. The vertex of the parent quadratic function is the coordinate point _____ and it is also the _____ (maximum or minimum) of the function.

Exploration 1:

6. Describe the transformation that you observed in slide 4, when you graphed $y = x^2 + k$.

7. Specifically, what happened to the graph when $k > 0$? When $k < 0$?

Exploration 2:

8. Describe the transformation that you observed in slide 6, when you graphed $y = (x - h)^2$.

9. Specifically, what happened to the graph when $h > 0$? When $h < 0$?

Exploration 3:

10. Describe the transformation that you observed in slide 8, when you graphed $y = ax^2$.

11. When $a > 0$, what happened to the graph when *a* increased away from 1? When *a* decreased closer toward zero?

12. Specifically, what happened to the graph when *a* became negative?

Exploration 4:

13. Describe the transformation that you observed in slide 10, when you graphed $y = \left(\frac{x}{b}\right)^2$.

14. When $b > 0$, what happened to the graph when *b* increased away from 1? When *b* decreased closer toward zero?

15. Specifically, what happened to the graph when *b* became negative?

Extension Questions:

Use the information and variables (*h, k, a, b*) you saw in this exploration to answer questions 14-15.

16. The vertex for *any* quadratic function is the point _____.

17. The axis/line of symmetry (AOS/LOS) for *any* quadratic function is the line _____.