Algebra 2 Graphing Absolute Value Functions Lab Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Materials Needed:**

Graphing calculator, Parent Graphs of Absolute Value Functions, 4 Colored Pencils, Pencil, Handout

**Task:**

You will graph several different absolute value functions in different categories on graph paper and using a graphing calculator. You are discovering what transformations will be made from the parent graph.

**Procedure:**

1. The graph of  is given on the axes provided. This is called the “parent graph” since it is the original absolute value function. All other graphs will be modified versions of this one. Your job will be to figure out how the following graphs have changed from this “parent graph”.
2. Within your groups, assign someone to A, B, C, and D. Each student will graph his or her assigned problem using the colored pencil stated below. If you don’t have 4 students, then take turns to who will graph 2 absolute value functions.

Student A is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and gets the RED pencil.

Student B is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and gets the BLUE pencil.

Student C is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and gets the GREEN pencil.

Student D is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and gets the PURPLE pencil.

1. 

On the axes provided, graph each of the following using your graphing paper then put that on your

graph paper, using your colored pencil. Each student will put their graph on the SAME “parent

graph” provided.

Student A:  Student B: 

Student C:  Student D: 

1. Compare your parent graph from part I to each of the graphs in part III.
   1. Each student should list what the bottom most point of your graph is (referred to as vertex).

Student A: \_\_\_\_\_\_\_ Student B: \_\_\_\_\_\_\_\_ Student C: \_\_\_\_\_\_\_\_ Student D: \_\_\_\_\_\_\_\_

* 1. What happens to the graph if “*k*” is negative? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  2. What happens to the graph if “*k*” is positive? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  3. In, what does the “*k*” do to the parent graph? Make sure all in group agree and understand the answer. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  4. **Without** graphing, explain how  would change if  is graphed. \_\_\_\_\_\_\_\_\_\_\_\_

**\*Let’s get back together to discuss with whole class to see how you did! ☺**

1. 

On the axes provided, graph each of the following, using your calculator to assist you.

Student A:  Student B: 

Student C:  Student D: 

1. Compare your parent graph from part I to each of the graphs in part V.

6. Each student should list what the bottom most point of your graph is (referred to as vertex).

Student A: \_\_\_\_\_\_\_ Student B: \_\_\_\_\_\_\_\_ Student C: \_\_\_\_\_\_\_\_ Student D: \_\_\_\_\_\_\_\_

1. What happens to the graph if “*h*” is negative? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

8. What happens to the graph if “*h*” is positive? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

9. In , what does the “h” do to the parent graph?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

10. **Without** graphing, explain how  would change if  is graphed?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**\*Let’s get back together to discuss with whole class to see how you did! ☺**

1. 

On the axes provided, graph each of the following, using your calculator to assist you. So far we

have only looked at absolute value functions where the number in front of the absolute value was 1.

Let’s see what happens when a number is put out in front.

Student A:  Student B: 

Student C:  Student D: 

1. In, what happened to the graph when “*a*” was negative? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. In, what happened to the graph when “*a*” was positive? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. In, what happened to the graph when  (Hint: think about what absolute value means – referring to Students A and Student C) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
4. In , what happened to the graph when (Referring to Students B and D) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**\*Let’s get back together to discuss with whole class to see how you did! ☺**

1. Putting it all together! ☺

Try at first without a calculator to fill in the chart below. If you really can’t figure it out, refer to

your calculator but see what you can do without.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Graph** | **Shape (standard, narrow or wide)** | **Opens up/down?** | **Moves left/right?** | **Moves**  **up/down?** | **Vertex** | **Domain** | **Range** |
| 15. |  |  |  |  |  |  |  |
| 16. |  |  |  |  |  |  |  |
| 17. |  |  |  |  |  |  |  |
| 18. |  |  |  |  |  |  |  |
| 19. |  |  |  |  |  |  |  |

1. Sum it up!
2. How do you determine if the shape is standard, narrow or wide by just looking at the function?
3. How do you know if the graph opens up or down by just looking at the function?
4. How do you know if the graph moves left or right by just looking at the function?
5. How do you determine if the graph moves up or down by just looking at the function?
6. How do you determine the vertex by just looking at the function given?
7. How do you determine the domain by looking at the graph?
8. How do you determine the range by looking at the graph?