Lab: Transformations of Absolute Value Functions

Graph the following absolute value functions using your graphing calculator. For each family of functions, sketch the graph displayed on graph paper. Then answer the questions given.

1. Parent graph: $y = |x|$

$y = |x| + 2$

$y = |x| + 4$

$y = |x| + 8$

    a.   What do all functions in this family have in common? In what ways are they different from one another?

    b.   Write the equation of two more functions that belong to this family. Explain.

2. Parent graph: $y = |x|$

$y = |x + 1|$

$y = |x + 2|$

$y = |x - 2|$

$y = |x - 4|$

    a.   What do all functions in this family have in common? In what ways are they different from one another?

    b.   Write the equation of another function that belongs to this family. Explain.

3. Parent graph: $y = |x|$

$y = 2|x|$

$y = 4|x|$

$y = 8|x|$

    a.   What do all functions in this family have in common? In what ways are they different from one another?

    b.   Write the equation of two more functions that belong to this family. Explain.
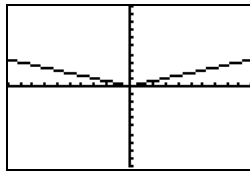
4. Graph the following functions:

$$y = |x| + 2$$
$$y = |x + 2|$$

   a. What do these functions have in common? In what ways are they different from one another?
   b. Predict what the graph of $y = |x - 3| + 2$ will look like? Explain your reasoning.

5. Maria graphed an absolute value function that looked like this:

   a. Write an equation that could represent the function Maria graphed. Explain.
   b. Predict what the reflection over the x-axis of Maria's graph would look like. Sketch your prediction.