# ***Lesson 2.6: Toolkit Functions with Transformations***

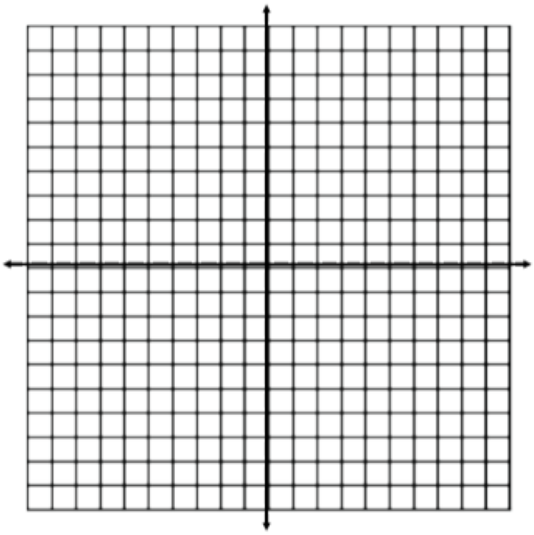
https://fluidmath.net/apps/FluidMath/?d=E6A34CFEA75&n=ti1
Click the website above and follow the instructions. Fill in the guided notes as you go through each exercise.

**Part 1: Five Functions**

Before you get started, what is the definition of a function?

**Function -**

1. The Quadratic Function $y = x^2$



Table

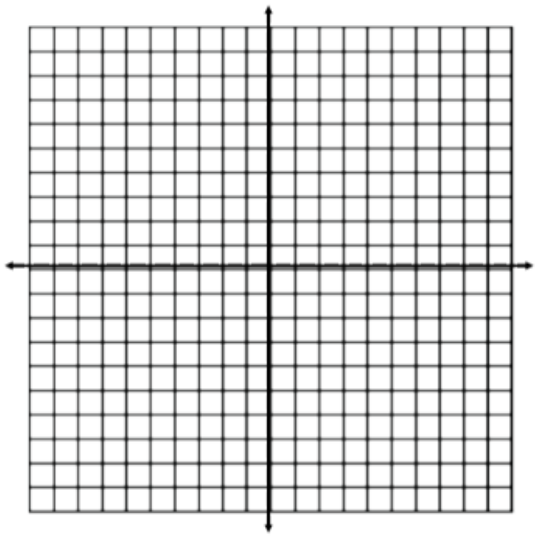
| x | y |
|---|---|

Based on the graph above and your knowledge of transformations, how do you think the graph of the function $y = (x - 5)^2 + 2$ compares to the parent function $y = x^2$? What about $y = -x^2$?

The quadratic function is concave up. What do you think the quadratic function $y = -x^2$ is called?

Where is the function $y = x^2$ increasing? Decreasing?

2. The Square Root Function $y = \sqrt{x}$



Table

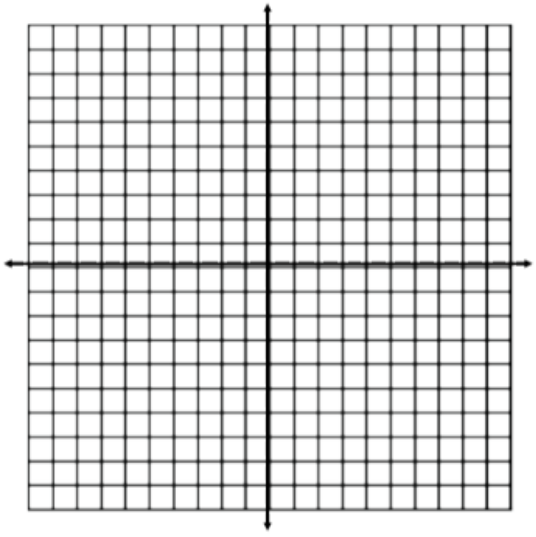
| x | y |
|---|---|

Why do you think the function is undefined for all negative values of x?

At what x value will the y value reach 9?

How would the graph of the function $y = 4\sqrt{x} - 7$ compare to the graph of the parent function?

3. The Absolute Value Function $y = |x|$



Table

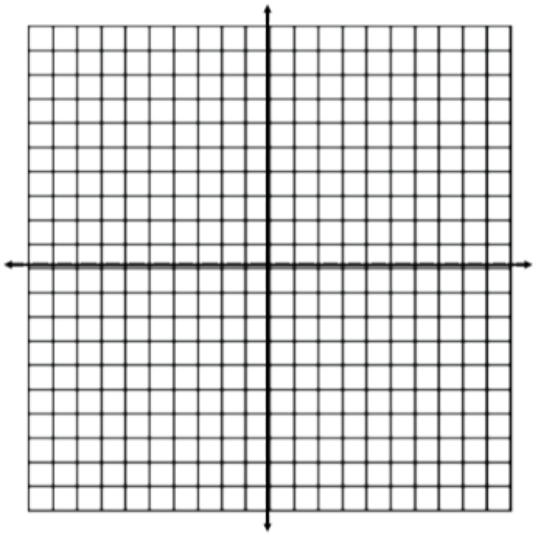
| x | y |
|---|---|
| | |

Based on the parent function's graph above, how do you think the graph of y = -|x| looks? What about the graph of y = |-x|?

Where is the function increasing? Decreasing?

Does the absolute value function have an absolute minimum or an absolute maximum?

4. The Reciprocal Function $y = \frac{1}{x}$



Table

| x | y |
|---|---|
| | |

Why is the function not defined when x = 0? What is happening at the vertical line x = 0?

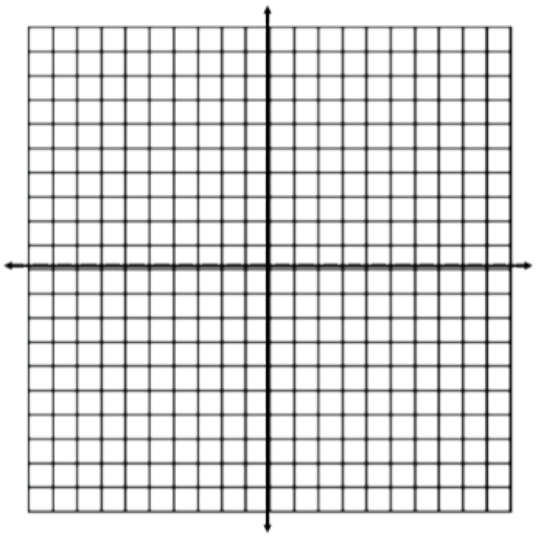
What is happening at the horizontal line y = 0? Is there ever an x value that can be plugged in to return a y value of 0?

Where is the reciprocal function concave up? Concave down?

Where is the reciprocal function increasing? Decreasing?

How would the graph of the function $y = \frac{-1}{x+4} - 2$ compare to the graph of the parent function?

5. $y = \frac{1}{x^2}$



Table

| x | y |
|---|---|

What changed from the graph of the function $y = \frac{1}{x}$ to $y = \frac{1}{x^2}$? Does $y = \frac{1}{x^2}$ still have a vertical asymptote at x = 0?

What is happening at the horizontal line y = 0? Is there ever an x value that can be plugged in to return a y value of 0?

Where is the reciprocal function concave up? Concave down?

Where is the reciprocal function increasing? Decreasing?