Math 48A, Lesson 11: Transformations of Functions (Part 2)

1. COMBINE HORIZONTAL AND VERTICAL SHIFTS

1A. Consider the following quadratic functions

, ,

Table

Description automatically generatedCreate a table of values and graph the resulting parabolas on these axes below.

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| *Input* | *Output* | | |
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1B. Make a conjecture (a mathematical guess) about what happens in the following scenario:

Assume we have a function and constants .

Suppose we define functions

What is the relationship between and ? What happens if constant is positive or negative? What happens if constant is positive or negative?

2. REFLECTING GRAPHS ABOUT THE X-AXIS

2A. Let’s consider how to “reflect” the graph of a function about the axis. To do so, consider the following functions

and .

Create a table of values and graph the resulting curves on these axes below.

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A picture containing table

Description automatically generated

2B. Let’s consider how to “reflect” the graph of a function about the axis. To do so, consider the following functions

and .

Create a table of values and graph the resulting curves on these axes below.

Table

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| *Input* | *Output* | |
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2C. Suppose we have a function and we define a new function . Based on your work in Problems 2A and 2B, make a conjecture about the relationship between the graphs of and . Explain why you think your conjecture might be true.

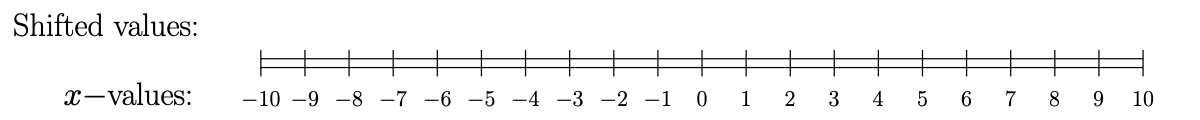
3. REFLECTION ABOUT VERTICAL AXIS

Consider the following shifts of the input variable

Diagram

Description automatically generated

Draw the effect of this shift on the real number line (axis) below:



What do you notice about the reflexed input versus the original input ?

4. REFLECTING GRAPHS ABOUT THE Y-AXIS

4A. Let’s consider how to “reflect” the graph of a function about the axis. To do so, consider the following functions

and .

Create a table of values and graph the resulting curves using Desmos.com

4B. Let’s consider how to “reflect” the graph of a function about the axis. To do so, consider the following functions

and .

Create a table of values and graph the resulting curves using Desmos.com

4C. Suppose we have a function and we define a new function . Based on your work in Problems 4A and 4B, make a conjecture about the relationship between the graphs of and . Explain why you think your conjecture might be true.