Math 48B, Lesson 15: Graphs of Logarithmic Functions

In Math 48B Lessons 14, 15, 16, 17, and 18, we study logarithmic functions:

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| Logarithmic Form | Exponential Form |
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To begin our exploration, let’s recall the rules of powers/exponents.

1. HOW TO EVALUATE LOGARITHMS?

Consider the two equivalent forms for logarithmic functions:

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| Logarithmic Form | Exponential Form |
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Use these two equivalent forms to evaluate the following logarithm problems.

1A. 1B. 1C.

2. WHAT DOES THE GRAPH OF A LOGARITHM LOOK LIKE?

2A. Fill out the table for the logarithmic function below. The, use Desmos.com to create a graph and describe the relevant features of that graph including the domain, range, x-intercept, and the end behavior as .

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2B. Fill out the table for the common logarithmic function

The, use Desmos.com to create a graph and describe the relevant features of that graph including the domain, range, x-intercept, and the end behavior as .

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2C. Suppose that and determine the characteristics of the function

Sketch a graph of this curve below and describe the relevant features of that graph including the domain, range, x-intercept, and the end behavior. Using Desmos.com, graph the log functions with , and on the same axes. Highlight the various features of each graph.

3. WHAT DOES THE GRAPH OF A LOGARITHM LOOK LIKE?

3A. Fill out the table for the logarithmic function below. The, use Desmos.com to create a graph and describe the relevant features of that graph including the domain, range, x-intercept, and the end behavior as .

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3B. Fill out the table for the common logarithmic function

The, use Desmos.com to create a graph and describe the relevant features of that graph including the domain, range, x-intercept, and the end behavior.

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3C. Suppose that and determine the characteristics of the function

Sketch a graph of this curve below and describe the relevant features of that graph including the domain, range, x-intercept, and the end behavior.

4. TRANSFORMATIONS OF EXPONENTIAL FUNCTIONS?

4A. For logarithmic function , what do parameters  *,,* and do to the graph of ? Develop graphs on Desmos.com to highlight each parameter and demonstrate the effect on your graph. Capture

4B. Test your hypothesis from Problem 4A above by graphing the function