

Algebra 2: Exponential Growth & Decay Functions Introduction

Essential Question: “What are the characteristics of the graph of exponential growth or decay functions?”

Goal: Explore exponent graphs using Desmos Graphing calculator

Analyze functions and graphs to determine how parent functions are translated by function operations

Part 1: Graphing exponential growth functions

- 1) Set calculator to degree mode
- 2) Graph the function $f(x) = 2^x$ and draw a labeled sketch on graph paper

Observations

- 3) What are the domain (possible x-values) and range (possible y-values) of the function? Write each in interval notation.

- 4) Make a table of values for the function (y-intercept is middle)

x			0		
y					

Changing Function

- 5) Keeping the original function on the Desmos graph, graph the function $f(x) = 4^x$ and draw a labeled sketch on graph paper

Observations

- 6) What are the domain and range of the function? Write in interval notation.

- 7) Complete the table of values for the function (use the same x-values as your last function)

x			0		
y					

Changing Function

- 8) Keeping both of the above functions on the Desmos graph, graph the function $f(x) = 2^x + 1$ and draw a labeled sketch on graph paper

Observations

- 9) What are the domain and range of the function? Write in interval notation.

- 10) Complete the table of values for the function (use the same x-values as your last function)

x			0		
y					

Summary of Findings

- 11) What do you notice about the domain and range of the 3 different function graphs and their equations? How are they different? What causes the changes?

Part 2: Graphing exponential decay functions

- 1) Graph the function $g(x) = \frac{1}{2}^x$ and draw a labeled sketch on graph paper.

Observations

- 2) What are the domain and range of the function? Write each in interval notation.

- 3) Make a table of values for the function

x			0		
y					

Changing Function

- 4) Keeping the original function on the graph, graph the function $g(x) = \frac{1}{4}^x$ and draw a labeled sketch on graph paper.

Observations

- 5) What are the domain and range of the function? Write in interval notation.

- 6) Make a table of values for the function (use the same x-values as your last function)

x			0		
y					

Changing Function

- 7) Keeping both of the previous functions on the graph, graph the function $g(x) = \frac{1}{2}^x + 1$ and draw a labeled sketch on graph paper.

Observations

- 8) What are the domain and range of the function? Write in interval notation.

- 9) Make a table of values for the function (use the same x-values as your last function)

x			0		
y					

Summary of Findings

- 10) What do you notice about the domain and range of the 3 different function graphs and their equations? How are they different? What causes the changes?

Part 3: Drawing Inferences

After completing this project, list 4 concepts you now understand about exponential growth and decay functions.