

Name:

Period:

Date:

Math Lab: Graphing Exponential Functions

Exponential functions are ones in which the variable is in the exponent. As with other types of functions, there is a parent graph for exponential functions ($y = b^x$ where b is the base) and we can create other similarly shaped graphs using transformations.

Complete the tables of ordered pairs below for each of the following parent graphs, then use the points to sketch each graph on the coordinate plane below in the given colors.

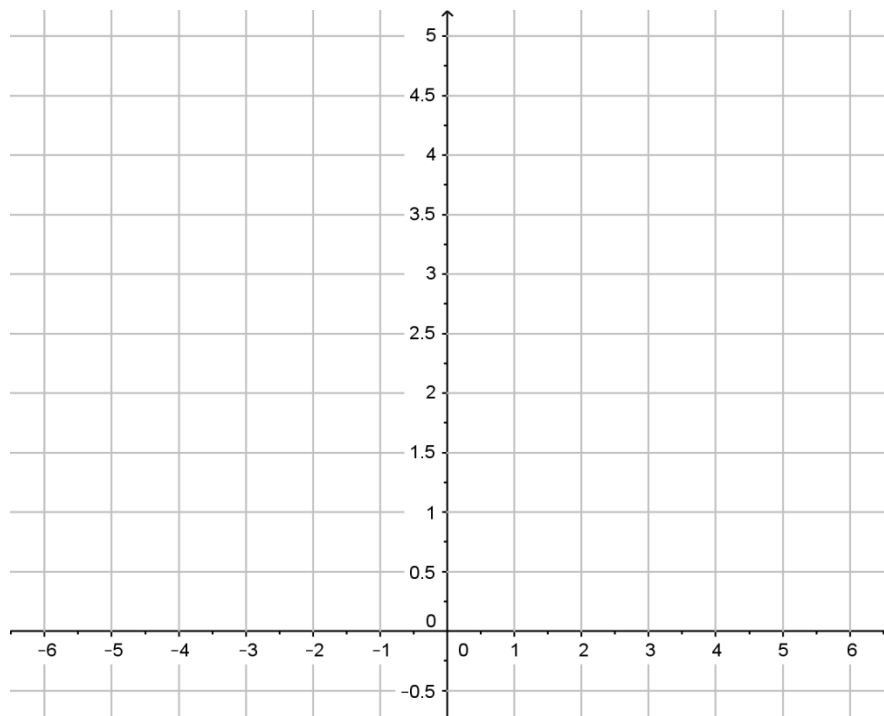
$y = 2^x$ (BLACK)	
-2	
-1	
0	
1	
2	
3	

$y = 3^x$ (RED)	
-2	
-1	
0	
1	
2	
3	

$y = 4^x$ (BLUE)	
-2	
-1	
0	
1	
2	
3	

Is there ever any value of x that will make $y = 0$?

Is there ever any value of x that will make y negative?



Find the domain and range for each parent graph.

$y = 2^x$ (BLACK)

$y = 3^x$ (RED)

$y = 4^x$ (BLUE)

Domain:

Domain:

Domain:

Range:

Range:

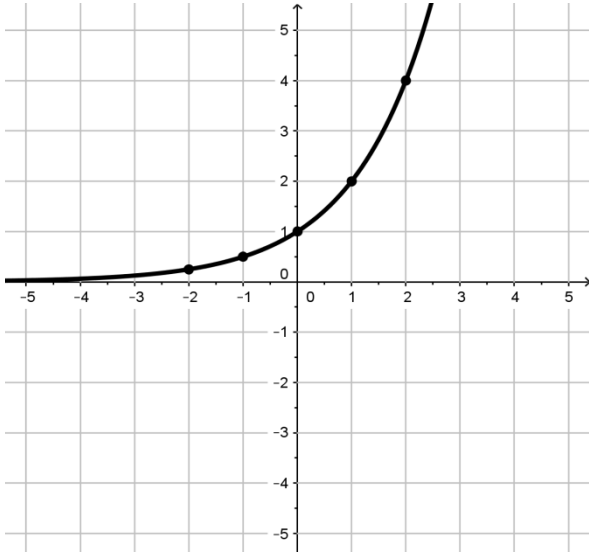
Range:

Horizontal Asymptote at:

Horizontal Asymptote at:

Horizontal Asymptote at:

Use a graphing calculator to view the graph of each function and the table of ordered pairs to neatly sketch them on the graph below in the given colors. Then find the domain, range, and asymptote for each.



What affect does adding or subtracting a value “outside” the x have on the graph of the exponential function?

Does this change impact the domain, range, or asymptotes?

$y = 2^x$ (GIVEN)

$y = 2^x + 2$ (RED)

$y = 2^x - 2$ (BLUE)

Domain:

Domain:

Domain:

Range:

Range:

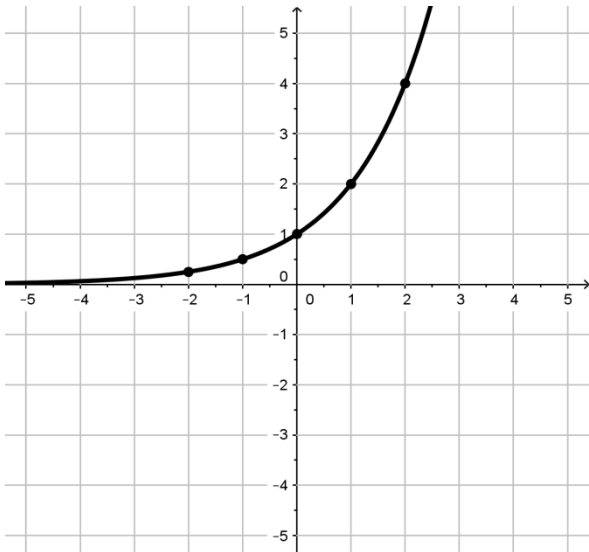
Range:

Horizontal Asymptote at:

Horizontal Asymptote at:

Horizontal Asymptote at:

Use a graphing calculator to view the graph of each function and the table of ordered pairs to neatly sketch them on the graph below in the given colors. Then find the domain, range, and asymptote for each.



What affect does adding or subtracting a value “inside” from the x have on the graph of the exponential function?

Does this change impact the domain, range, or asymptotes?

$y = 2^x$ (GIVEN)

$y = 2^{x+2}$ (RED)

$y = 2^{x-2}$ (BLUE)

Domain:

Domain:

Domain:

Range:

Range:

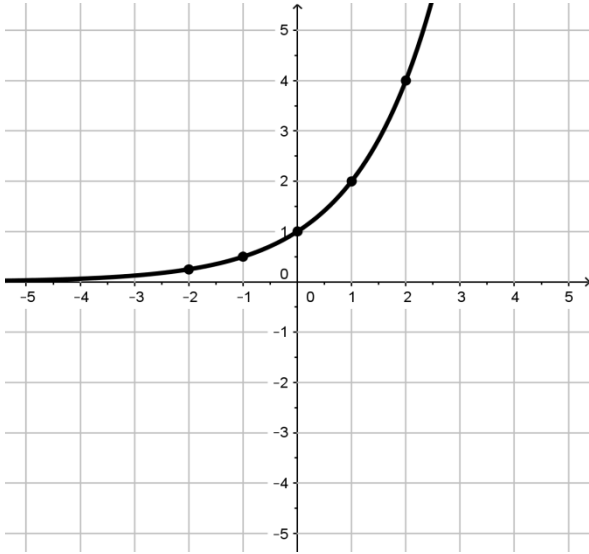
Range:

Horizontal Asymptote at:

Horizontal Asymptote at:

Horizontal Asymptote at:

Use a graphing calculator to view the graph of each function and the table of ordered pairs to neatly sketch them on the graph below in the given colors. Then find the domain, range, and asymptote for each.



What affect does multiplying x by a value have on the graph of the exponential function?

Does this change impact the domain, range, or asymptotes?

$y = 2^x$ (GIVEN)

$y = 2^{2x}$ (RED)

$y = 2^{1/2x}$ (BLUE)

Domain:

Domain:

Domain:

Range:

Range:

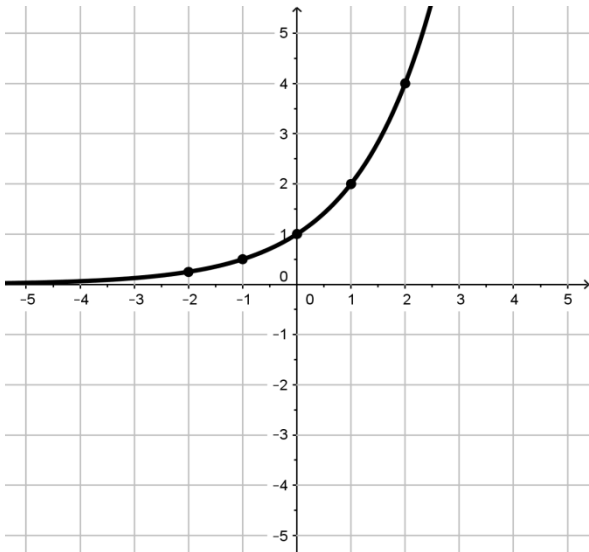
Range:

Horizontal Asymptote at:

Horizontal Asymptote at:

Horizontal Asymptote at:

Use a graphing calculator to view the graph of each function and the table of ordered pairs to neatly sketch them on the graph below in the given colors. Then find the domain, range, and asymptote for each.



What affect does multiplying by a negative have on the graph of the exponential function?

Does this change impact the domain, range, or asymptotes?

$y = 2^x$ (GIVEN)

$y = -2^x$ (RED)

$y = 2^{-x}$ (BLUE)

Domain:

Domain:

Domain:

Range:

Range:

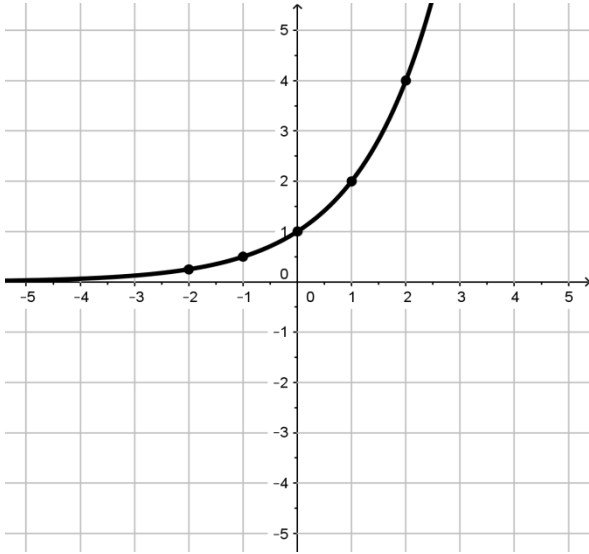
Range:

Horizontal Asymptote at:

Horizontal Asymptote at:

Horizontal Asymptote at:

Use a graphing calculator to view the graph of each function and the table of ordered pairs to neatly sketch them on the graph below in the given colors. Then find the domain, range, and asymptote for each.



What effect does changing the base to a number between 0 and 1 have on the graph?

What is another way to write this function so it has a base of 2?

$y = 2^x$ (GIVEN)

$y = \left(\frac{1}{2}\right)^x$ (RED)

Domain:

Domain:

Range:

Range:

Horizontal Asymptote at:

Horizontal Asymptote at:

Without a calculator, match each function with its graph.

_____1] $f(x) = 5^x$

_____2] $f(x) = -5^{-x}$

_____3] $f(x) = -5^{x-1}$

_____4] $f(x) = 5^{-x} + 1$

_____5] $f(x) = 5^{x+1}$

_____6] $f(x) = -5^x - 1$

