



Exponential Functions $f(x) = ab^x$

Student Activity

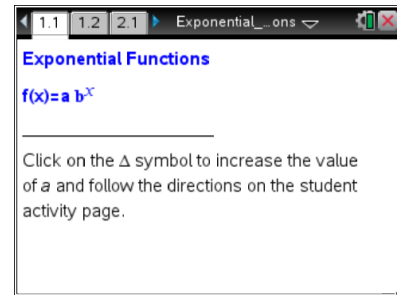


Name _____

Class _____

Open the TI-Nspire document *Exponential_Functions.tns*.

What is true of the function values $f(x) = ab^x$ when $a > 0$? Or when $a < 0$? What is true about the graph of $f(x) = ab^x$ when $b > 1$? Or when $0 < b < 1$? In this activity, you will explore these topics as you investigate the effects of a and b on the graphs of functions of the form $f(x) = ab^x$.



Move to page 1.2.

- On page 1.2, you will see a graph of the function $f(x) = ab^x$, where $a = 1$ and $b = 2$. Click on the Δ symbol to increase the value of a .
 - What happens to the graph of $f(x) = ab^x$ as you increase the value of a ?
 - Does the domain change?
 - Does the range change?
- Click on the ∇ symbol to change the value of a to a negative number.
 - What happens to the graph of $f(x) = ab^x$?
 - Does the domain change?
 - Does the range change?
- For the function $f(x) = ab^x$, find the following values.
 - $f(0)$
 - y -intercept of the graph
- Describe the graph of $f(x) = ab^x$ when $a = 0$. Why does this happen?
- A function is called *exponential* if it is of the form $f(x) = ab^x$, provided $a \neq 0$, $b > 0$, and $b \neq 1$.
 - Why do you think that $a = 0$ is not included?
 - Why is the base $b = 1$ not included?



Exponential Functions $f(x) = ab^x$

Name _____

Student Activity



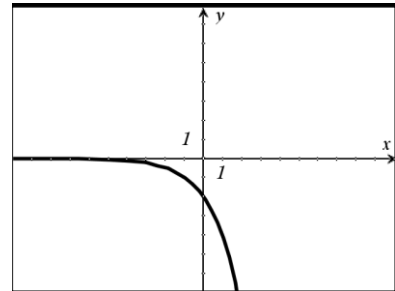
Class _____

Move to page 2.1.

6. On page 2.1, you see a graph of the function $f(x) = ab^x$, where $a = 1$ and $b = 1/2$. Click on the Δ symbol to increase the value of a .
 - a. What happens to the graph of $f(x) = ab^x$ as you increase the value of a ?
 - b. Do the domain and range change? Explain.

7. Click on the ∇ symbol to change the value of a to a negative number.
 - a. What happens to the graph of $f(x) = ab^x$?
 - b. Does the domain change?
 - c. Does the range change?

8. Look at the graph at the right of $f(x) = ab^x$. Margaret says that $a < 0$ and $b > 1$. Is she correct? Justify your response mathematically.





Exponential Functions $f(x) = ab^x$

Name _____

Student Activity

Class _____

Move to page 3.1.

9. Sketch the graph of each of the following.

Graph: $f(x) = ab^x$	$a > 0$	$a < 0$
When $b > 1$		
When $b = 1$		
When $0 < b < 1$		