

Pre Calculus
Exploration on the exponential functions:
Properties of Exponential Functions

Name: _____
Period: _____
2007-2008

In this activity, you will investigate properties of the exponential functions. You will need a ***TI Nspire*** calculator. Select a new application: **graphs and geometry**. Graph $y = e^x$. To get the best viewing window, you will need to make the changes yourself. Record your viewing window below and sketch the graph....include significant points:

Xmin = _____

Xmax = _____

Ymin = _____

Ymax = _____

Why did you choose those particular values? _____

I. Zeroes, maximum values, minimum values

- Put a **point on** your graph. Grab the point and drag it on the curve. Find the following. Give your answers as ordered pairs (if possible):

Zeroes: _____

Maximums: _____

Minimums: _____

As you drag the point so that the x-coordinate so that it gets larger, what happens to the y-coordinate? In other words, what is the limiting value for the function? _____

Write your response as a formal "limit".

As you drag the point so that the x-coordinate gets smaller (goes to negative infinity), what happens to the y-coordinate? In other words, what is the limiting value for the function?

Write your response as a formal "limit".

Is the function increasing or decreasing? Does it ever change from increasing to decreasing or from decreasing to increasing? _____

II. Horizontal shrinking and stretching $y = e^{bx}$

- Grab the curve and drag it to the left but keeping to the right of the y-axis. What is happening to the coefficient of x, i.e. b ? Describe how the graph has changed. Look at the ENTIRE function. Write your conclusions below:

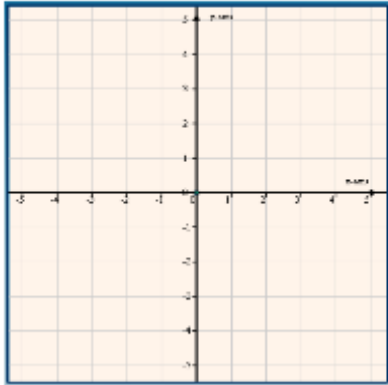
- Grab the curve and drag it to the right. Watch the coefficient of x, i.e. b . What happens to b ? Drag it until the $b=0$. What does the graph look like? Why?

- Grab the curve again and drag the graph so that the exponent becomes negative. What happens? Can you drag the function so that the function becomes negative?

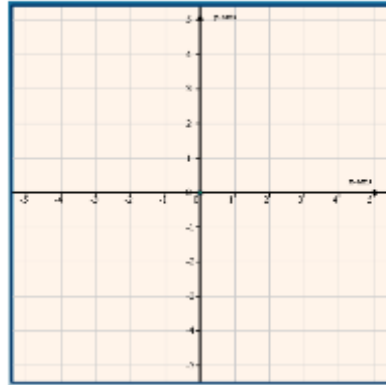
Conclusions: What are the main characteristics that you discovered about the stretching and shrinking of exponential functions? Be as detailed as possible.

III. What have you learned? Use your knowledge from the exploration to sketch the following graphs (include 2 significant points):

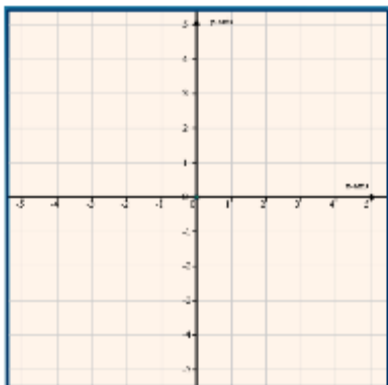
(a) $y = e^x$



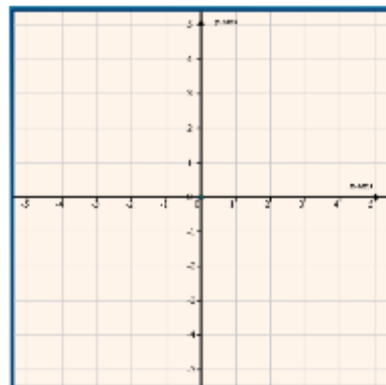
(b) $y = e^{-x}$



(c) $y = e^{2x}$



(d) $y = e^{.5x}$



(e) $y = e^{-.5x}$

