**Unit 2 – Key Features of Exponential Graphs**

* The basic form for an exponential equation is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + a is the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (unless the graph is translated)
  + b represents the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
    - If b is > 1 the equation represents \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
    - If b is < 1 the equation represents \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Exponential equations will always have a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ or a line the graph approaches but never crosses
  + To create an equation for a vertical line \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

***Transformations of Exponential Functions***

* Just like the other functions we learned about, exponential functions can be moved up, down, left, or right or stretched or compressed either vertically or horizontally
* A value added/subtracted at the end of an exponential function will shift the graph either \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ or \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + + moves the graph \_\_\_\_\_\_\_\_\_\_\_\_\_
  + – moves the graph \_\_\_\_\_\_\_\_\_\_\_\_\_
* A value added/subtracted with the exponent will move the graph either \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ or \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + + moves the graph \_\_\_\_\_\_\_\_\_\_\_\_\_
  + – moves the graph \_\_\_\_\_\_\_\_\_\_\_\_\_
* A value multiplied outside parenthesis or away from the exponent will stretch or compress the graph \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + Numbers greater than 1 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ the graph vertically
  + Numbers less than 1 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ the graph vertically
* A value multiplied with the exponent will stretch or compress the graph \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + Numbers greater than 1 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ the graph horizontally
  + Numbers less than 1 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ the graph horizontally

***For each example below, determine which way the function was moved from either parent function***

UP or DOWN \_\_\_\_\_\_\_\_

LEFT or RIGHT \_\_\_\_\_\_\_

UP or DOWN \_\_\_\_\_\_\_\_

LEFT or RIGHT \_\_\_\_\_\_\_

UP or DOWN \_\_\_\_\_\_\_\_

LEFT or RIGHT \_\_\_\_\_\_\_

UP or DOWN \_\_\_\_\_\_\_\_

LEFT or RIGHT \_\_\_\_\_\_\_

UP or DOWN \_\_\_\_\_\_\_\_

LEFT or RIGHT \_\_\_\_\_\_\_

UP or DOWN \_\_\_\_\_\_\_\_

LEFT or RIGHT \_\_\_\_\_\_\_

UP or DOWN \_\_\_\_\_\_\_\_

LEFT or RIGHT \_\_\_\_\_\_\_

UP or DOWN \_\_\_\_\_\_\_\_

LEFT or RIGHT \_\_\_\_\_\_\_

UP or DOWN \_\_\_\_\_\_\_\_

LEFT or RIGHT \_\_\_\_\_\_\_

***For each example below, decide if the graph was effected vertically or horizontally by either a stretch or a compression from either parent function or .***

Vertical or Horizontal

Stretch or Compression

Vertical or Horizontal

Stretch or Compression

Vertical or Horizontal

Stretch or Compression

Vertical or Horizontal

Stretch or Compression

Vertical or Horizontal

Stretch or Compression

Vertical or Horizontal

Stretch or Compression

Vertical or Horizontal

Stretch or Compression

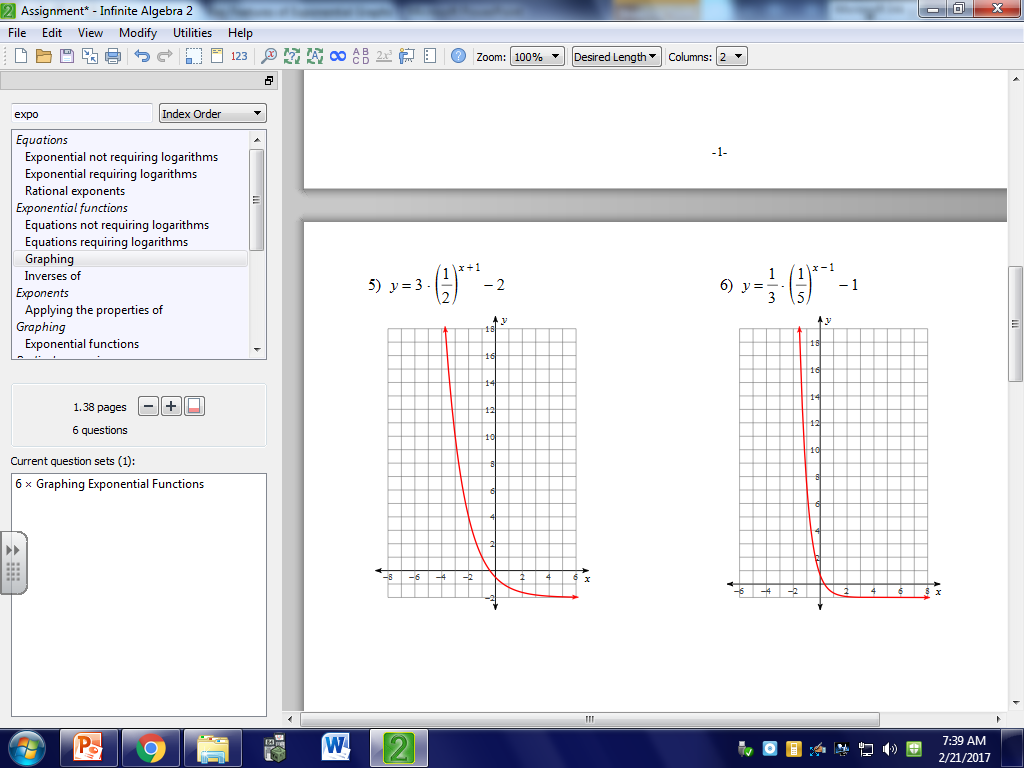
Vertical or Horizontal

Stretch or Compression

Vertical or Horizontal

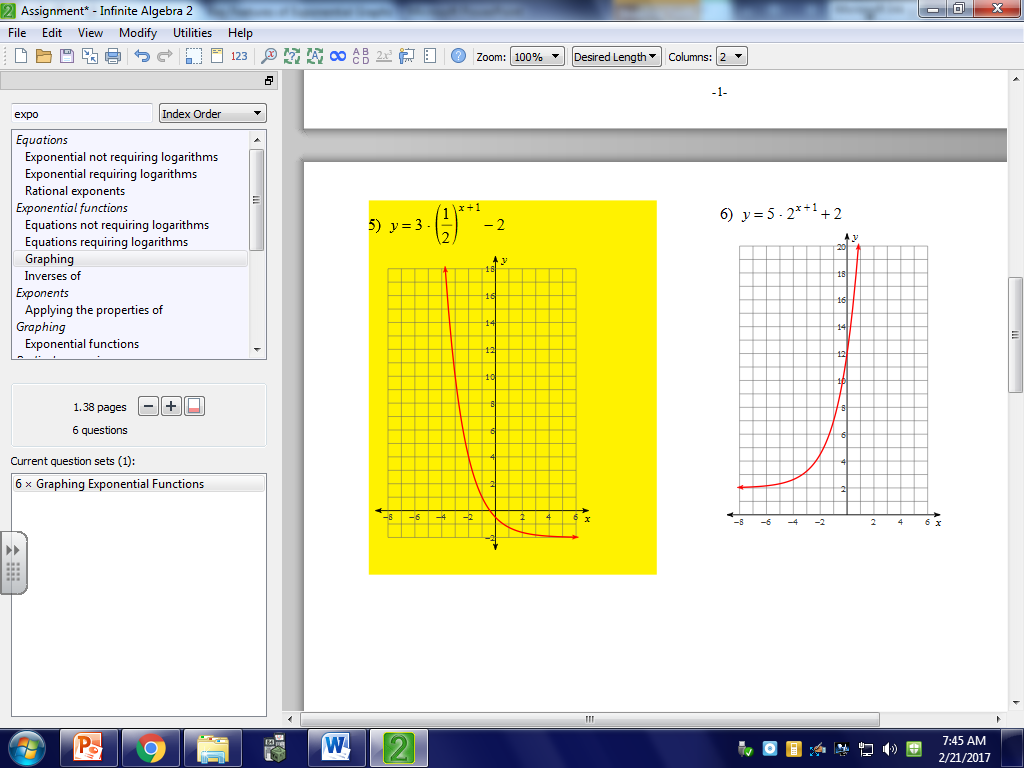
Stretch or Compression

***Key Features of Exponential Graphs***

* In addition to the key features we talked about with other graphs (domain, range, increasing/decreasing) we will be talking about \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + End behavior will ask you to look at your y-values as x approaches (right side of the graph) and x approaches (left side of your graph)
* We will also identify the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ or the line our graph will get very close to but won’t touch

(#1) The graph of is shown below. Use this graph to identify the following key features.

* Domain: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Range: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Increasing/Growth or Decreasing/Decay
* Asymptote at \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Y-intercept at \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* End behavior:

 , \_\_\_\_\_\_\_\_\_\_\_\_ , \_\_\_\_\_\_\_\_\_\_

(#2) The graph of is shown below. Use this graph to identify the following key features.

* Domain: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Range: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Increasing/Growth or Decreasing/Decay
* Asymptote at \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Y-intercept at \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* End behavior:

, \_\_\_\_\_\_\_\_\_\_\_\_ , \_\_\_\_\_\_\_\_\_\_

* From the previous two examples, do you notice any relationship between the equation and the vertical asymptote? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* For exponential equations, the vertical asymptote will always be at y = the value of the vertical shift and the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ will be (#, )

**For each equation below, identify the vertical asymptote as well as the domain and range.**

Vertical asymptote @ y = \_\_\_\_\_\_\_

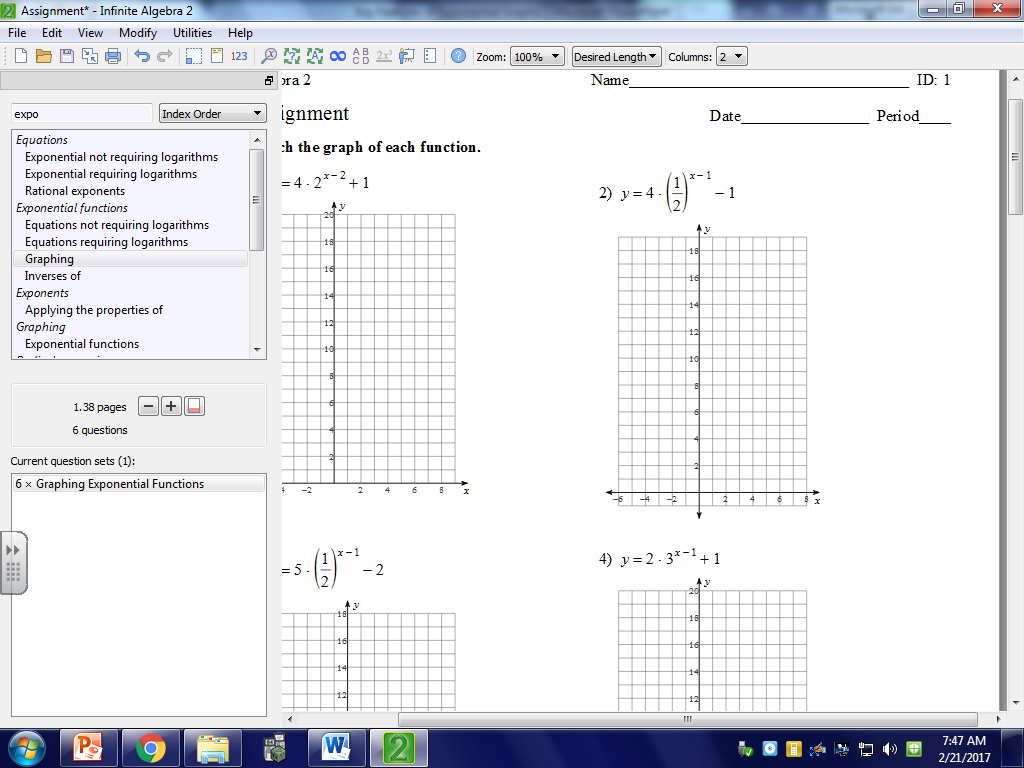
Domain: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Range: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Vertical asymptote @ y = \_\_\_\_\_\_\_

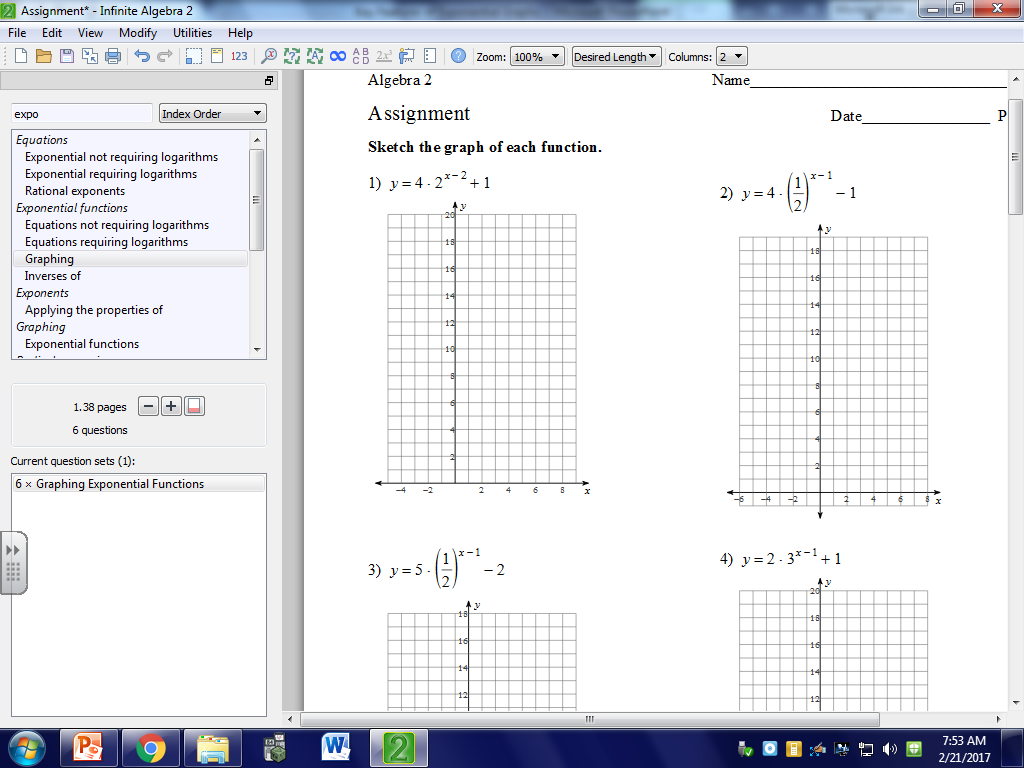
Domain: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Range: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**(#3) Graph Then use this graph to identify the following key features.**

* Domain: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Range: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Increasing/Growth or Decreasing/Decay
* Asymptote at \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Y-intercept at \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* End behavior:

, \_\_\_\_\_\_\_\_\_\_\_\_ , \_\_\_\_\_\_\_\_\_\_

 (#4) Graph Then use this graph to identify the following key features.

* Domain: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Range: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Increasing/Growth or Decreasing/Decay
* Asymptote at \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Y-intercept at \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* End behavior:

, \_\_\_\_\_\_\_\_\_\_\_\_ , \_\_\_\_\_\_\_\_\_\_