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| In this activity, you will examine the family of exponential functions of the form  where and are parameters. You will use the **Transformation App** (Transfrm) on your handheld to manipulate these parameters in Questions 1 - 3. |  |

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| The parameter  is the base of the exponential function and  Using the transformation app, change the value of a parameter by entering the equation for each question into Y1 and Y2, and pressing the arrow keys to manipulate each parameter of the function on the graph.  **Question 1** |
| Graph the following functions:  and  For specific values of press the arrows to change the value of , and observe the changes in the graph of .  a. Explain why for every value of the graph of passes through the point  b. Is it possible for the graph of  to intersect the *x-*axis? Explain why or why not. |
| **Question 2** |
| Graph the following function:  For a specific value of , click the arrows to change the value of , and observe the changes in the graph of  Repeat this process for other values of Describe the effect of the parameter on the graph of  Discuss the effects of both positive and negative values of . |

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| **Question 3** |
| Graph the following functions:  and  For specific values of and , click the arrows to change the value of , and observe the changes in the graph of . Describe the effect of the parameter on the graph of Discuss the effects of both positive and negative values of . |
| **Question 4** |
| Turn off the Transformation App by selecting Quit-App on the screen. Graph each function given and answer the following questions.  a. Display the graphs of  and  (i) How is the graph of related to the graph of ?  (ii) Use the properties of exponents to justify your answer.  b. Display the graph of  and  (i) How is the graph of related to the graph of ?  (ii) Use the properties of exponents to justify your answer. |
| 1. Use your answers to parts (a) and (b) to explain the relationship between a horizontal dilation of the graph of an exponential function and a change of base of the exponential function. |
| **Question 5** |
| 5. Without using your calculator, match each equation with its corresponding graph. Check your answers by graphing each function on your calculator.  (a)  (b)  (c)  (d)  (e)  (f)  Note: The function in part (e) is the “natural” exponential function and involves the number |
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