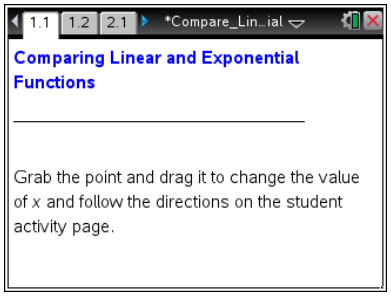
Open the TI-Nspire document *Compare_Linear_Exponential.tns.*

In this activity, you will explore the values of the expressions $3x$ and 3^x as x changes from 0 to 5. You will compare the two expressions by investigating patterns in how their values change both in a table and graphically.



Move to page 1.2.

Press ctrl ▶ and ctrl ◀ to navigate through the lesson.

1. Grab and drag the point to change the value of x. Complete the table below. Which column is growing faster?

x	$3x$	3^x
0		
1		
2		
3		
4		
5		

2. a. As x increases from 2 to 3 in the table, how does the value of $3x$ change?

   b. As x increases by 1, describe the pattern in the numbers in the $3x$ column of the table.

3. a. As x increases from 2 to 3 in the table, how does the value of 3^x change?

   b. As x increases from 3 to 4 in the table, how does the value of 3^x change?

   c. As x increases by 1, describe the pattern you notice in the numbers in the 3^x column of the table.

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4. Complete the bottom row of the table for $x = 6$. How did you determine the values for $3x$ and 3^x?

x	$3x$	3^x

5. Why are the values for 3^x increasing faster than the values for $3x$?

6. The function $f(x) = 3^x$ is called an ***exponential function,*** while the function $f(x) = 3x$ is a ***linear function.*** Describe the differences in the two functions.

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Press ctrl ▶ and ctrl ◀ to navigate through the lesson.

7. Drag the point on the arrow to the right to produce two graphs—one red and one blue. Use the information from the table in question 1 to identify which graph represents an exponential function and which graph represents a linear function. Justify your answer.

8. How do the graphs of $f(x) = 3x$ and $f(x) = 3^x$ support your response to question 5?

9. Aaron says that the values of $f(x) = 5^x$ will increase faster than the values of the linear function $f(x) = 5x$. Do you agree or disagree? Support your answer.

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