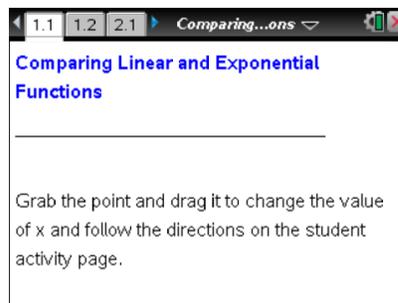




Open the TI-Nspire document

Comparing_Linear_and_Exponential_Functions.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, 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.
 - c. As x increases from 2 to 3, how does the value of 3^x change?
 - d. As x increases from 3 to 4, how does the value of 3^x change?
 - e. As x increases by 1, describe the pattern in the numbers in the 3^x column of the table.



Comparing Linear and Exponential Relations Student Activity

- On page 1.2 you can only look at values of x from 0 to 5. If $x = 6$, what would be the values of $3x$ and 3^x ? How did you determine the values for $3x$ and 3^x ?
- Why are the values for 3^x increasing faster than the values for $3x$?
- 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.

Move to page 2.1.

- Drag the point to the right to produce two graphs—one solid, one dashed. 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.
- How do the graphs of $f(x) = 3x$ and $f(x) = 3^x$ support your response to question 4?
- 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? Justify your answer.