Name _____

Date _____Pd_____

INVESTIGATING EXPONENTIAL FUNCTIONS

In today's experiment, you will investigate properties of an exponential function by making cuts to an item and observing the new length of the item after each cut.
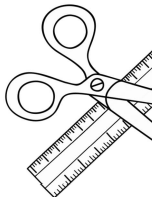
STEP 1 ▸ Use a ruler to measure the initial length of the item in centimeters. Be sure your item is laying flat and straight before measuring.

Initial length of item: _____

STEP 2

Record the initial length of the item in the table under 0 number of cuts. Then follow the steps below to complete the table:

- Fold the item in half and cut it into two equal pieces.
- Record the new length of the item and the number of cuts in the table.
- Repeat until your item is too small to fold in half. Add more columns to the table if needed.

# OF CUTS	0	1				
LENGTH (CM)						

Observe your cut pieces and the lengths shown in the table to answer the following questions.

a. Is the length of your item decreasing at a constant numerical rate after each cut? Justify your answer.

b. If you had the tools to help you continue cutting smaller and smaller pieces, would there be a way for the length of the item to ever reach zero? Explain your reasoning.

STEP 3

a. Using the data from your table, plot the points to graph the function. Label the x and y-axis and choose appropriate intervals for the graph.

b. What is the y-intercept of the function?

c. If you continued to make cuts, what would happen to the value of y?

d. Using your reasoning in step 2, will the function cross the x-axis?
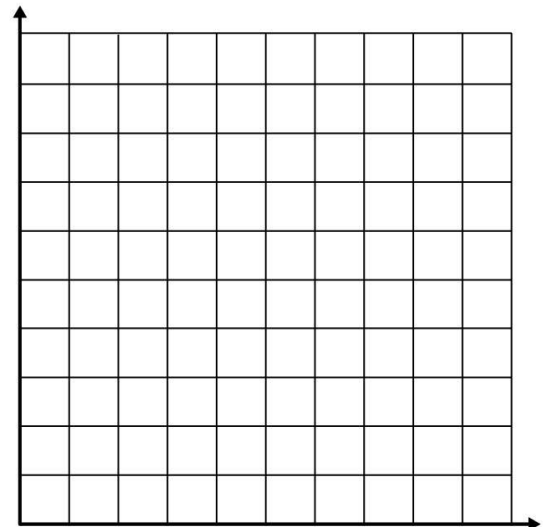
Valencia conducts a similar experiment with a stick of gum that initially measures 8 centimeters. However, Valencia cuts off 0.5 centimeters each time instead of cutting it in half. The data from her experiment is shown in the table below. Use the table to create a graph of g(x), the length of the gum after x number of cuts.

# OF CUTS	0	1	2	3	4	5
LENGTH (CM)	8	7.5	7	6.5	6	5.5
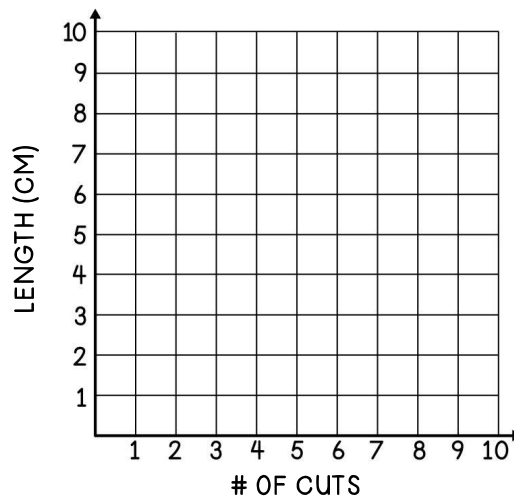
1. What is happening to the length of the stick of gum as the number of cuts increases?

2. What type of function is g(x)? Explain your reasoning.

3. The function represented in your experiment is called an exponential function. List some of the differences between the properties of the function from your experiment and g(x).

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