

### How High Does a Ball Bounce?

ID: XXXX

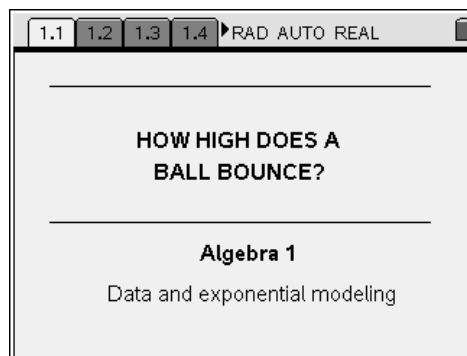
Name \_\_\_\_\_

Class \_\_\_\_\_

*In this activity, you will explore:*

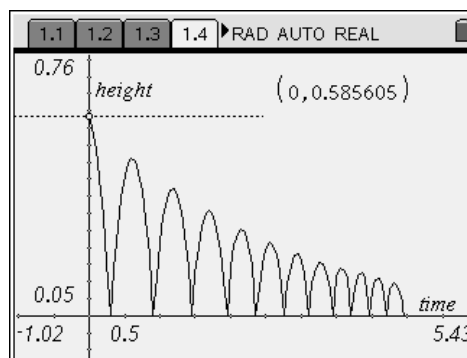
- *creating an exponential equation*
- *making conjectures based on the model*

Open the file *Alg1Act05\_BallBounce\_EN.tns* on your handheld and follow along with your teacher and the directions provided in the TI-Nspire file. Record your answers on this worksheet or as directed by your teacher.



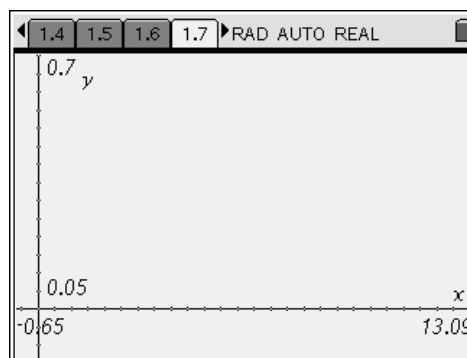
Read pages 1.2 and follow the directions on page 1.3. Look at the graph of the ball bounce data on page 1.4.

1. Describe any trends you see in this data.



Follow the directions on page 1.5 to set up, capture, and display the rebound data. Then follow the directions on pages 1.8 and 1.9 to graph an exponential function to model the data and sketch a graph of your scatter plot and exponential function below. Use what you have learned to answer the following questions.

2. What is the initial height from which the ball was dropped?
3. What is the average ratio of the rebound heights? What does this value mean in terms of the bouncing ball?



4. Describe how the rebound height changes over time.
  
  
  
  
  
  
  
  
  
  
5. By what percent is rebound height decreasing with each bounce?
  
  
  
  
  
  
  
  
  
  
6. Write an exponential equation in the form of  $y = a(b)^x$  to describe the rebound data.
  
  
  
  
  
  
  
  
  
  
7. Suppose you drop another racquetball from the same initial height. Use your model to predict the height of the 5th and 16th bounces.
  
  
  
  
  
  
  
  
  
  
8. Suppose you drop yet another racquetball from the same initial height, recorded a rebound height of 0.115353, but you lost count of the number of bounces. According to your model, what bounce number is it likely to have been?
  
  
  
  
  
  
  
  
  
  
9. How do you think the rebound rate of a volleyball would compare to that of the racquetball. Do you think that all types of sports balls have the same rebound rate?