Exponential Models

5614

Introduction

In this activity, students will explore an exponential model for the rebound heights of a playground ball.

Grades 9-12

NCTM Algebra Standards

- Represent and analyze mathematical situations and structures using algebraic symbols
- Use symbolic algebra to represent and explain mathematical relationships

Files/Materials Needed

BALLBOUN.8xp, ballbounce.act, ballbouce_L3.8xl, ballbounce_L4.8xl, BallBounce.edc

1

a. Launch TI-Navigator™ on the computer and start the session.

**b.** Have each student log into NavNet on their calculator.

2

a. *Force send* the program **BALLBOUN.8xp** to the students. The program BALLBOUN contains the data time (seconds) in L1 and height (ft) in L2 of a playground ball.

b. Have students log out of NavNet and create a scatter plot of the data in L1 and L2.

c. Use **Screen Capture** to check to see if the students have a similar graph to the one below. If not, discuss how to set up the appropriate window to display the data.

3
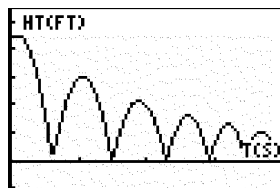
a. Instruct students to trace the heights (peaks) and create a table of bounce number (starting at 0) and corresponding rebound heights. Have students enter the bounce number in L3 and the rebound heights in L4.

b. Have students create a scatter plot of L4 vs L3. Use Screen Capture to check to see if the students have a similar table and graph to those below. If not, discuss how to set up the appropriate window to display the data.

4
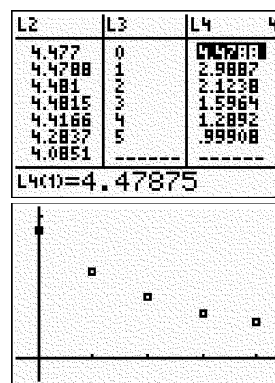
a. Load the activity settings file **ballbounce.act.**

b. Load the lists **ballbounce_L3.8xl** and **ballbounce_L4.8xl.**

c. Select the **List-Graph** tab, and click the **Configure Plots** button. Choose any one of the plot mark types and select L3 for the X-List and L4 for the Y-List. Click the OK button.

5

a. Start the activity and have students log back into NavNet.

b. Instruct students to submit their own exponential equation for the data.

c. Use **Quick Poll** (with *Open Response*) to ask:
- *What is the initial height of your model?*
- *What is the rebound percentage of your equation?*

d. Discuss the student's equations and instruct students to make adjustments to their equations so they are a better fit. Discuss what students are doing to make the adjustments.

e. Stop the activity and clear the activity data. Reconfigure **Contribute equations** so that students are submitting two equations.

f. Start the activity and have students send two equations: their model and the regression equation. If the screen is getting too cluttered, instruct students to clear Y1 which is their equation so that they are only sending the calculator's exponential regression, or you can highlight certain equations and utilize the Hide/Show function.

g. Discuss the differences between their equation and the calculator's equation.

6

a. *Force send* the LearningCheck™ file ***BallBounce.edc***.

b. Have students complete the assignment. Analyze the results with Class Analysis and discuss the results.