

Ball Bounce II

Algebra 1

Date_____ Period_____ Team Members (Indicate yourself!):

We now wish to explore the Bouncing Ball in our quest for the Quadratic within. If we didn't stop the ball from bouncing each time, maybe its momentum would carry on in such a way that the model would be Quadratic.

Materials

- Racquet Ball
- 150 Centimeter Tape measure
- Pen or Pencil
- Tape for the wall
- TI-83/TI-82 graphing calculator
- Instructions
- Post-it® Notes
- Excel or Graphical Analysis

1. In your group, collect the data for a dropped ball from a height of 200 centimeters. Pick a location from which your team members can see the tape on the wall, and where the ball tends to bounce straight up and down.
2. This time let the ball continue to bounce until you get all the bounces you can. Use the Post-it® Notes to mark the location on the tape that the ball returns to on each bounce. Try to get as many bounces as possible on one complete drop. Repeat the drop if you are not satisfied with the data. Do each full Trial, before you move to the next one.
3. Repeat the complete drops for a total of 5 Trials.
4. Before you fill in the Average Height column, mark out the highest and lowest heights for each Bounce Number from the 5 Trials. This means the average will be the sum divided by 3.

Table I

Bounce Number	Trial One Height	Trial Two Height	Trial Three Height	Trial Four Height	Trial Five Height	Average Height (cm)
0	200	200	200	200	200	200
1						
2						
3						
4						
5						
6						
7						

5. Now fill in Table II below using the Average Heights from Table I as the Initial and Final Heights for each Bounce. Calculate the Difference of each Height and the Ratio of the Heights. Place these values in the appropriate columns.

Table II

Bounce	Initial Height H_i	Final Height H_f	Difference = $H_i - H_f$	Ratio = $H_f \div H_i$
0	200			
1				
2				
3				
4				
5				
6				
7				

6. Average the Difference column and the Ratio column from Table II.
Round these values to an appropriate number of decimal places

Average Difference = _____ Average Ratio = _____

7. Calculate the Sum of the Differences column.

Total Difference = _____

8. Using your Graphing Calculator **and** either Graphical Analysis or Excel, put the data from Table I into two lists (X-Values = Bounce Number, Y-Values = Average Height).

9. Produce a Scatter Plot of this data.

10. Select a Model from the 7 Parts of Algebra and get the equation using both the Bubble Boy **and** the Regression methods. Give both equations and state the selected model.

11. Produce the answers to questions 8, 9, and 10.

12. Graph a Histogram using the data from Table II.

Differences: X-Values = Bounce, Frequency = Difference

(Note: Use the Bounce number of 1 for the first Difference.)

13. Repeat steps 8, 9, 10, and 11 using the data from Table II

Ratios: X-Values = H_i , Y-Values = H_f .

14. Turn in your work from the calculator and computer (GA or Excel) with this sheet.