

“Choose A Model”

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Abstract

Mathematical modeling has taken a front row seat in our classrooms as part of the 'reform' movement. Collecting, graphing, and analyzing data is sprinkled throughout the K-12 mathematics curriculum. Choosing the appropriate function that fits the data, however, can be a tricky process, usually determined by the curriculum. This activity demonstrates the importance of looking at the residuals generated by a regression algorithm or by a hand-fit function and studies the impact of residuals graphs on our choice of a model.

Overview

TI-Navigator is a powerful tool that makes dissemination and collection of important information fast and easy. TI-Navigator also helps to promote classroom discussions. In this activity, the teacher will distribute two lists to the class, ask students to devise an appropriate mathematical function that 'fits' the data, and look at the 'residuals' graph. The teacher will then collect screenshots of a) the data and the function and b) the residuals graphs to share with the class via a 'slideshow'.

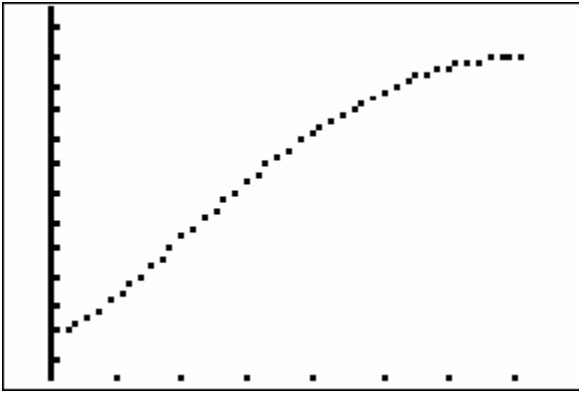
Procedure

- **Teacher** sends 2 lists and a Learning Check document to student calculators
- **Students** prepare a scatterplot of the data, decide on a mathematical function that fits the data, and graph the function over the data
- **Students** save this graph as Pic1 (Draw...Sto...Storepic)
- **Students** then prepare a scatterplot of the residuals...
 - If a regression was used, the list RESID is in the calculator
 - If a 'by hand' fit was used, then the residuals are $L2 - Y1(L1)$
- **Students** save this graph as Pic2
- **Teacher** collects Pic1 and Pic2 from students and display a slideshow of the screens. Discussion ensues
- <optional> **Students** can find a model for the residuals, then subtract the residuals model from the original model to get a 'better' fit. Then examine the residuals again to decide on the appropriateness of the model.

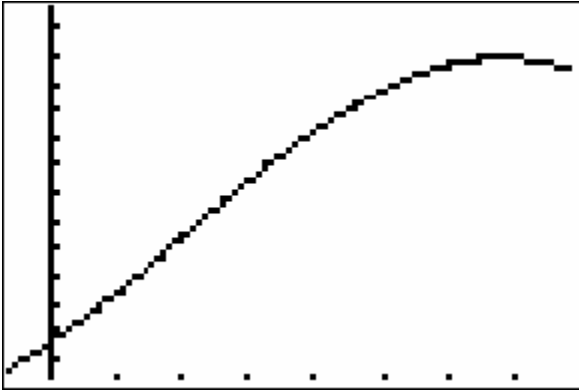
L1	L2	----- 2
2	2.01	
6	2.09	
10	2.25	
14	2.47	
18	2.73	
22	3.02	
26	3.33	
L2(?) = 3.33		

Stat Editor containing 'interesting' data

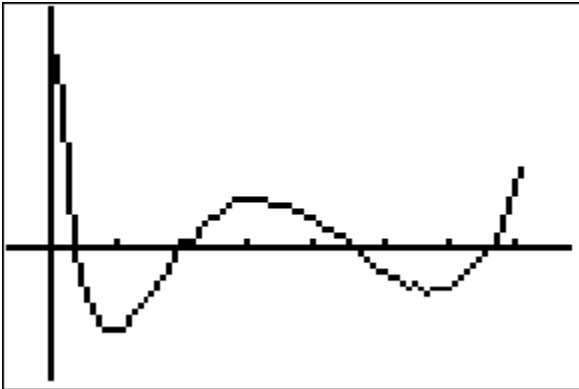
Screenshots:



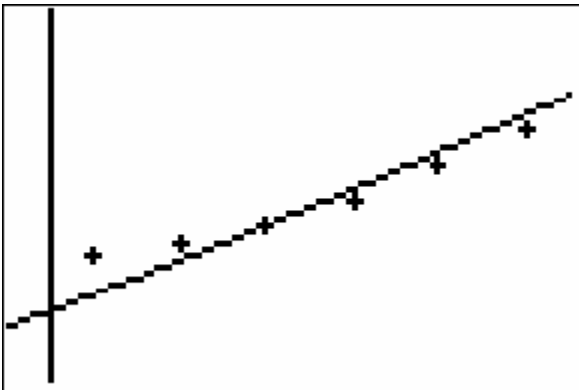
StatPlot of {L1, L2}



Cubic Regression curve fit

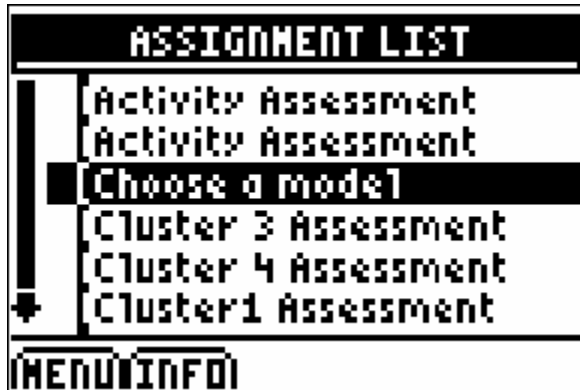


StatPlot of Residuals from Cubic fit

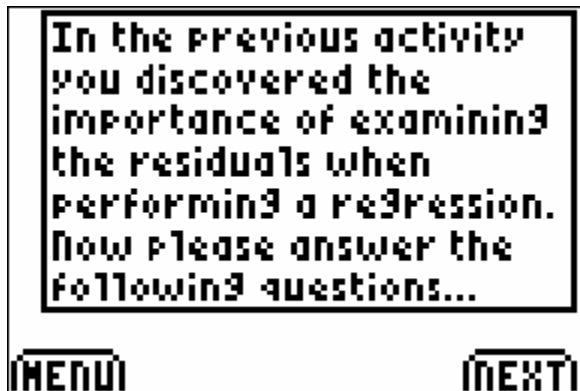


Closeup: [-2, 24] x [1,4]

Learning Check Activity...



Introduction screen...



Summary: