7-24-2006

Linear Regression Using TI Calculator

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Fayne Winter   July 24, 2006

Team L

Lesson Plan For JULY 25, 2006

You should submit this form in addition to any computer generated files/documents/models to your group folder on Angel. Please create a .zip file and upload the group of files as a single archive.

Name: Fayne Winter
Grade level(s)/Subject taught: Math 7
Objectives: Further Exploration of linear equations and slope. This lesson is to go along with the first lesson plan I created for our 1st assignment using Function Flyer in Interactivate. Students will explore the slope of a line using the TI-83 calculator and will gain an understanding of how the slope of a line changes the look of a line. Students will reinforce their understanding of how to find the slope of a line in different ways

1. *Write* the Mathematical Concept or "key idea" that modeling will be used to teach: (e.g. Students use mathematical modeling/ multiple representation to provide a means of presenting, interpreting, communicating, and connecting mathematical information and relationships)

Mathematical Modeling

Materials: Graphing Calculators, TI Study Cards – SLOPE, pencils, graph paper, rulers

- **Using ___TI-83 Calculator (or available equivalent)___ I plan on having my students…**
  (software / modeling package(s))

Warm-Up: List the main ideas you learned about *Linear Equations* in the activity we did yesterday with Project Interactivate called Function Flyer. (We will go through what we learned about linear equations whole group)

Mini-Lesson: Students will use the TI-83 calculator to go through the Study Cards for Slope which I downloaded from the TI internet site. This will be a review of slope and the specifics of finding the slope from points given, from plotting points on a graph, reviewing the different ways of finding slope, and identifying which number in a linear equation is the slope of that line.

Work Time:

ACTIVITY 1 - Students will use the points from the Study Cards and plot them on the TI-83 calculators to explore the different slopes of the lines they create. They will put the points into the L1, etc., screens, do a linear regression and then graph them on the calculator and describe the differences between the lines they are using. Students will graph 3 of these cards. They _must_ do Card #10, but can choose two of the other 3 Cards to put into the *List* screen and do *Linear Regressions* for each of the lines, on the calculator.

Directions for putting these points into the LIST screen and doing a Linear regression.

1) Go to STAT and EDIT
2) Put the x values into L1 and the y values into L2
3) Go to STAT, CALC, LinReg(ax+b) and press enter
4) Push 2nd, L1 comma 2nd L2 comma – Push VARS, Y-VARS, and enter for Y1
5) Graph
6) Go to the Y= screen and ***record the equation*** in Y1.
7) For the 2nd card you must use L3 and L4 for the data and Y2.
8) For the 3rd card (Card #10) you must use L5 and L6 for the data and Y3.

For the 2nd and 3rd cards, before you do step 5, you will need to go to the y= screen first and change the form of the line.
For the 2nd card you chose, choose the thicker line for graphing.
For the 3rd card, Card #10, choose the thinner, dotted line for graphing.

Do steps 1 – 6 for 3 of the Cards below, (you must include Card #10 as 1 of the 3 cards you choose).

Card #2
Card #7
Card #8
Card #10 (must do and put in L5 and L6 and use Y3)

After graphing the 3 Card's data and recording the equations on the Y= screen, answer the following questions:

A) Which line is the steepest? What is the slope of that line?
B) Which line has the greatest slope? What is the slope of that line?
C) Which line, or lines, is/are decreasing? Increasing? How can you tell?
D) Write an equation that has a slope greater than the greatest slope of the lines you graphed.
E) Write an equation that has a slope less than the lowest slope of the lines you graphed.

ACTIVITY 2 –

For Cards #11, 12, and 13:

1) Look at the equations on these 3 cards, write them down and make a prediction if the linear equations are positive (increasing), or negative (decreasing). Explain why you chose the answer you did for each equation.
2) Predict which of the lines you think has the steepest slope. Explain why you chose that equation.
32) Go to the Y= screen and delete the equations in Y1, Y2, and Y3
4) Put the equations on Cards# 11, 12 & 13 into Y1, Y2, and Y3.
5) Choose different thicknesses of lines for each equation like you did for Activity 1.

Answer the following questions based on the graphs from Cards #11, 12, and 13.

   A) Were your predictions for numbers 1 and 2 correct?
   B) How can you tell the slope of a line just by looking at the equation?
   C) How can you tell the slope of a line by looking at the points only?
   D) How can you tell the slope of a line by looking at its graph?

ACTIVITY 3 –

Choose 3 of the Cards you worked with and graph them on graph paper, labeling the linear equation that goes with the lines you graphed.
Create a presentation of your Cards where you will be showing the graphs you created by hand and answering the following questions:
1) Are your graphs increasing/decreasing and how can you tell?
2) Which of your graphs is the steepest and how can you tell?
3) Which of your graphs has the largest slope and how can you tell?
4) What part of a linear equation tells you what the slope of the line is?
5) How can you find the slope from looking at the: line
                                                      equation
                                                      the points

CLOSING: Presentation and explanations outlined in Activity 3.