REGRESSION EQUATIONS ON THE TI-86

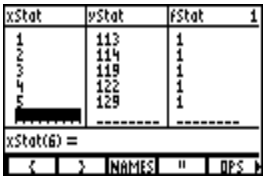
1. Prepare y(x) screen.

- Clear y1. Either clear all other equations or turn them off.
- To turn off y2: GRAPH F1 y(x)= ? y2, then press F5 SELCT< 2nd [QUIT].

2. Enter data pairs.

- 2nd [STAT] F2 Edi t .
- You can enter the data in the xStat and yStat lists or you can create and name new lists with your own titles.
- To clear old data, > to highlight the name of the list, then press CLEAR ENTER.
- Enter the data, pressing ENTER after each entry. Be sure that the data pairs match up correctly. Enter 1 in the fStat list for each data pair. [If a data pair occurs more than once, you can enter the data only once and enter the number of times it occurs in the fStat list.] You must have the same number of entries in each list. (You cannot use 0 as an x-value for logarithmic regression; enter 0.000001 instead of 0 for x.)
- **Example:** Data pairs: 1 113, 2 114, 3 119, 4 122, 5 129

Lists:



- 2nd [QUIT] after all data is entered.

3. Turn on STAT PLOT.

- 2nd [STAT] F3 PLOT F1 PLOT1 ENTER.
- ? (or press ENTER) Type= F1 SCAT.
- ? (or press ENTER) Xlist Name= F1 xStat.
- ? (or press ENTER) Ylist Name= F1 yStat.
- ? (or press ENTER) Mark= F1 R. Press 2nd [QUIT] when finished.

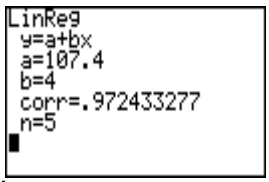
4. Draw scatter plot.

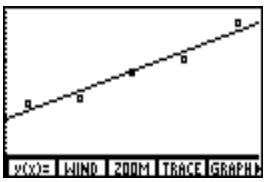
- GRAPH F3 ZOOM MORE F5 ZDATA. This procedure adjusts the window to fit the data, but the menu bars cover up part of the display. To remove the menu bars, press CLEAR.
- If you want to be able to use the menu bars, you should resize the window: GRAPH F2 WIND ? ? ? yMin < over to the right of the current numerical value. Then press x . 9 GRAPH.
- 2nd [QUIT].

Scatter plot:

5. Calculate linear regression equation.

- We will let y1 be the regression equation: GRAPH F1 y(x)= 2nd [STAT] F5 VARS MORE MORE F2 RegEq 2nd [QUIT]. Each time you calculate a new regression equation, it will automatically be stored as y1.
- Calculate regression equation: 2nd [STAT] F1 CALC F3 LinR ENTER EXIT EXIT.
- To superimpose regression equation on scatterplot: GRAPH F2 [GRAPH].
- The linear regression equation is y = 107.4 + 4x.





6. The correlation coefficient r.

- The correlation coefficient r is a number between –1 and +1 that indicates the closeness of the fit of the regression line. The closer |r| is to 1, the better the fit. This line is a good fit, but there may be another type of regression that is even better!

7. Use regression equation to predict other x-values: suppose x = 10.

- Using FORECAST: 2nd [STAT] MORE F1 FCST x=10 ENTER F5 SOLVE EXIT.
- Using the regression equation stored as y1: 10 STO< X-VAR ENTER 2nd ALPHA [y] 1 ENTER

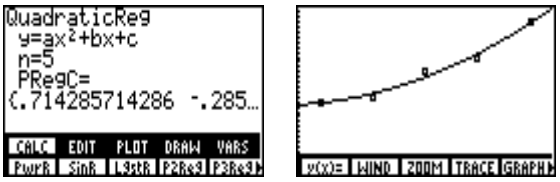
8. Use regression equation to predict other y-values: suppose y = 10.

- Using FORECAST: 2nd [STAT] MORE F1 FCST ENTER y=10 > F5 SOLVE EXIT.

9. Calculate other types of regression models: **all coefficients rounded to 3 decimals**.

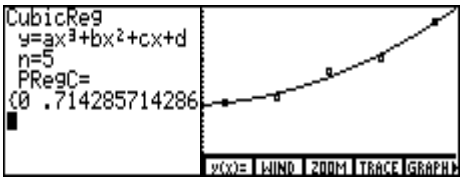
- **Quadratic model: P2Reg**

  $y = 0.714x^2 – 0.286x + 112.4$



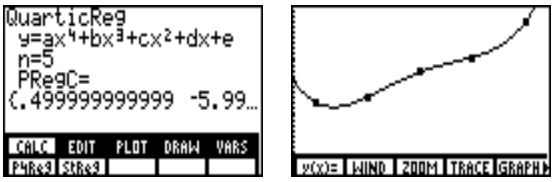
- **Cubic model: P3Reg**

  $y = 0.714x^2 – 0.286x + 112.4$
  Isn't that strange!!



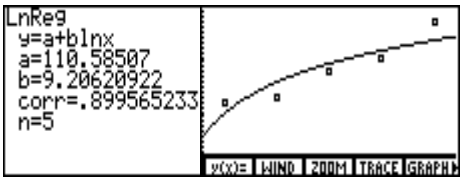
- **Quartic model: P4Reg**

  $y = 0.5x^4 – 6x^3 + 25.5x^2 – 41x + 134$
  This is a perfect fit!



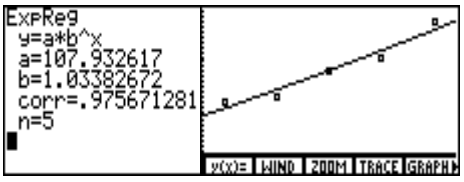
- **Natural logarithmic model: LnReg**

  $y = 110.585 + 9.206 \ln x$



- **Exponential model: ExpR**

  $y = 107.933*(1.034^x)$



Regression Equations on the TI-86
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