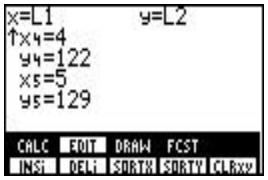
REGRESSION EQUATIONS ON THE TI-85

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. Clear old data and enter data pairs.

- STAT F2 Edi t .
- You can name the xlist and ylist as you wish; we will use L1 and L2 here: ALPHA [L] 1 ENTER ALPHA [L] 8 ENTER.
- Always clear old data before entering new data: F5 CLRxy.
- Enter the data, pressing ENTER after each entry. Be sure that the data pairs match up correctly. 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. Set window to fit data, allowing some blank space on all sides.

- GRAPH F2 RANGE.
- The menu at the bottom of the screen will take up about ¼ of the screen; therefore, it is necessary to adjust the window.
- To set yMin: arrow over to right of current numerical value. Press x . 9 GRAPH 2nd [QUIT].

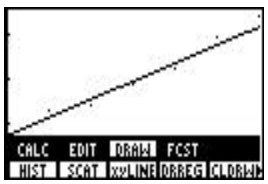
4. Draw scatter plot: Scatter plot:

- STAT F3 DRAW F2 SCAT
- 2nd [QUIT].

5. Calculate linear regression equation.

- STAT F1 CALC ENTER ENTER F2 LINR.
  This means that y = 107.4 + 4x is the ***line*** of best fit.
- 2nd [QUIT].

6. Superimpose linear regression line on scatter plot.



- GRAPH F1 y(x)= y1= 2nd [VARS] MORE MORE F3 STAT ? RegEq ENTER 2nd [QUIT].
- Each time a new regression equation is calculated, y1 will be automatically updated.
- STAT F3 DRAW F2 SCAT.

7. 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 model is a good fit, but there may be another type of regression that is even better!

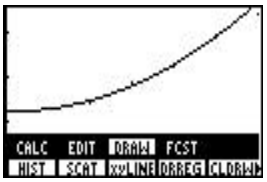
8. Use the regression equation to predict y-values for other x-values: suppose x = 10

- STAT F4 FCST x= 1 0 ENTER F5 SOLVE. This yields y = 147.4; then press 2nd [QUIT] to exit.
- Alternate method if you have stored regression equation in y1: 1 0 STO< ENTER 2nd ALPHA [y] 1 ENTER.
- You can also use forecast to find x if y is given! Suppose y = 10: STAT F4 FCST ENTER y= 1 0 > F5 SOLVE. 2nd [QUIT] to exit.

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

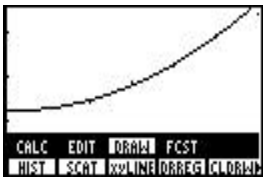
- **Quadratic:** Use P2REG

  $y = 0.714x^2 - .286x + 112.4$



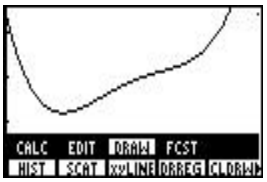
- **Cubic:** Use P3REG

  $y = 0.714x^2 - .286x + 112.4$
  Isn't that strange!!



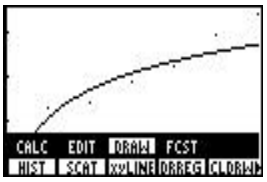
- **Quartic:** Use P4REG

  $y = .5x^4 - 6x^3 + 25.5x^2 - 41x + 134$
  This is a perfect fit!



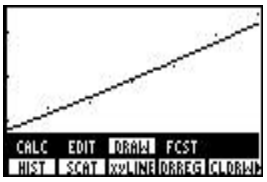
- **Natural Logarithmic:** Use LnR

  $y = 110.585 + 9.206 \ln x$



- **Exponential:** Use EXPR

  $y = 107.933*(1.034^x)$



Regression Equations on the TI-85
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