

Curve-Fitting on the TI-85/86

Example: Fit a line to the following data rounding to the 3rd decimal place, and predict y when x=15.

```
x|6 4 2 15 9
y|5 2 8 12 10
```

0. Clean out the function editor by pressing **GRAPH F1:y(x)=**. Then, deleting or deselecting all functions listed. Remember to exit out of the function editor by pressing **EXIT EXIT**.
1. Enter data:
 - a. Enter STAT(istics) menu.
 - TI-85| Press **STAT**.
 - TI-86| Press **2nd STAT**.
 - b. Enter editor.
 - Press **F2:EDIT**.
 - c. Select variables. We'll use the standard xStat and yStat as well as on the TI-86 fStat. But, you can name them anything you wish. xStat will hold the x's, yStat will hold the y's, and on the TI-86 fStat will hold the frequencies for each point.
 - TI-85| Notice that the xlist name and the ylist name are already set to the last variables used. So if the cursor is already on the word xStat just press **ENTER ENTER**. Otherwise, select xStat from the menu. Press **ENTER**. Select yStat from the menu and press **ENTER**.
 - TI-86| If the editor has any names across the top other than xStat, yStat and fStat; move the cursor on the name and press **DEL**. Repeat with other names. Now type **F3:NAMES F2:xStat ENTER (cursor right) F3:NAMES F3:yStat ENTER (cursor right) F3:NAMES F1:fStat ENTER (cursor left) (cursor left) (cursor down)**.
 - d. If xStat and yStat are not empty, clear old data.
 - TI-85| Press **F5:CLRxy**.
 - TI-86| Use cursor keys to put cursor on the word "xStat". Press **CLEAR ENTER**. Repeat with the words "yStat" and "fStat".
 - e. Type in data. Make sure to keep the each y value paired with the appropriate x value.
 - TI-85| Alternate x and y values starting with x and press **ENTER** between numbers. For this example type **6 ENTER 5 ENTER 4 ENTER 2 ENTER 2 ENTER 8 ENTER 15 ENTER 12 ENTER 9 ENTER 10 ENTER**.
 - TI-86| Enter all x's then all y's in order. Move the cursor to the line just below the name xStat. For this example, type **6 ENTER 4 ENTER 2 ENTER 15 ENTER 9 ENTER** to enter x's. Then press **(cursor right)** to get to top of y's. Then type **5 ENTER 2 ENTER 8 ENTER 12 ENTER 10 ENTER**. Finally enter frequencies of 1 in for fStat by typing **(cursor right) 1 ENTER 1 ENTER 1 ENTER 1 ENTER 1 ENTER**. Make sure you have as many 1's as you do x's and y's.
2. Set viewing window such that all data points are in the window. In this case, [0,20]by[0,20] with a scale of 1 might be a good choice.
 - Press **EXIT EXIT GRAPH F2:RANGE/WIND 0 ENTER 20 ENTER 1 ENTER 0 ENTER 20 ENTER 1 ENTER**.
3. View just the data.
 - TI-85| Press **EXIT STAT F3:DRAW F2:SCAT CLEAR**.
 - TI-86| Press **GRAPH F1:y(x)=**. Look at the top of the screen. If "Plot1" is not reversed (highlighted), press **(cursor up) ENTER**. Now type **EXIT F5:GRAPH CLEAR**.
4. Perform the regression.
 - a. Go to regression menu.
 - TI-85| Press **EXIT EXIT F1:CALC ENTER ENTER**.
 - TI-86| Press **EXIT EXIT 2nd STAT F1:CALC**.
 - b. Select type of regression. Only those common to both the TI-85 and TI-86 are listed.

<u>Menu Option</u>	<u>Type of Regression</u>	<u>Equation</u>	
LINR / LinR	linear	$y = a+b*x$	
LNR / LnR	Natural Logarithmic	$y = a+b*\ln(x)$	
EXPR / ExpR	Exponential	$y = a*b^x$	
PWRR / PwrR	Power	$y = a*x^b$	
P2REG / P2Reg	Quadratic	$y = a*x^2+b*x+c$	PRegC={a b c}
P3REG / P3Reg	Cubic	$y = a*x^3+b*x^2+c*x+d$	PRegC={a b c d}
P4REG / P4Reg	4th Degree Polynomial	$y = a*x^4+b*x^3+c*x^2+d*x+e$	PRegC={a b c d e}

 In this case, we want LINR/LinR because we want to fit a line to the data. Thus, on the:
 - TI-85| press **F2:LINR**.
 - TI-86| press **F3:LinR ENTER**.
 - c. The screen should now display the regression output. The numbers could be rounded differently.
 - a=3.36575875486 and b=.560311284047 .
 Thus, the linear regression formula(the line of best fit) is $y=0.560x+3.366$

5. Display the regression function with the data.
 - a. Go to draw sub-menu, clear screen, and replot points.
 - TI-85| **EXIT F3:DRAW F5:CLDRW F2:SCAT**
 - TI-86| **2nd STAT F4:DRAW MORE F2:CLDRW**
 - b. Graph regression function.
 - TI-85| **F4:DRREG CLEAR**
 - TI-86| **F1:DRREG CLEAR**
6. Use regression function to predict y value when x is a given number.
 - TI-85| **EXIT EXIT F4:FCST 15 ENTER F5:SOLVE**
 - TI-86| **EXIT EXIT MORE F1:FCST 15 ENTER F5:SOLVE**
 Thus, y should be 11.770428015564 when x is 15.
7. On the TI-86, to turn off plots press **EXIT GRAPH F1:y(x)= (cursor up) ENTER EXIT EXIT**.

Note: The TI-86's draw sub-menu has a SCAT option like the TI-85. But, the data is easier to see using the plots as above.
 The regression equation is stored in the variable RegEq.