Using the TI-83/84 for Modeling (x, y) Data

You will enter your (x, y) data in a statistical table, with the x and y values in two separate lists, usually L_1 and L_2.

If there are already unwanted data in the lists, you can use either of two ways to clear the lists:

STAT → 1:Edit. In each list, use up-arrow, then press CLEAR, then press ENTER.

Note: If you accidentally press DELETE instead of CLEAR , you also delete the entire list place holder!

However, you can get it back: STAT → EDIT menu → 5:SetUpEditor. ENTER

Or STAT → 4:ClrList. Specify the list(s) you want to clear, such as 2nd L1 , 2nd L2.

How to enter data: STAT → 1:Edit. Enter all the x-values in the L_1 column.

Then use the right arrow to go to L_2 and enter the y-values. Finally, double-check each x and y value for errors.

Creating a scatter plot of (x,y) data:

1. Press Y= and clear out any unwanted functions, so they won't be graphed.
2. In order for the points to display on the graph, STATPLOTS must be on, with the correct lists selected for x and y, and the type of graph selected must be a scatter plot:
   - ✓ 2nd Y= (STATPLOT): Plot1 should be On. All others should be Off.
   - ✓ Type should be scatterplot (1^{st} item).
   - ✓ Xlist should be L_1 and Ylist should be L_2, unless you entered the data in different lists.
3. Set the viewing window to show all the data points: You can do this by going WINDOW and manually entering Xmin slightly less than your smallest x value, Xmax slightly more than your largest x value, and likewise for y, *or* you can let the calculator set the window for you automatically, using ZOOM → 9:ZoomStat. The problem with ZoomStat is that often the data points with lowest and highest x values are at the very edge of the screen.

Finding the best model for the data: In mathematical modeling, we seek to find a function whose graph fits the data points in the scatter plot better than any other. This function is the best model for the data. Several types of functions are available, from linear models (straight lines) to non-linear models (curves).

Press STAT → CALC menu, then choose the type of function you want.

Linear model: Use LinReg(ax+b), where *a* is the slope of the line, and *b* is the y-intercept.

Non-linear models (curves):

QuadReg gives a quadratic model in the form $y=ax^2+bx+c$. (shape: parabola)

CubicReg gives a cubic model in the form $y=ax^3+bx^2+cx+d$. (shape: "S" curve)

QuartReg gives a quartic model in the form $y=ax^4+ bx^3+cx^2+ \ldots$. (shape: "U" or "W" curve)

LnReg gives a logarithmic model in the form y=a+b*ln(x). (shape: logarithmic curve)

ExpReg gives an exponential model in the form $y=a*b^x$. (shape: exponential curve)

PwrReg gives a power model in the form y=a*x^b. (shape: parabola, "U", or "S" curve)

In addition to the parameters of the function (a, b, etc.), you are also give the value(s) of r and/or r^2 if the diagnostics settings are on. (If not, 2nd CATALOG, select DiagnosticOn). These provide one way of comparing how well different models fit the data points. r is the correlation coefficient, and r^2 is the coefficient of determination.

The closer r is to 1 or –1 (and the closer r^2 is to 1), the better the model fits the data.

For linear models, the sign on r will be the same as the sign of the slope.

Graph the model and the scatter plot together:

Either write down the equation and enter it manually in Y=

or at Y= insert the equation using VARS → 5:Statistics → EQ menu → 1:RegEQ. Then press GRAPH.