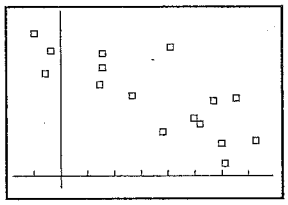
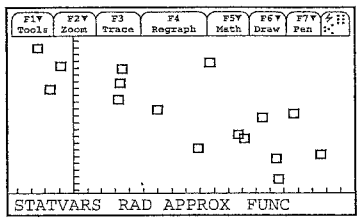
Technology Toolbox

Least-squares regression lines on the TI-83/84/89

We will use the fat gain and NEA data from Example 3.9 (page 200) to show how to use the TI-83/84/89 to determine the equation of the least-squares regression line.

- Enter the NEA change data into L_1/list1 and the fat gain data into L_2/list2.
- Define a scatterplot using L_1/list1 and L_2/list2, and then use ZoomStat (ZoomData) to plot the scatterplot.





To determine the least-squares regression line:

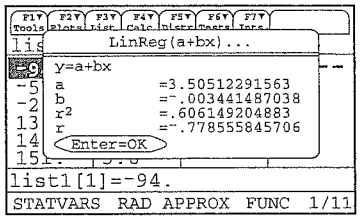
TI-83/84

- Press **STAT**, choose CALC, then `8:LinReg(a+bx)`. Finish the command to read `LinReg(a+bx)L1,L2,Y1`. (Y1 is found under VARS/Y-VARS/1:Function.)

TI-89

- In the Statistics/List Editor, press **F4** (CALC), choose `3:Regressions`, then `1:LinReg(a+bx)`.
- Enter list1 for the Xlist, list2 for the Ylist, choose to store the RegEqn to y1(x), and press **ENTER**.

```
LinReg
 y=a+bx
 a=3.505122916
 b=⁻.003441487
 r²=.6061492049
 r=⁻.7785558457
```



Note: If r^2 and r do not appear on your TI-83/84 screen, then do this one-time series of keystrokes: Press **2nd** **0** (CATALOG), scroll down to `DiagnosticOn`, and press **ENTER**. Press **ENTER** again to execute the command. The screen should say "Done." Then press **2nd** **ENTER** (ENTRY) to recall the regression command and **ENTER** again to calculate the least-squares line. The r^2- and r-values should now appear.

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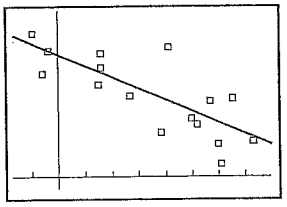
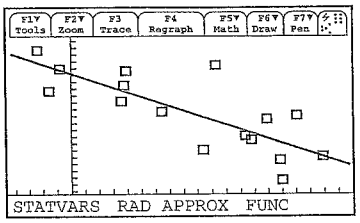
Least-squares regression lines on the TI-83/84/89 *(continued)*

- Deselect all other equations in the Y=screen and press GRAPH (◇ F3 on the TI-89) to overlay the least-squares line on the scatterplot.





- Save these lists for later use. On the home screen, execute the command `L1→NEA:L2→FAT` (`list1→NEA:list2→FAT` on the TI-89).

Although the calculator will report the values for a and b to nine decimal places, we usually round off to fewer decimal places. You would write the equation as

$$\hat{y} = 3.505 - 0.00344x$$

When you write the equation, don't forget the hat symbol over the y; this means *predicted value.*