LINEAR REGRESSION
TI-83 QUICK REFERENCE

1. Enter the X-data and the Y-data in separate lists. You may also enter frequencies in a third list. You have the option of using the lists L_1 - L_6 or lists which you name.

2. Activate the linear regression feature by pressing [STAT], then pressing the right arrow to move the cursor over "CALC" and pressing [4] for LinReg(ax+b) or [8] for LinReg(a+bx).

3. LinReg(ax+b) or LinReg(a+bx)** will be pasted on the home screen. You may then enter the arguments Xlist, Ylist, freqlist and regression equation separated by commas. For example, if you have the Xlist in L1, the Ylist in a list you have named ABC, the frequency list in L4 and wish to store the regression equation in Y1, you would enter L1,ABC,L4,Y1.

4. If no arguments are listed after Linreg(ax+b) the calculator assumes that you are using L1 for Xlist, L2 for Ylist, each frequency is 1 and the regression equation is not to be stored.

5. Other combinations of arguments are:

   LinReg(ax+b)Xlist,Ylist. Each frequency is 1 and the regression equation is not stored.

   LinReg(ax+b)Xlist,Ylist,freqlist. The regression equation is not stored.

   LinReg(ax+b)regequ. Xlist is assumed to be L1, Ylist is assumed to be L2 and each frequency is 1.

   LinReg(ax+b)Xlist,Ylist,regequ. Each frequency is assumed to be 1.

6. After entering the arguments, press [ENTER] The equation form, the value of a and the value of b are displayed. The frequency equation is stored as directed. If Diagnostics are turned on, the values of r^2 and r are displayed.

** As the procedures for LinReg(ax+b) and LinReg(a+bx) are identical, we will refer to both as LinReg(ax+b).

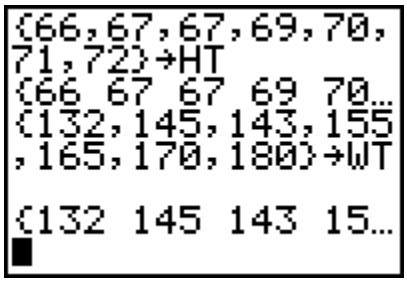
Lamar Middleton, Polk Community College, 1997.

EXAMPLE
LINEAR REGRESSION - USING THE TI-83

Assume that we have collected data shown in the table below relating the height and weight of the members of a swim team.

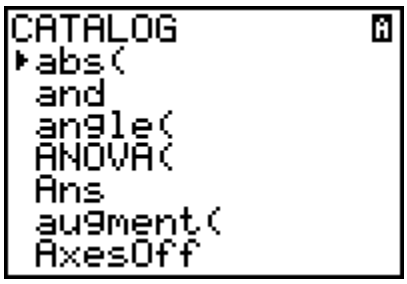
Height (inches)	Weight (pounds)
66	132
67	145
67	143
69	155
70	165
71	170
72	180

Enter the height information in a list which you name HT and enter the weight data in a list you name WT. (See the unit on entering and editing lists if you need assistance with this.) One would normally plot the data and determine what type of regression best fits the data. Assume that this has been done and that we decide to use a linear regression.



Before finding the linear regression equation for this data, we must decide if we wish to view the diagnostic information, r and r^2, for the regression. The commands to turn the diagnostics on or off are contained in the CATALOG. We will turn the diagnostics on.

Press [2nd] [0] (CATALOG).



Notice that the calculator is in ALPHA mode. Press [X^{-1}] (FINANCE D) and the calculator will move to the function in the CATALOG which start with the letter d.

```
CATALOG          1
▸dbd(
 ▸Dec
 Degree
 DelVar
 DependAsk
 DependAuto
 det(
```

Now use the down arrow to scroll down to “DaignosticOn.”

```
CATALOG          1
 Degree
 DelVar
 DependAsk
 DependAuto
 det(
 DiagnosticOff
▸DiagnosticOn
```

Now press [ENTER] twice and the diagnostics will be displayed.

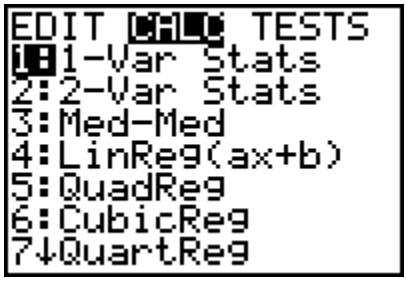
```
{66 67 67 69 70…
{132,145,143,155
,165,170,180}→WT

{132 145 143 15…
DiagnosticOn
                Done
```

If you decide that you do not wish to see the diagnostics, you may use the same CATALOG procedure to execute “DiagnosticOff.”

Press [STAT] .

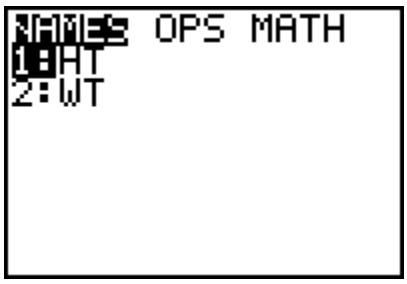
```
EDIT CALC TESTS
1:Edit…
2:SortA(
3:SortD(
4:ClrList
5:SetUpEditor
```

Press the right arrow to highlight “CALC.”



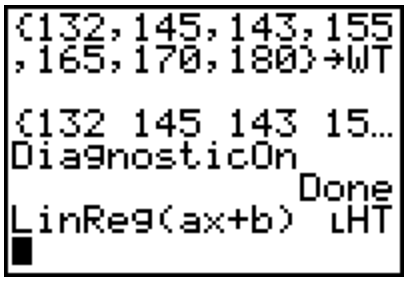
Press [4] to select “LinReg(ax+b).” The function is pasted on the home screen and accepts up to four arguments. They are Xlist, Ylist, freqlist and regequ. See the QUICK REFERENCE for an explanation of these. Our Xlist is list HT, our Ylist is list WT and we have no frequency list. Let us place the regression equation in Y1.

Press [2nd] [STAT] (LIST).

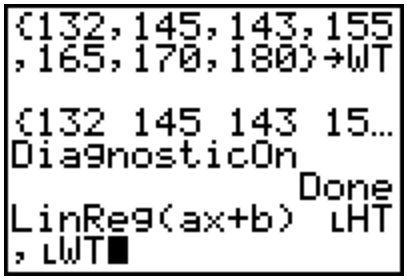


Your screen may differ from the preceding one in that there may have been other lists previously listed, but the lists HT and WT should be somewhere in your list of list names. Use the down arrow

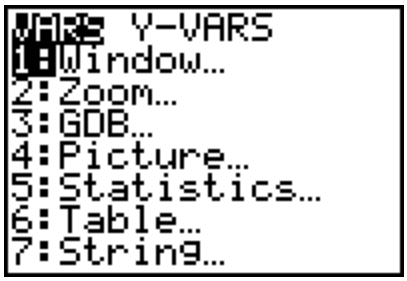
as necessary to highlight list HT and press [ENTER].



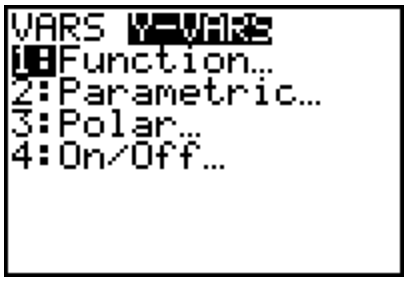
Now press [,], the comma key, to separate the list names and repeat the process above to paste the list WT on your screen.



Now press [,] and [VARS].



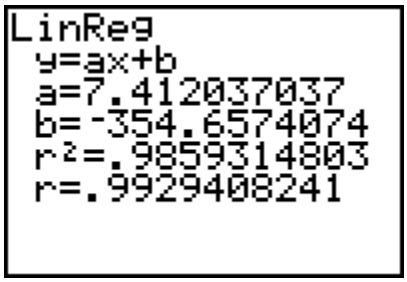
Use the right arrow to highlight “Y-VARS.”



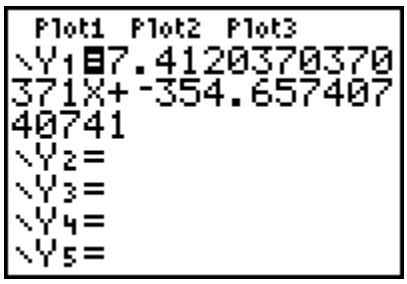
Now press [1] for function.

Finally press [1] to select Y1. (Note: This will cause the regression equation to be written into Y1. If you do not wish for your current Y1 to be replaced, you can select any of the other

functions Y2-Y0.) If you now press [ENTER], your regression equation is displayed with the diagnostics.



If you now press [Y=], you will see that the equation has been written into Y1 and you have the option of graphing it.



EXERCISES with ANSWERS

1. Find the linear regression equation for the X-values {1,2} and Y-values {6,-2}.

```
LinReg
 y=ax+b
 a=-8
 b=14
 r²=1
 r=-1
```

(NOTE: This is equivalent to finding the equation of the line through the points (1,6) and (2,-2). The values of r^2 and r show that the linear regression is a perfect fit.)

2. Find the linear regression equation for the data

X	Y
3	7
5	6
4	6
8	2

```
LinReg
 y=ax+b
 a=-1
 b=10.25
 r²=.9491525424
 r=-.9742446009
```

3. Find the linear regression equation LinReg(a+bx) for the data below.

X	Y
1	52
2	70
3	79
4	83
5	89

```
LinReg
 y=a+bx
 a=48.5
 b=8.7
 r²=.9128075253
 r=.9554096113
```