





Correlation and Regression

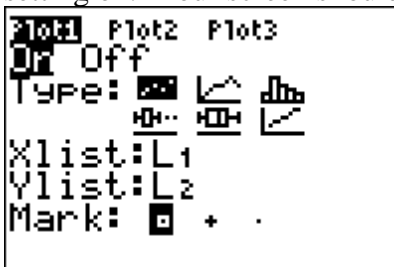
I took a simple random sample of eleven of my Elementary Statistics students and recorded the following values for the percentage grade on Test 1 and the percentage grade received on the cumulative midterm exam. The data is given below.


Grade on Test 1	Grade on Midterm Exam
78	83
75	75
53	48
65	72
81	85
74	75
74	69
77	80
71	48
39	23
94	92

1. The calculator can be used to draw the scatterplot for this data:

Step 1 – Enter data: enter Test 1 grades in L1 and Midterm exam grades in L2

Step 2 – Set up StatPlot: Press   to access the StatPlot menu. Press  to select **StatPlot 1**. Use your arrow keys to move your cursor to highlight ON, and to select the scatterplot setting (highlighted) and press  to turn the selected setting on. Your screen should look like this when you are finished:



Step 3 – Display the scatterplot by pressing  and selecting **9: ZoomStat**.

Step 4 – Draw the scatterplot as instructed. Be sure to label the axes with the names of the variables they represent.

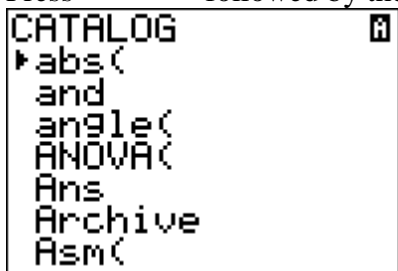
2. Use your calculator to find the Correlation Coefficient (r), the Coefficient of Determination (r^2) and the Least Squares Line ($y = ax + b$) for the Test 1 grade and the Midterm Exam grade.

Step 1 – Enter data: enter Test 1 grades in L1 and Midterm exam grades in L2. (If you have just drawn the scatterplot of the data, this step is already completed.)

Step 2 – Set up calculator to display r and r^2 . This step needs to be done only once – the first time you calculate a correlation coefficient.

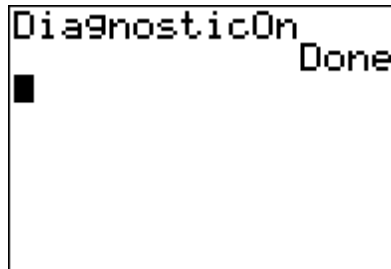
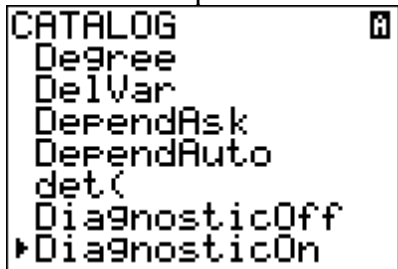
On older calculators:

Press  followed by the  key to get the Catalog.




Scroll through the Catalog list until you see DiagnosticOn. With the > marker pointing at

this command press  twice.



On newer calculators:

Select  and scroll down to the line StatDiagnostics. Make sure ON is selected.

To change setting, move cursor to highlight and press .



Step 3 – Press **STAT** and scroll over to **CALC** and select **4: LinReg (ax+b)** and type **L1,L2** (these are the defaults, so you can skip listing L1 and L2 unless you are using another list) and press enter to display the correlation coefficient, the least squares line and the coefficient of determination.

```
LinReg(ax+bx) L1,
L2
```

```
LinReg
y=a+bx
a=-22.63290977
b=1.279080675
r2=.8357347641
r=.9141853008
```

If the Stat Wizard is turned on in newer calculators, your LinReg(ax+b) screen will look like this:

```
LinReg(ax+b)
Xlist: 1
Ylist: L2
FreqList:
Store RegEQ:
Calculate
```

If you are using L1 and L2 for the data, scroll down to Calculate.

The output screen will appear the same: listing the coefficients for the equation first (along with the reminder of how to plug values into the equation), and the diagnostic values.

You can use the equation to predict values.

Step 1: Enter the Least Squares Line as Y1 on the **Y=** menu. Press **GRAPH** to display the scatterplot and the least squares line. (If you enter Y1 on the StoreRegEQ line, you can skip this step. You can also specify Y1 in the LinReg command LinReg(ax+b) L1,L2,Y1 after the list specification in older calculators. To type Y1 on

the screen press **VAR** and then follow the menu options to Y-Vars to Function and Y1.)

Step 2: Press **2nd** **TRACE** to display the **CALC** menu and press **ENTER** to select

1:value. Enter the value for x (Test 1 grade in this example) and press **ENTER** to display the predicted y-value (Midterm Exam grade in this example).

```

Calculator
1: value
2: zero
3: minimum
4: maximum
5: intersect
6: dy/dx
7: ∫f(x)dx

```

