

Technology Insight 3 - Scatter Plots, Correlation, and Regression

The following data are the length of a car and its weight for 15 randomly selected vehicles. We want to create a scatter plot of the data, determine if there is significant linear correlation, and determine the linear regression equation.

Length	154	177	177	179	190	194	180	189	197	208	167	191	188	200	215
Weight	2560	2740	3610	3225	3215	3270	3645	3530	3600	4085	2615	3555	3465	4170	4415

TI-84

Begin by entering the data into L1 and L2.

Step 1) Press **stat** and 1:Edit and enter the data: the lengths into L1, and the weights into L2.

L1	L2	L3	L4	L5	2
194	3270				
180	3645				
189	3530				
197	3600				
208	4085				
167	2615				
191	3555				
188	3465				
200	4170				
215	4415				

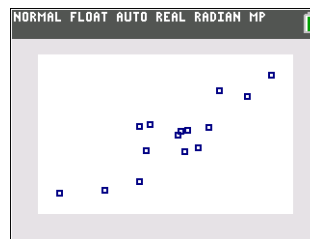
L2(16)=

Step 2) Press **2nd** **y=** (StatPlot) and select Plot1. Turn ON Plot1 and set it up for a scatter plot. Make sure L1 and L2 are the Xlist and Ylist.

Step 3) Press **zoom** 9:ZoomStat

Plot1	Plot2	Plot3
On	Off	Off
Type: [Scatter]		
Xlist:L1		
Ylist:L2		
Mark: [Square]		
Color: NAVY		

Step 2



Step 3

Regression Line

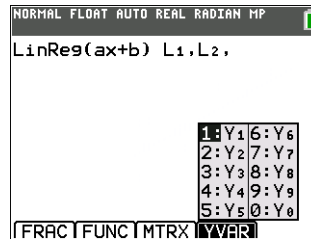
To calculate and plot the regression equation, and calculate the correlation coefficient, first press MODE and make sure **STAT DIAGNOSTICS** is ON. Pres 2nd QUIT to exit MODE.

Step 4) Press **stat** and move the cursor to CALC, and select **4:LinReg (ax+b)**

EDIT	CALC	TESTS
1:1-Var Stats		
2:2-Var Stats		
3:Med-Med		
4:LinReg(ax+b)		
5:QuadReg		
6:CubicReg		
7:QuartReg		
8:LinReg(a+bx)		
9:LnReg		

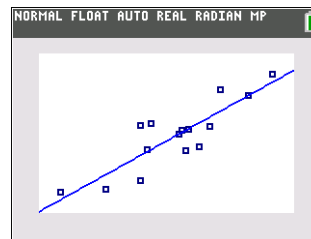
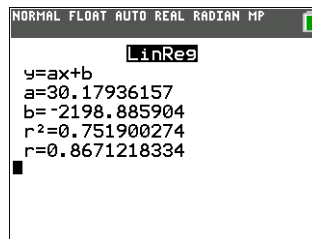
Step 5) Select your two lists containing the data (2nd 1, and 2nd 2) (the comma button is above the 7). We also want to have the regression equation stored into Y1.

Step 6) Press comma, and then **alpha** **trace** (**f4**) and select Y1.



(Note: if you have an older calculator you may not get the f1 shortcut menu. In this case you'll need to press VARS, Y-VARS, 1:Function, and Y1.

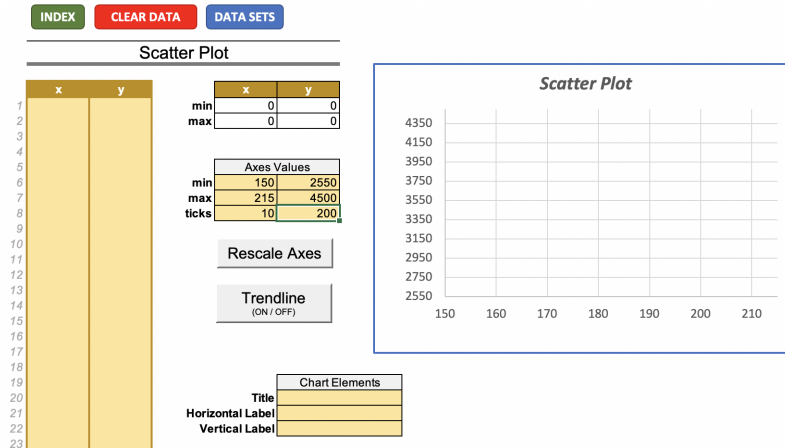
Step 7) Pressing **enter** should give a screen showing the regression equation and the correlation coefficient. Press **graph** to graph the regression equation stored into Y1.



If your calculator doesn't show the correlation coefficient, we'll need to turn that on the calculator. Press 2nd 0, which brings up the **catalogue**. Scroll down until you see DiagnosticsOn and press ENTER twice. Now when you enter the command LinReg(ax+b) you'll get the equation and the correlation coefficient.

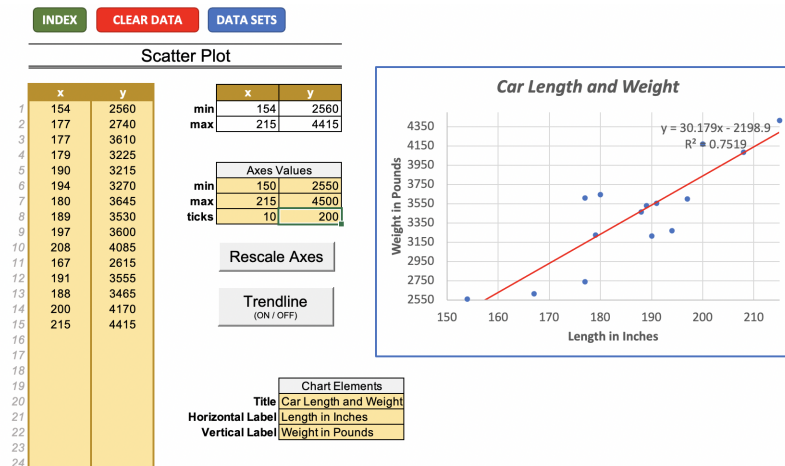
EasyStats

Step 1) Open EasyStats and click on Charts Scatterplot, and enter the data into the x and y lists.



Step 2) Most likely you will need to adjust the horizontal and vertical axes. Using the displayed min and max values adjust the axes values and tick marks, and click the **Rescale Axes** button.

Step 3) Click on on the **Trendline** button to display the linear regression line.



You can also add a chart title and label the axes.

EasyStats displays the linear regression line along with the R^2 value. To get the correlation coefficient we'll need to manually take the squareroot of this value.