STEM Center (BLRC 200)
Academic Success Center
HCC Brandon Campus

TI Graphing Calculator Workshop

Part 1: Stats Functions

Lists

Oftentimes questions will present you with multiple data points, and ask that you perform statistical analysis of that data set. To perform this analysis on the calculator, you need to enter those data points into **lists**. Lists can be edited by using the "STAT" button on your calculator, and then using the "Edit..." option. This will present you with an array of lists labeled L1, L2, L3, and so on. You can enter any data you are given under one of the list names. To delete data points, you can either go to the point in question and press "DEL", or go to the list name and press the "CLEAR" button (if you want to remove all data points in that list.)

Practice: Put the following data sets in under the lists named. These will be used for future problems.

1. L1: 8, 6, 7, 5, 3, 0, 9
   L4: 1, 1, 2, 3, 5, 8, 13
2. L2: 3, 9, 4, 4, 2, 5, 2, 6, 1, 7, 0
   L3: 13, 4, 11, 10, 19, 10, 23, 7, 29, 8, 30

1-D Statistics

Once you have a list full of data points, you can begin performing 1-D statistics. 1-D statistics simply means that there is one dimension, or one list, involved in the analysis. Therefore, 1-D statistics usually only requires one list (unless you are also including a list of frequencies).

To use 1-D statistics, press the "STAT" button on your calculator, move to the "CALC" submenu, and press the "1-Var Stats" button. The calculator will then take you to a screen prompting you to name a list, a FreqList (or frequency list; this one is optional). You can select the list you want by pressing "2ND" and then the number of the list you wish to use (i.e. L_1 for list 1, L_2 for list 2, etc.) Once you have entered your list, and (if desired) another list for FreqList, press the calculate button, and you will receive your statistics, including mean, standard deviation, minimum and maximum values, and more.

Practice: Perform 1-D statistical analysis of the following, and give the mean, standard deviation (σ_x), and sample standard deviation values (S_x). We are using the lists created above for these questions.

3. L_3
4. L_1
5. L_2, with L_3 as the frequency list

2-D Statistics

2-D Statistics are extremely similar to 1-D statistics, except that they require two lists with an equal number of data points. To access 2-D statistics, press the "STAT" button, go to the "Calc" submenu, and press the "2-Var Stats" option. This will redirect you to a menu where you can enter one list as the "XList", one as the "YList", and one as a frequency list (again, optional).

Practice: Perform 2-D statistical analysis on the following, finding the x mean, the standard deviation for X, the y mean, the standard deviation for y, and the Sum of XY.

6. L_1 and L_4
7. L_2 and L_3
8. L_3 and L_2

R-Value and Linear Regression

Linear regression is a tool for finding how in sync two data sets are with one another. X Y lists are used for this, and treated similar to points on a graph. The idea behind this is to create a line and equation for predicting future data from past data. This line is called the Least-squares regression line, and serves as a line of best fit. The output of this function will be an equation, $y=ax+b$, with a specific a and b value based on your data sets, as well as an r and r^2 value. These values tell you, respectively, the slope of the line (a), the value you can expect when your X variable is 0 (the intercept b), the coefficient of determination (r^2), and the correlation coefficient (r). The r value will give you a number between -1 and 1, and the closer |r| is to 1 the more accurate your predictions from your line equation will be.

To use this function, go to the STAT button, then to the CALC submenu. Click the option that says "LinReg(ax+b)". Now, enter your two lists (first list being your "x" list, second being your "y" list), and press enter.

Practice: Perform linear regression line analysis on the following, and cite the slope, the intercept, and the r values you find.

9. L_1 and L_4
10. L_2 and L_3
11. L_4 and L_1
12. L_3 and L_2

Graphing scatter plots and Box plots

Whenever we input data points into our calculator, we can create a scatter plot graph using the plotting tool. To access the plotting tool of the calculator, we press "2^{nd}" and then "Y =" to access the "Stat Plot" menu. Once we are in the Stat Plot menu, we can activate of the available plots (labelled Plot 1, Plot 2, Plot 3…). Be sure to have only ***one*** active at a time by pressing the "Enter" key and switching the plot to "on", and to disable any extra plots by switching them to "off". Once we have one activated, we can choose the type of graph (Scatter, Dotted, Bar…) and choose one set of data point to use as our X-list and another set of data values to use as our Y-list (just like in the previous section). The plot is now active, and will show up whenever we hit the "Graph" key on our calculator.

Box plots are special, since they only require on set of data values to create. When plotting a box plot, be sure to choose the *box plot* type graph, as well as choosing an appropriate x-list and leaving the y-list blank.

Note: We may need to adjust the dimensions of our graphing window to match the data values. Using the "Window" key allows us to shift the dimensions to match any of the functions we are graphing.

Graphing Linear Regression (Least-squares regression line)

The linear regression tool provides us all the info for the equation of the least-squares regression line. Once we know this equation, we can model it on a graphing calculator. To perform a graph of our least-squares regression line, we press the "Y =" key. Once there, we can input the equation of our least-squares regression line into one of the available slots, in the form of Y=ax+b (you'll have to jot down these values to correctly input them here) and hit "Enter" to save it. The least-squares regression line will now show up whenever we hit the "Graph" key on our calculator, alongside the scatter plot!

Practice: Try graphing the scatterplot and least squares regression line of the following. Remember to activate only the plots you are using, and deactivate any plots you are not. Note the line is already given.

13. L_1 and L_4 with Y = -0.07x +5.10

14. L_2 and L_3 with Y = -3.03x +26.76

15. L_4 and L_1 with Y = -0.035x +5.595

16. L_3 and L_2 with Y = -0.27x +8.00

Answer Key

1-D Statistics

3. $\bar{x} = 14.9$ $S_x = 8.97$ $\sigma_x = 8.55$

4. $\bar{x} = 5.43$ $S_x = 3.10$ $\sigma_x = 2.87$

5. $\bar{x} = 2.56$ $S_x = 2.20$ $\sigma_x = 2.20$

2-D Statistics

6. $\bar{x} = 5.43$ $S_x = 3.10$ $\bar{y} = 4.71$ $S_y = 4.43$ $\Sigma xy = 175$

7. $\bar{x} = 3.91$ $S_x = 2.70$ $\bar{y} = 14.91$ $S_y = 8.97$ $\Sigma xy = 420$

8. $\bar{x} = 14.91$ $S_x = 8.97$ $\bar{y} = 3.91$ $S_y = 2.70$ $\Sigma xy = 420$

R-Value and Linear Regression

9. a = -0.07 b = 5.10 r = -0.05

10. a = -3.03 b = 26.76 r = -0.913

11. a = -0.035 b = 5.595 r = -0.05

12. a = -0.27 b = 8.00 r = -0.913

13. 14. 15. 16.