Learning some statistics with the TI-83+ requires a few bits of knowledge, let’s explore “MEASURES OF CENTRAL TENDENCY”:

1. The **Mean** (or **average**) is the sum of all the data points in your data set divided by the number of data points (or items) for example: a set {1, 2, 78, 4, 23} has a mean that looks like the following:
   \[
   \frac{1 + 2 + 78 + 4 + 23}{5} = \frac{108}{5} = 21.6
   \]

2. The **Median** is the “middle” number of a data set. Imagine the following:
   1, 2, 3, 4, 5   “3” is in the middle therefore the median. Imagine the following:
   1, 2, 3, 4, 5, 6   The median is now located between 3 and 4 therefore 3.5 the average of 3 & 4

3. The **mode** is the most common number in a data set. Imagine this data set:
   1, 2, 19, 15, 19, 23   The mode is 19 since it is the most common item in the data set.

These are clearly small and simple data sets. If we wanted to work with larger data sets and more complex data sets we’d prefer to utilize technology to perform these calculations. Of course, we want to know what they mean which is why we should calculate them by hand first with a few smaller data sets. Let’s explore larger data sets with a graphing calculator (TI-83+) and a spreadsheet (MS Excel).

Let’s start with a calculator (TI-83+):

The **MAJOR** buttons we will be using are circled/ovaled below:
First, turn the calculator ON by pressing \( \text{ON} \). Then press the \( \text{STAT} \) button. We will then see something "like" the following screen:

![Calculator Screen](image)

Press \( \text{ENTER} \) to see the following screen and we want a clear set of lists. So we arrow up and over to L1 to see the following highlighted screen:

![List Highlighted](image)

we then press \( \text{CLEAR} \) and \( \text{ENTER} \) to get a screen that looks like:

![Clear Lists](image)

Now, we should enter our data into L1:

Example: Here are a set of (at rest) Pulse rates for 10 teens (aged 13 - 15).

72, 92, 67, 71, 88, 92, 90, 84, 82, 76
Entering them into the calculator we see a screen similar to the following.

scroll down.

Now that we have a data-set we need to do something with it.

Let’s analyze our 1-variable statistics. To do that use the following: Press and arrow to.

Choose 1-Var Stats and press. You should get the following:

choose your list by pressing and choosing from the following L1

You’ll see the following screen:

Pressing will give you the following screens:

You’ll get a significant amount of information relating to the measures of central tendency.
You can see the Mean ($\overline{x}$ = 81.4) While the Median "Med" = 83.

It is also useful to use our "graphing" calculator to actually graph our data and analyze it.
For example we can look at our data in a “Boxplot”. To do that follow the directions here:

First press 2nd and STAT PLOT to get the following screen. Make
sure that they are all off. Hitting ENTER twice on PLOTSOFF will clear the plots for you. You may find yourself getting back to the menu above.
We want to hit enter on 1: to see the following screen:
press **ENTER** on **ON** to turn the plot that we want showing. Then Arrow down to the **TYPE** and we want a Boxplot. Your screen should look like what is shown here.

and pressing **ZOOM:9 STAT (Press the ZOOM button and Press the 9 button or scroll down to 9:ZoomStat)**

We'll get a screen that looks like this:

We can use our **TRACE** button to trace out the Min, Q1, Med, Q3, and Max values of our data set. If we got back to our **1-Var Stats** using **and can see these values there, as well.**

Now we should want to look at differences (or **deviations**) in our data set:
First let's look at the **RANGE** of our values. This is just the Minimum value subtracted from the Maximum value, or Max - Min

We can see in our data set as shown here that our Max = 92 and our Min = 67. That means our Range is 92-67 = 25

That seems to be a pretty large spread of data points but what about interquartile ranges? We've seen that our first Quartile is 72 and our Third Quartile is 90. Our interquartile range is 18. What are our other interquartile ranges?

Visit the following website for a graphical depiction of mean and even mean deviation (not covered here but still of interest)

Now what if we tried to compare pulse and temperature?

72, 92, 67, 71, 88, 92, 90, 84, 82, 76

Let's assume that each temperature value matches with the one above it.
99, 101, 98, 97, 96, 95, 98, 99, 99, 96

Let's go through the same procedures to determine measures of central tendency and measures of difference or deviation.

What is the **Mean** of our temperature values?
What is the Median?

What is the Mode?

What is the Range?

Draw a picture of a boxplot showing this data:

What is the interquartile range of Q1 and Q3?

Now we shall compare the two (as in the question...do people with greater heart rates (pulses) have greater temperatures? Or... do people with greater temperatures have greater heart rates?)

First, and ALWAYS FIRST, look at your data...DOES IT MAKE SENSE? Does anything in your data set not make sense? How can you “fix” it? Psst...A hint...Many times instruments do not work as well as we think they do. It might make sense to take another measurement.

Enter your data:
Using the TI-83+ we can enter the following (by going through the same steps as entering the pulse data - only enter the data in L2):

Secondly, enter the second list of data points. Third, calculate our 1-Var Stat and a 2 – Var Stat on it. Following the methods listed in the first section. First, pressing and choosing CALC and pressing ENTER ENTER

Shown here:
Much of this information is unnecessary right now. The important calculations to note are based upon what were asked in the preceding questions:

What is the Mean of our temperature values compared to our pulse rates?

What is the Median of each?

What is the Mode of each?

What is the Range of each?

Draw a picture of a boxplot comparing this data:

What is the interquartile range of Q1 and Q3 of each?

Now comparing the two...you'd likely want to create two boxplots or even better... a scatter plot (which can help present a possible relationship between these two values).

The boxplot is shown here and by now you should be able to create them, if not consult the directions presented earlier in this document.

The second might be a tad bit trickier. Please follow these screen captures:
First make sure your data exists then change to a scatter plot making sure that you are scatter plotting L1 and L2. (These are our X and Y values - respectively).

Example: Female 1: Pulse = 72 but Temp. = 99 we have an X of 72 but a Y of 99, giving us a data point on a graph.

Shown here:

Looking at this data and this graph can we derive a conclusion about temperature vs. pulse rate?

Let's try the other way...pulse rate vs. temperature. We just change our graph! We are now graphing L2 vs. L1 or, pulse rate vs. temperature.

NOT WHAT WE WANT: WHAT WE DO WANT: to do

this we press and choose from the following and then our graph should look like this:

It is still not really indicative of any relationship.