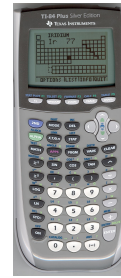


Interface between Mathematics and Biology  
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## Using your TI-84+ Calculator

### Basics

- ✓ Every key on the calculator has more than one function. Many of the operations we will use call for the secondary operations of the keys, entered using the **2<sup>nd</sup>** blue button, which will access the blue text above each key. When you see a direction with **2<sup>nd</sup>** followed by an instruction, look for the blue text. For example, to turn off the calculator, press **2<sup>nd</sup> OFF** (ON button).

### Entering a Data Set

1. Press the **STAT** button
2. Press **1** to select **1:Edit**
  - ❖ If the lists already have data you need to clear:
    - a. Press **▲** to highlight the heading of the list, i.e. **L1**
    - b. Press **CLEAR** button followed by **ENTER** to clear the list
3. Enter the data into the column under “L1”, following each entry by pressing **ENTER**
4. Use **▶** to move to the column under “L2”
5. Enter the second set of data into the column under “L2”, following each entry by pressing **ENTER**
6. To exit, press **2<sup>nd</sup> QUIT** (the MODE button)

### Displaying a Data Set

#### Histogram Display

1. Follow steps 1 – 3 above
2. Press **▼**, then **▶** twice and **ENTER** to select the histogram display
3. Press **▼ 2<sup>nd</sup> LIST** (STAT button) and **ENTER** to choose L1 for **Xlist:L1**
4. Press **GRAPH** to display the histogram

## Adjusting the Viewing Window

**Method 1** (Using this method, the calculator adjusts the viewing window for you. It's not always perfect, so to adjust it yourself, use Method 2 below.)

1. Press **ZOOM**
2. Press **0** to select **0:ZoomFit**
3. Press **ENTER**

**Method 2** (Manually adjust the viewing window)

1. Press **WINDOW**
2. Enter the number you want for the X minimum followed by **ENTER**
3. Enter the number you want for the X maximum followed by **ENTER**
4. If you want the X scale to be something other than 1, enter that number. Otherwise, just press **ENTER**.
5. Enter the number you want for the Y minimum followed by **ENTER**
6. Enter the number you want for the Y maximum followed by **ENTER**
7. If you want the Y scale to be something other than 1, enter that number. Otherwise, just press **ENTER**.
8. DO NOT change the number next to **XRes=**. This should always remain at **1**.
9. Press **2<sup>nd</sup> QUIT** (MODE button) to exit

## Calculations

### Mean

1. Press **2<sup>nd</sup> LIST** (STAT button) and **▶▶** to select **MATH**
2. Press **3** to select **3:mean(**
3. Press **2<sup>nd</sup> LIST** (STAT button) then **ENTER** to calculate the mean of L1
  - ❖ To select a list other than L1 use **▼** and then press **ENTER**
4. Press **ENTER** to calculate the mean of the selected list

### Median

1. Press **2<sup>nd</sup> LIST** and **▶▶** to select **MATH**
2. Press **4** to select **4:median(**
3. Press **2<sup>nd</sup> LIST** (STAT button) then **ENTER** to calculate the median of L1
  - ❖ To select a list other than L1 use **▼** and then press **ENTER**
3. Press **ENTER** to calculate the median of the selected list

### Standard Deviation (SD)

1. Press **2<sup>nd</sup> LIST** and **▶▶** to select **MATH**
2. Press **7** to select **7:stdDev(**
3. Press **2<sup>nd</sup> LIST** (STAT button) then **ENTER** to calculate the SD of L1
  - ❖ To select a list other than L1 use **▼** and then press **ENTER**
3. Press **ENTER** to calculate the SD of the selected list

## Displaying the Normal Curve

- ❖ To display the normal curve in standard units, use  $\mu = 0$  and  $\sigma = 1$ .
1. Press **Y=**
  2. Press **2<sup>nd</sup> DISTR** (VARS button)
  3. Press **1** to select **1:normalpdf(**
  4. Press **X,T,  $\theta$ ,n** (it's one button next to ALPHA)
  5. Press **,**
  6. Enter the mean of the data ( $\mu$ ) to be displayed followed by **,**
  7. Enter the standard deviation of the data ( $\sigma$ ) to be displayed
  8. Press **)**
  9. Press **WINDOW** and adjust the viewing window accordingly. The mean of the data ( $\mu$ ) should fall between the Xmin and Xmax. Press **GRAPH** to view the graph. You may have to make adjustments to the viewing window.

## Calculations

### Factorials (!)

1. Enter the number to be factorialized
2. Press **MATH**
3. Use **▶** three times to move over and select **PRB**
4. Press **4** to select **4:!**
5. Press **ENTER** to calculate the factorial

### Binomial Coefficient (n choose k)

$$\binom{n}{k} = \frac{n!}{k!(n-k)!}$$

1. Enter the **n** value
2. Press **MATH**
3. Use **▶** three times to move over and select **PRB**
4. Press **3** to select **3:nCr**
5. Enter the **k** value (or **r** value)
6. Press **ENTER**

## Line of Regression & Correlation Coefficient

- ❖ To be sure the correlation coefficient will be displayed, you need to be sure diagnostics are displayed. Follow these steps first.
  - a. Press **2<sup>nd</sup> CATALOG** (0 button)
  - b. Jump to "D" by pressing the **x<sup>-1</sup>** button (it has a D above it)
  - c. Use **▼** to arrow down until you see **DiagnosticOn**
  - d. Press **ENTER**
  - e. Press **ENTER** again – the screen should say:

**DiagnosticOn**

**Done**

### Finding the Line of Regression

1. Press **STAT**
2. Press **▶** to select **CALC**
3. Press **4** to select **4:LinReg(ax+b)**
4. Press **2<sup>nd</sup> LIST** (STAT button) and select the list for the x-values, followed by **ENTER**
5. Press **,** (above the 7)
6. Press **2<sup>nd</sup> LIST** (STAT button) and select the list for the y-values, followed by **ENTER**
7. Press **ENTER**

**Displaying the Line of Regression**

1. After finding the line of regression above, note what  $a=$  and what  $b=$
2. Press **Y=**
3. Next to  $Y_1=$  enter the number given for  $a=$
4. Press the **X,T,  $\theta$ ,n** button
5. Press **+**
6. Enter the number given for  $b=$
7. Press **GRAPH** to display the line of regression

**Displaying a Data Set****Scatter Plot Display**

1. Press **2<sup>nd</sup> STAT PLOT** (the  $y=$  button)
2. Press **1** to select **1:Plot1**
3. Press **ENTER** to select **ON**, turning on Plot 1
4. Press **▼** then **ENTER** to select the scatter plot display
5. Press **▼ 2<sup>nd</sup> LIST** (STAT button) and press **ENTER** to choose L1 for **Xlist:L1**
6. Press **▼ 2<sup>nd</sup> LIST** (STAT button), then **▼** and **ENTER** to choose L2 for **Ylist:L2**
7. Press **GRAPH** to display the scatter plot

## Addendum to Calculator Directions

### Histogram Display

1. Press **2<sup>nd</sup> STAT PLOT** (the  $y=$  button)
2. Press **1** to select **1:Plot1**
3. Press **ENTER** to select **ON**, turning on Plot 1
4. Press **▼**, then **►** twice and **ENTER** to select the histogram display
5. Press **▼ 2<sup>nd</sup> LIST** (STAT button) and **ENTER** to choose L1 for **Xlist:L1**
6. Press **GRAPH** to display the histogram

### Viewing Window for Histogram

1. Press **ZOOM**
2. Press **9** to select **9:ZoomStat**
3. The histogram should display. To make further adjustments:
  - a. Press **WINDOW**
  - b. The value next to **Xscl** determines the width of each bar, starting at **Xmin**. To adjust these values use the arrows to move up and down and enter your desired values, following entries with **ENTER**.