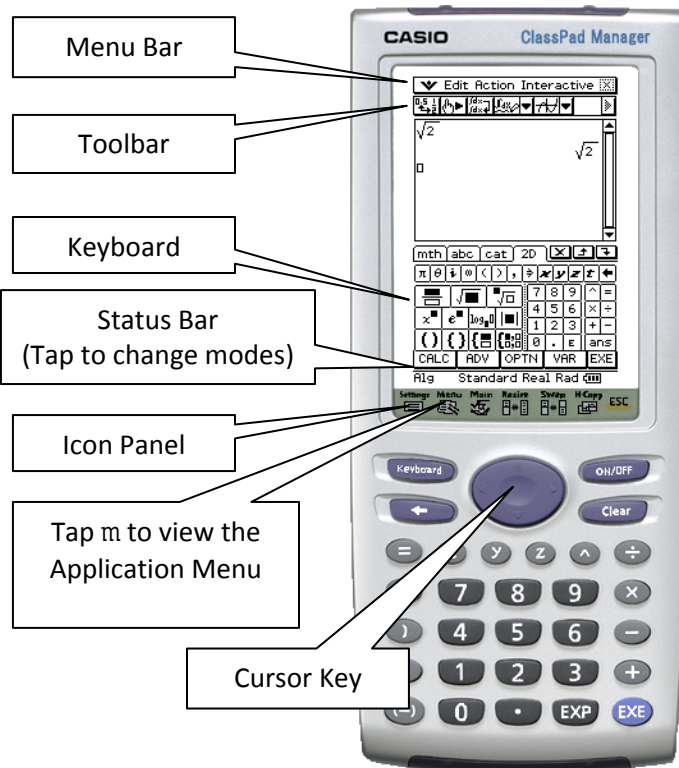


# STATISTICS ON THE CLASSPAD

## Useful Vocabulary



## Entering Math

One of the nice qualities of the ClassPad is the minimalist approach to buttons. This is achieved by having access to an onscreen keyboard. You can turn it



on and off with the Keyboard button. Here you can easily find most of the mathematical terms you will use. There are four tabs at the top of the keyboard: mth, abc, cat, and 2D. To enter  $\sqrt{2}$  go to the Main application. This can be done through the Application Menu, tap m, or by tapping M in the Icon Panel. Open the Keyboard and tap on the 2D tab then tap the 5 button. You can hit 2 on the calculator or tap 2 in the Keyboard. Then tap EXE and your screen should look like the ClassPad above.

## Drag and Drop

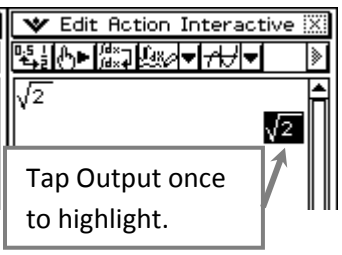
The stylus allows us to interact with the ClassPad in many convenient ways. One is that we can Drag and Drop information to save time.

To Drag and Drop something we first highlight it.

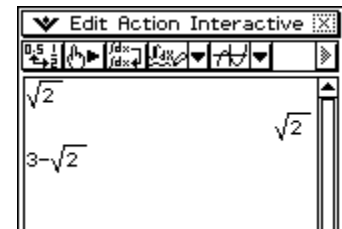
To highlight In-Line:



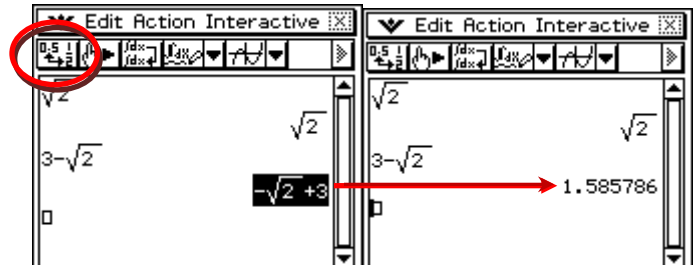
To highlight Output:



Next, press on the highlighted selection, hold and drag it to where you want it. Release when you see the cursor blinking.



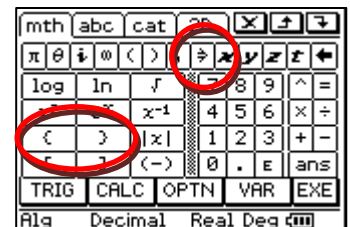
**Decimal Tip:** While in Main you can toggle highlighted outputs between Standard and Decimal mode with . .



## Lists in 'Main'

When in the Main application, M, the primary method of interacting with Statistics is to enter items into a list and then perform your calculations on that list.

To enter a list, press k to open the soft keyboard, tap {, enter a list of numbers separated by commas (using either the



soft keyboard or the main keypad), and close using the } symbol; to assign this list a name, continue by tapping the assign operator,  $\rightarrow$ , and then use the soft keyboard under the 'abc' tab to enter any name you wish.

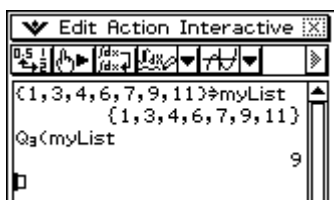
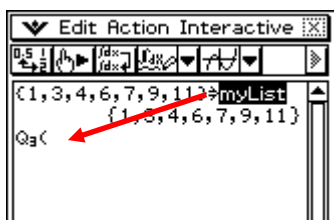
After naming your list, tap EXE on the soft keyboard or E on the main keypad to complete the list assignment.

## List Calculations

Now that we have created a list, we can perform a variety of calculations on it. From the 'Main' application, a list of common statistical functions can be accessed through the Action -> List-Calculation menu.

To compute the third-quartile value for your list, just select  $Q_3$  from the available list and then enter the name of your list. To make things even easier, don't re-type the name of your list; instead, highlight it from the previous line and drag-and-drop it into position using the stylus, then press E.

If you wish, you can use a closing parenthesis, but the ClassPad will often be able to determine where it belongs. Furthermore, all the list functions will work equally well on an unnamed list; it is only somewhat easier to use a name in place of a long list of values.



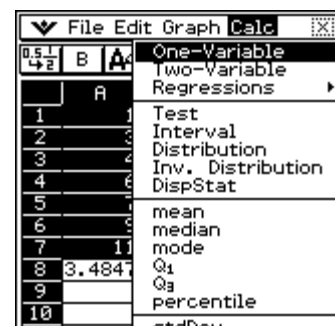
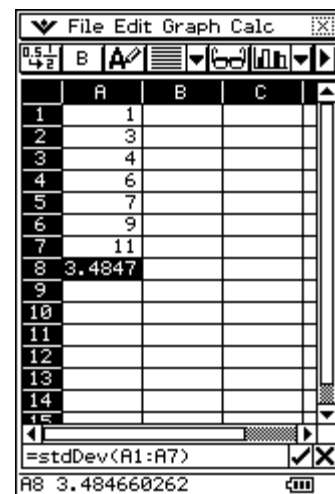
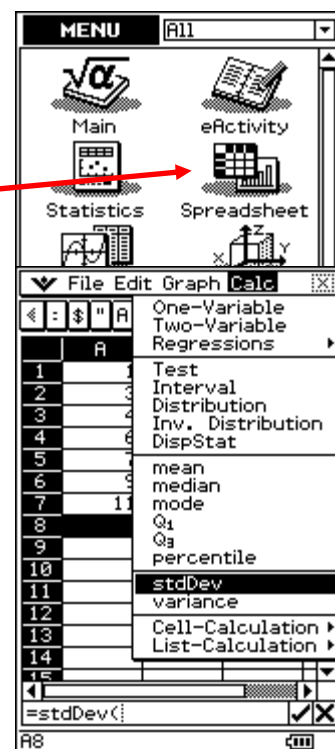
## The Spreadsheet Application

To open Spreadsheet, first go to the Application Menu by tapping m at the bottom of the screen. Then, tap Spreadsheet.

Spreadsheet offers a very intuitive interface for anyone who is already familiar with Excel or similar programs. All of the calculations that are available in the Main application are also available here, under the 'Calc' menu; plus, there are a few more, such as One- and Two-Variable stats and a number of Regressions. To begin with, let's enter the same numbers from the previous example; you can switch between cells either by using the stylus, the cursor key, or by pressing EXE.

After entering the last number, tap in the next cell (or press EXE) and then use the 'Calc' menu to select 'stdDev'. At this point, the Spreadsheet is waiting for you to tell it which cells to use. To select the cells we've just entered, touch the first cell and drag to the last (you'll see a small dotted outline around the selected cells). When you're ready, press EXE and you should have the Standard Deviation visible in cell A8.

If you want even more information at your fingertips, try selecting the numbers first and then tap Calc -> One-Variable.

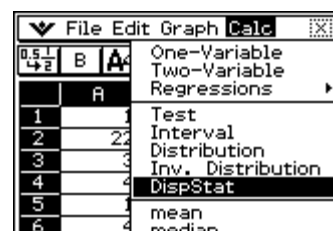
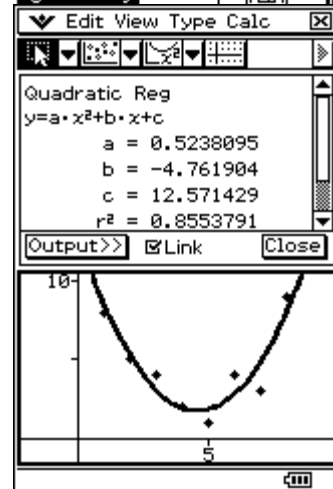
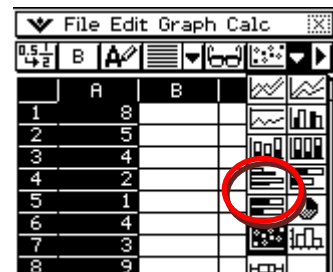
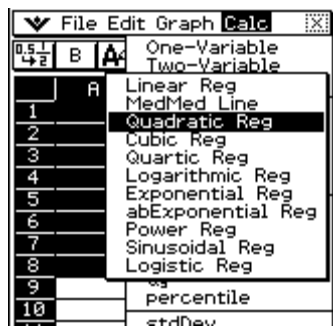


## Regressions in Spreadsheet

If you have a collection of data entered and would like to compute a regression curve, select (highlight) the data and tap Calc -> Regressions, followed by the particular regression you desire. If you want to look at the data first, *then* select an appropriate regression, begin by creating a scatter plot.

To create a scatter plot, first select your data. You can enter it in two columns (x and y-coordinates) or let ClassPad fill in the first column for you. Select cells by touching an unselected cell and dragging the stylus across all cells you wish to highlight. Tap the right-most button on the Toolbar to create a scatter plot (if it doesn't look like a scatter plot, tap the down arrow  $\downarrow$  to open the graph menu and select the scatter plot image). Then, while the scatter plot has the focus (bold border), tap Calc and select your desired regression curve.

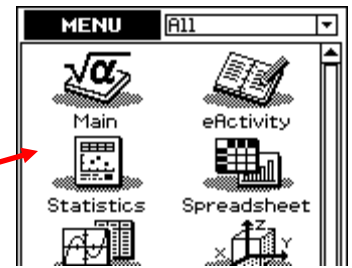
You can output the coefficients of the regression to the spreadsheet by tapping 'Output' or, if you leave 'Link' checked, you can select and drag the points in your scatter plot. As you move them, the regression is automatically recalculated and the new coefficients are displayed. You can access your last statistics results at any time (in Spreadsheet, Statistics, or Main) by tapping Calc -> DispStat.



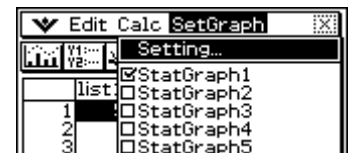
## The Statistics Application

The Statistics application is designed to work with several different data sets whereas Spreadsheet is stronger at performing calculations over a range of cells.

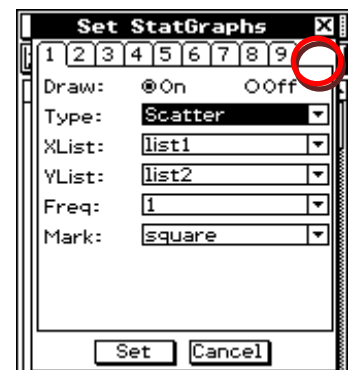
To open Statistics, first go to the Application Menu by tapping  $\pi$  at the bottom of the screen. Then, tap Statistics.



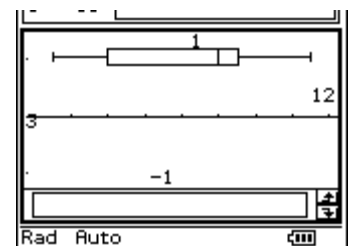
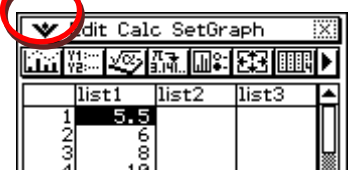
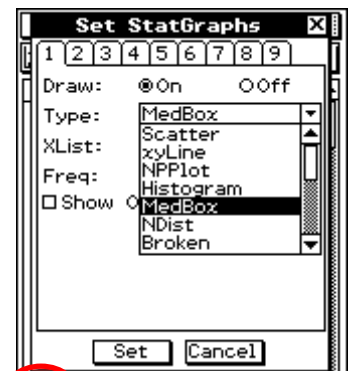
As mentioned in the section titled "Lists in Main", statistics is designed to work with lists. There are six lists predefined for you (labeled 'list1' through 'list6'). Enter a group of numbers into list1 and then tap SetGraph -> Setting...



This brings up a tabbed list of the 9 graphs which can be plotted simultaneously, but for now we'll just use the first tab. Make sure the

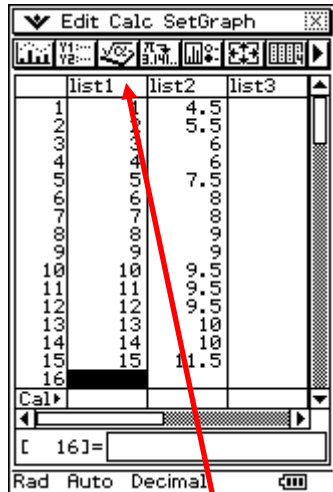


radio button for 'On' is selected, tap the drop-down arrow to the right of 'Type', and select 'MedBox'. 'XList' is the label for the list of values we want to use (in this case, list1 is what we want), and 'Freq' allows you to use a second column for frequency data (we will leave it on the default setting of 1, for now and we will leave the checkbox for 'Show Outliers' unchecked). Tap 'Set' and then tap the Plot button  $\gamma$  on the top left of the toolbar to see your Box Plot.



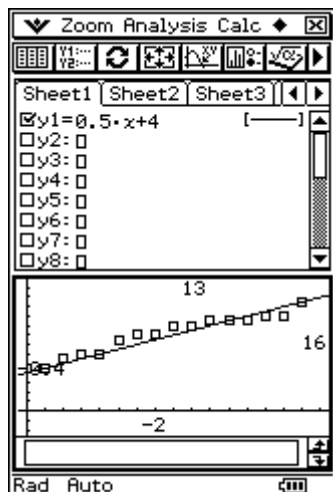
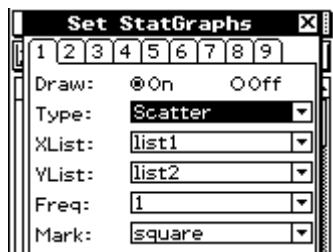
## Differences from Spreadsheet

There are several things to keep in mind when working with the Statistics application, as opposed to Spreadsheet. Where Spreadsheet would assume equally spaced x-values when computing a regression, Statistics makes you explicitly define your x-values in a list (thus, you need two lists for any regression – a list of x-values and a list of y-values). Furthermore, you can no longer highlight just the values that you wish to include in a calculation; any value in the list will be used, and no position in the list may be blank (blank signals the end of a data list).



Statistics also has the ability to open a 'Main' calculation window concurrently. To do this, tap the ~ symbol on the toolbar. Any time you wish to close another window or a graph, just tap the 'x' at the top right of the window.

Another useful feature is the ability to graph user-defined curves over a data plot. If I wish to plot the data above, I can tap SetGraph -> Setting... and select a ScatterPlot. Then, tap Set and Plot as before. To graph our own guess for line of best fit, first tap in the upper window to give it focus (a bold border) and then select the graph editor. Enter  $y1: 0.5 \cdot x + 4$ , press EXE to activate this function, and tap Plot once more to see both the data and the plot on the screen



simultaneously.

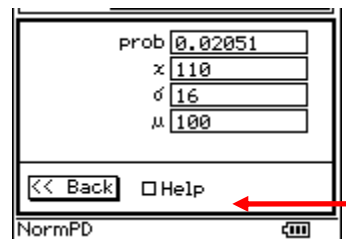
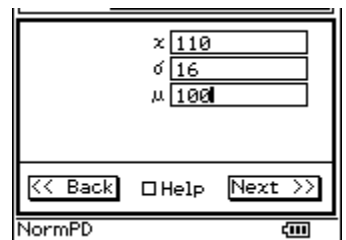
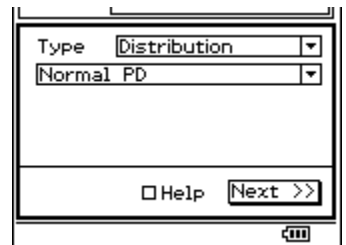
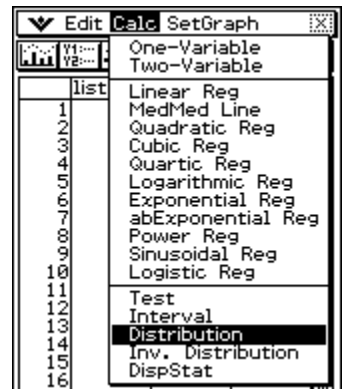
## Distributions

The Calc menu also provides access to Hypothesis Testing, Confidence Intervals, and Distribution calculations. Tapping on Calc -> Distribution calls up a Statistics Wizard that steps you through the process of gathering the data you need.

For instance, given a mean IQ of 100 with a standard deviation of 16, we can compute the probability of possessing a specific IQ.

Assuming that IQ is normally distributed, we select 'Normal PD' from the Distribution menu and tap 'Next'. We enter 16 for the standard deviation, 100 for the population mean and 110 for our data value. Tapping 'Next' tells us that there is roughly a two percent chance of having an IQ of 110. You can even tap the graph button on the toolbar to see a graph of the distribution along with the particular value you've picked.

There are many more distributions, hypothesis tests, and intervals to choose from, but all use the same wizard interface. Spreadsheet has a similar wizard, but allows you to select ranges of cells to compute multiple results simultaneously. Also note the 'Help' check box at the bottom of the screen. If you are unsure what type of value you are expected to enter, tap this and it will provide summaries for each input box.



## Additional Links

[www.classpad101.com](http://www.classpad101.com)

<http://edu.casio.com/products/cpeactivity/>