TI-Nspire

Summary Statistics

Aim

To provide an overview of working with data on the calculator.

Calculator objectives

By the end of this unit, you should be able to:

- generate lists of random numbers
- display dot plots, bar graphs and pie charts
- display histograms
- display qualitative data
- display data from a frequency plot
- work with box plots
- generate a five-number summary

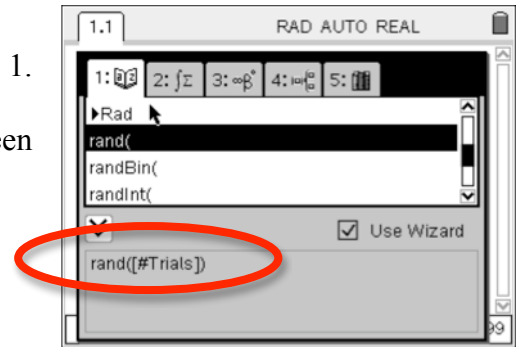
Contents

Random numbers
Dot plot, bar graphs, pie charts, histograms
Frequency tables
Five-number summary

Random Numbers

The TI-Npsire has a number of ways to generate a list of random numbers: **rand()**, **randInt()**, **randBin()**, **randNorm()**, **randSamp()**, **randSeed**, **randMat**, **randPoly**. The syntax for these can be obtained through the Catalogue, but are briefly discussed below:

rand()

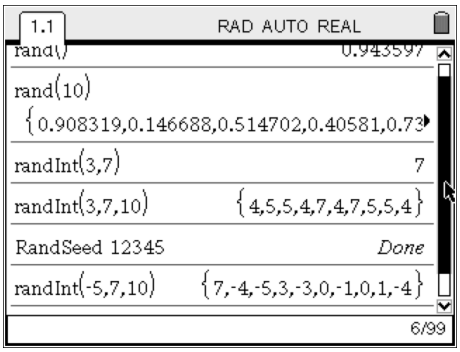


Generates a random number between 0 and 1. Type rand().
To create a list of 10 random numbers between 0 and 1, type rand(10).

randInt()

Generates a random integer from the lower-bound to upper-bound inclusive.
To generate one random integer, choosing from the integers 2 to 7 inclusive, type randInt(2,7). To generate a list of 10 such integers, type randInt(2, 7, 10)

randSeed()



Sets how the calculator seeds its random numbers (these are machine generated, so by definition are pseudo-random). A number of 0 will set the random seed to the factory default. If 2 calculators have the same random seed set, they will then generate exactly the same set of random numbers.

randBin

Generates a random number from a binomial distribution.

randNorm

Generates a random number from a normal distribution.

randMat()

Generates a random matrix. All elements in the matrix will be integers, ranging from -9 to 9 inclusive.

randPoly()

Generates a random polynomial in the given variable and of given order. All coefficients in the polynomial will be integers, ranging from -9 to 9 inclusive.

randSamp()

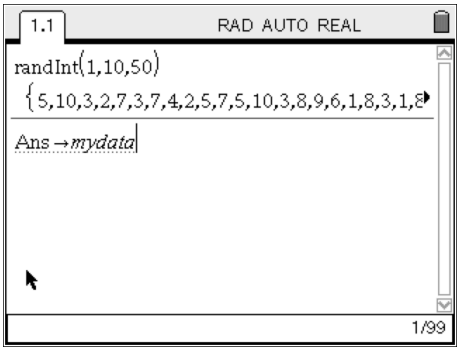
A discussion of this is appears below.

Creating lists of random numbers

Lists of random numbers can be created in both a Calculator page, as well as a L&S page.

Using the Calculator page and a D&S page.

1. Generate a set of data and store it as *mydata*.

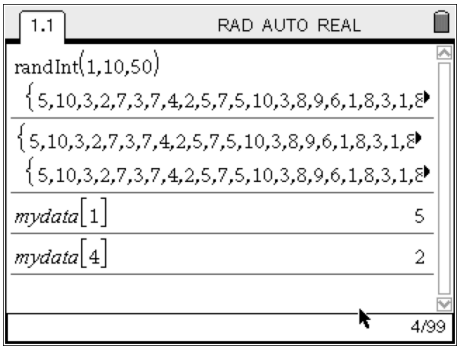


2. To access the *n*th member of the list, type:

mydata[*n*]

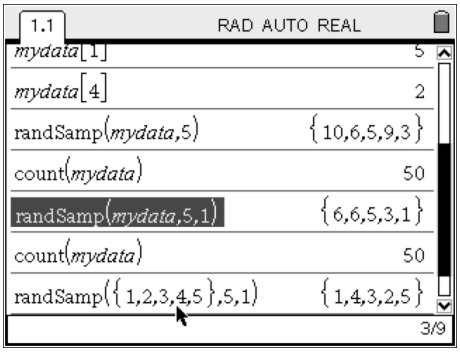
If you want to change a particular member of the data set, do the following:

6 -> mydata[3]

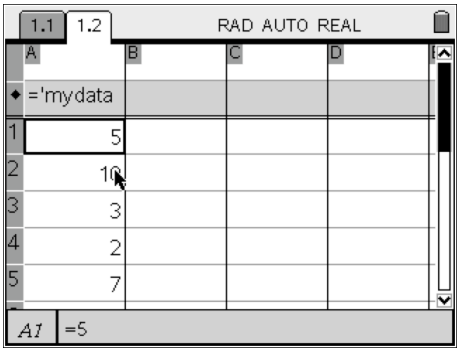


3. From the mydata list, we can select a set of random values, either with replacement, or without replacement. Note that the size of mydata does not change (count(mydata)=50 after both selections). Type:

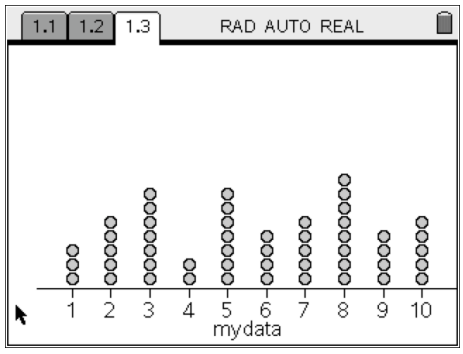
randSamp(listToSampleFrom, # of trial)
or, for without replacement:
randSamp(listToSampleFrom, # of trial, 1)



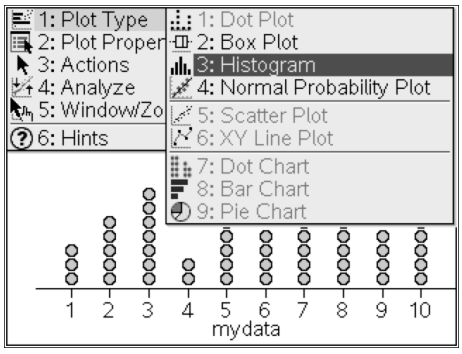
4. Lists generated in the calculator app, can be pasted into the L&S app. Remember to choose mydata from the menu.



Displaying data

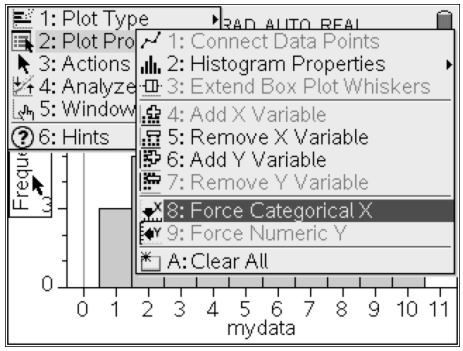


Open a new D&S page.
Select 'mydata' in the horizontal axis, to get a Dot Plot of the data, as shown opposite.
The data is plotted by default as continuous data (the calculator calls this numerical data).
Data points can be selected, picked up and dragged.

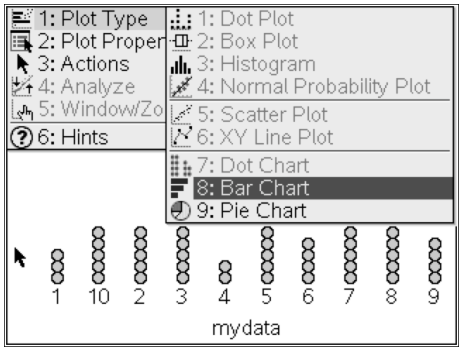


Consequently, a histogram of the data can be displayed.

Press (menu) 1:Plot Type, 3:Histogram

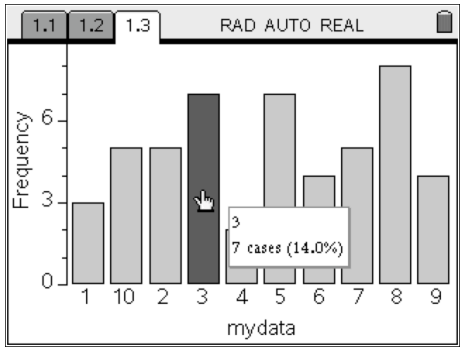


To display a bar graph, change the recognition of the data set to be catagorical (discrete data)



Press (menu) 1:Plot Type, 8: Bar Chart

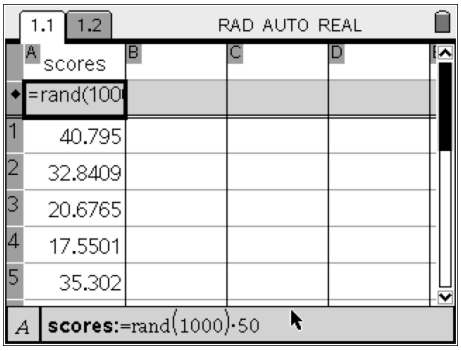
Notice that the data is arranged 1, 10, 2, …



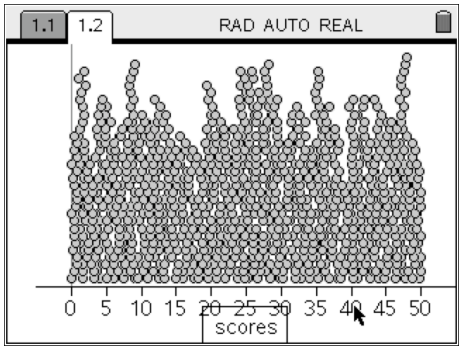
Clicking on each bar displays that bars information.

Pie Charts work in exactly the same way.

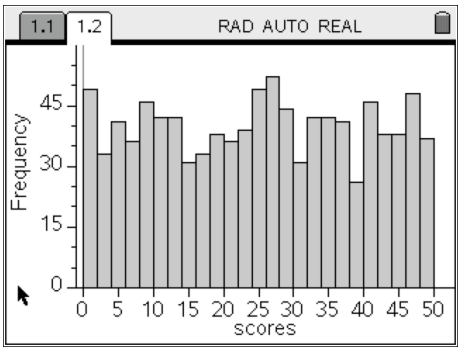
Continuous data



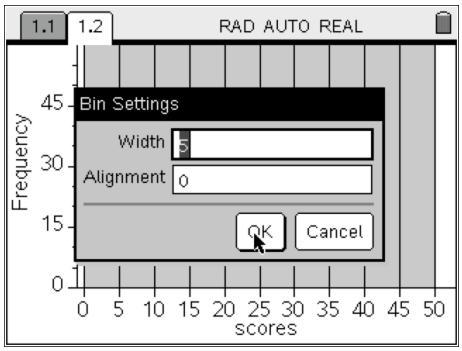
Generate a list of 1000 random numbers which lie from 0 to 50 inclusive.



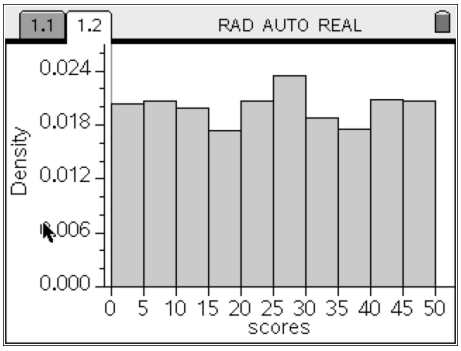
Create a dot plot of the data, by placing the variate 'scores' on the horizontal axis.



Create a histogram:
menu 1:Plot Type, 3: Histogram

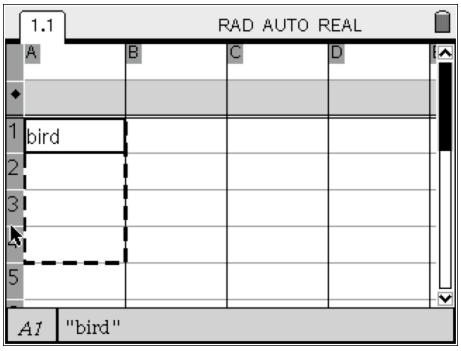


Change the width of the rectangles (called 'Bins' by the Nspire) changing the histogram properties:
menu 2:Plot Properties, 2: Histogram Properties, 2: Bin Settings

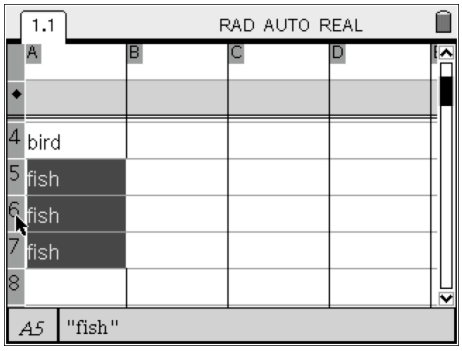


You will most likely also need to change the histogram scale.
Widths of the rectangles can also be changed by dragging the edge of one of the rectangles.

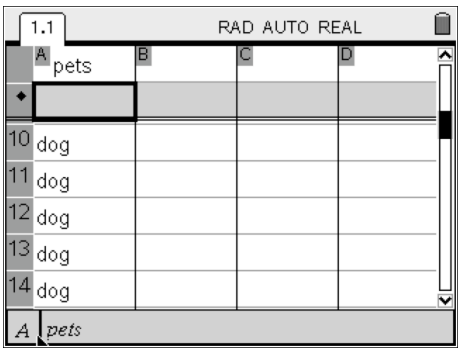
Working with qualitative variates



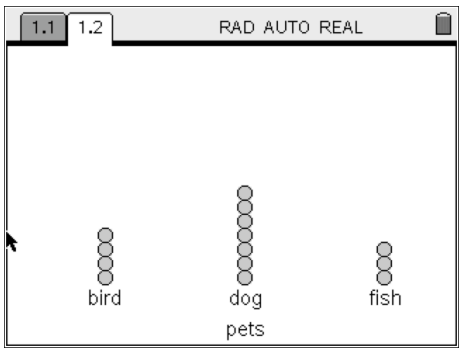
Enter in cell A1 "bird" (remember to use quotations marks; found on the grey button between ÷ and ×).
Place the cursor back in cell A1, and do: ⓑ 3:Data, 3: Fill Down, and use the cursor to go to cell A4. Press enter.



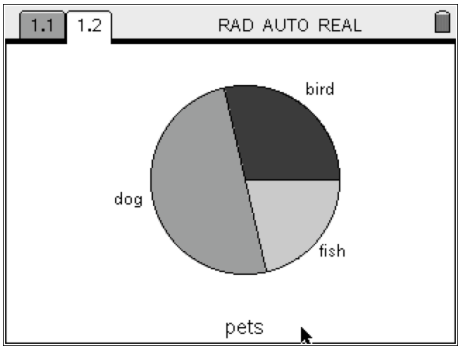
Do the same for "fish" – enter it in cell A5 and fill down to cell A7.



And the same for "dog".
Label the column pets (do not use quotation marks).



Add a D&S page and choose 'pets' for your horizontal axis.

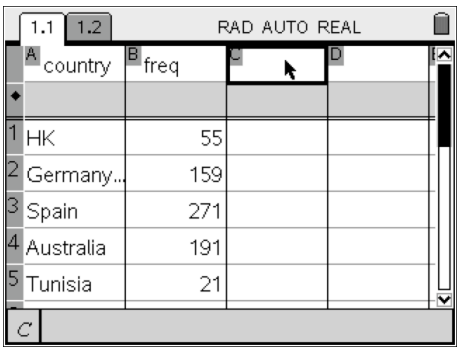


Draw a Pie Chart

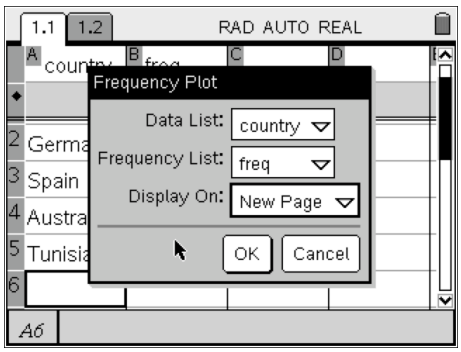
Frequency tables

There are two ways to display data from a frequency table. The easiest way is as follows:

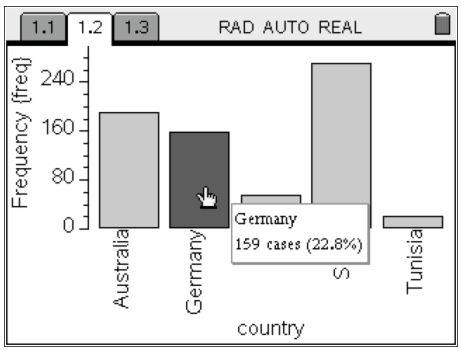
1. In a new L&S page, enter the frequency table shown:



2. Press (menu) 3:Data, 5: Frequency Plot, and set up the frequency plot as shown:

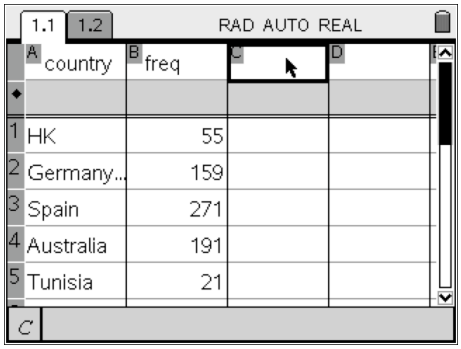


3. Again, information about the data set can be obtained by clicking on the bar, or sector of pie if you change the plot to a Pie Chart.



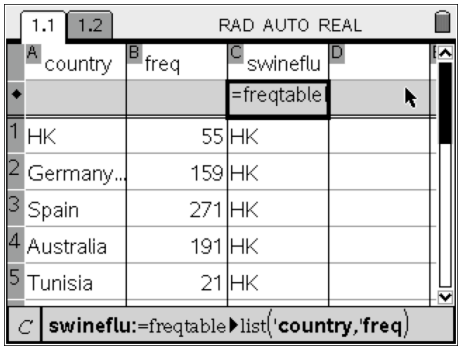
Alternatively, a frequency plot can be obtained by doing:

1. In a new L&S page, enter the frequency table shown:

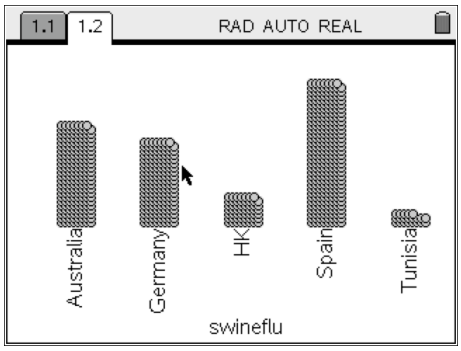


2. To plot data, all the data from the frequency table must be in a single column. This can be done using the function 'freqtable->list' which is obtained from the catalogue.

   Remember to choose the variable names from the stoVar button.

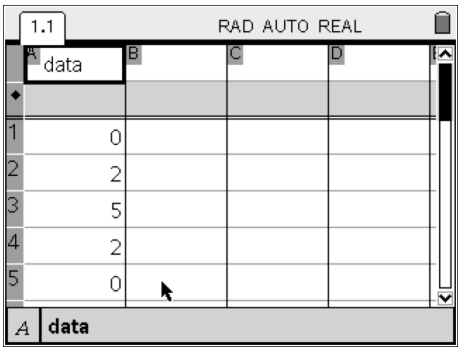


3. Add a new D&S page and have 'swineflu' displayed for your horizontal axis.



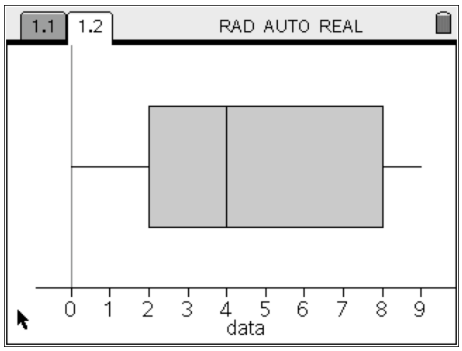
Box Plots

Using the box plot to obtain the five-number summary.

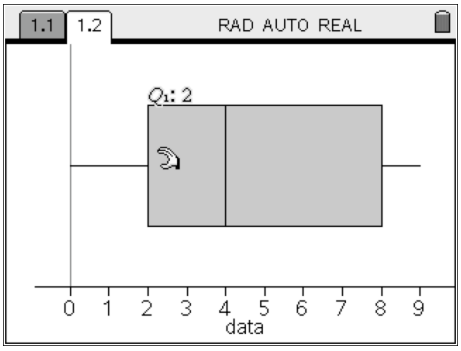


Enter some data in to a labeled column. e.g. here I have used:

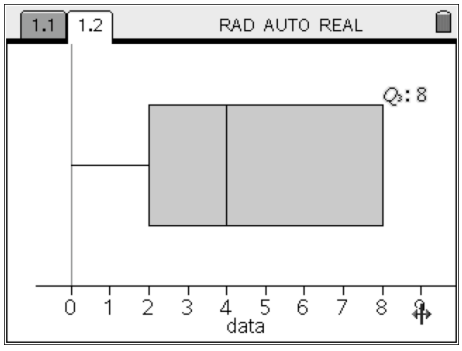
data = {0, 2, 5, 2, 0, 4, 4, 8, 9, 8, 8}



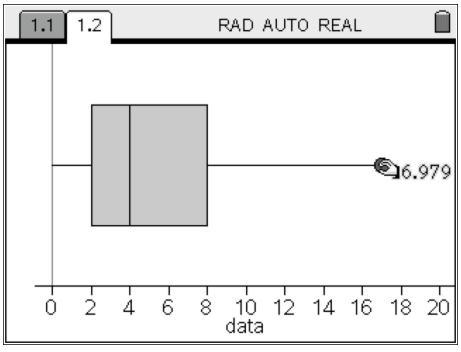
Add a D&S page, place 'data' along the horizontal axis and change the plot type to Box Plot.



Move the cursor over the critical points in the box plot, to see the 5-number summary information



Change the value of 9 to be 18, which makes it an outlier. Move the cursor to the right end of the horizontal axes, press ctrl ☼ to grab the axis and pull it in so that you can see the new outlier.



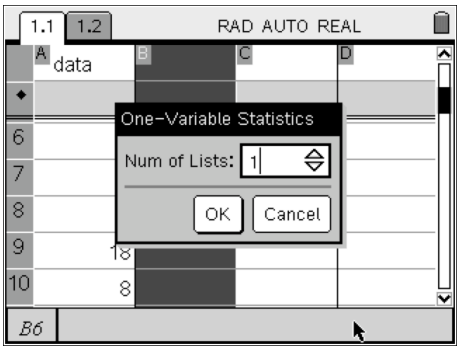
Grab the outlier and move it left and right to see the whisker appearing and disappearing.

Five-number summary

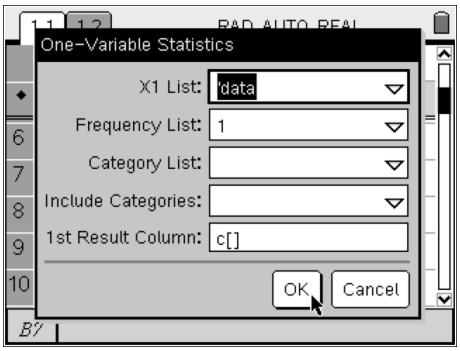
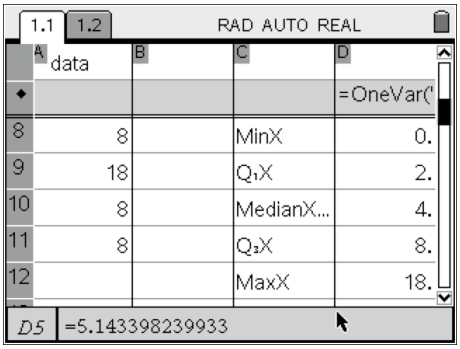
This can also be found by doing one-variable statistics:

1. Complete step 1 of 'Box Plots'. Press (menu), 4:Statistics, 1:Stats Calculations, 1: One-variable statistics.

   We have 1 list.



2. Change the 'x1 List' to the name of column A. Leave everything else alone. Press 'OK'.



3. The five-number summary appears in the second half of the results.