

Objective

To explore statistical values of a set of data and how those statistical values change as the data changes.

Explanation of the activity

A Sharp calculator equipped with statistical functions has a wide range of statistical operations that can be carried out. These can range from the basic calculations needed to evaluate the mean and standard deviation of a frequency distribution, to correlation and regression calculations in more advanced models.

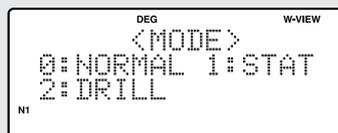
To access this range of functions the calculator has to be set initially in the statistics mode and then within that statistics mode the correct sub-mode must be selected.

Using the calculator

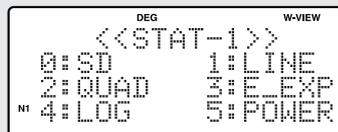
Switch on the calculator and press the MODE key.

The display will show

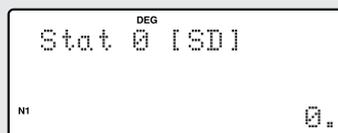
Pressing the numeric key 1 on the keyboard will set the calculator in Statistics mode.



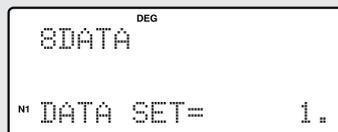
The display will now show the first five SD LINE QUAD E_EXP LOG POWER of seven statistics options (scroll down to see the others) INV G_EXP



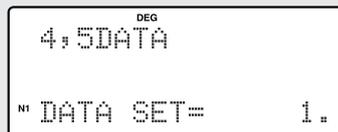
Pressing the numeric key 0: SD will set the calculator in the basic Statistics mode: STAT 0, allowing calculation of values relating to a **single** variate data such as mean or standard deviation.



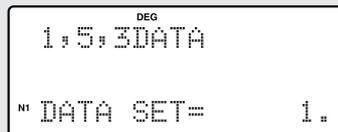
In Statistics mode, the CHANGE key acts as the DATA input key for the values of the variable. These values are recorded in memory as a DATA SET. The screen shows a single value, 8, entered as the first item of data.



The (x, y) key used prior to the DATA key allows a frequency distribution of a single variable to be input. E.g. value 4 frequency 5 as the first item of data.



If, when commencing Statistics mode, numeric key 1: LINE had been pressed, then calculations relating to **two** variate data could be carried out. The (x, y) key may now be used twice to enter frequencies of grouped data. E.g. two variate data (1, 5) with a frequency of 3, as the first item.



2nd function CA will clear any stored data from memory.

••••• Using the activity in the classroom •••••

The calculator can now be used to investigate how statistical values change as the data changes.

For example, investigate the change in mean and standard deviation that happens when we add a fixed value to all recorded values of a single variable.

3, 5, 12, 34, 50 adding 3 gives 6, 8, 15, 37, 53

The mean value of the first series is 20.8.

The mean value of the second series is 23.8 (a change of 3 in the mean value).

The SD of the first series is 18.28.

The SD of the second series is 18.28 (SD remains unchanged).

For a frequency distribution, do the same observations hold true?

X	f
2	2
6	3
9	4

Add 3 to each x value. Do not change the frequency.

X	f
5	2
9	3
12	4

Mean value is 6.44,
SD is 2.71.



A change of 3 in mean value.
SD remains unchanged.



Mean value is 9.44,
SD 2.71.

The calculator gives us a very powerful way of investigating statistical values, their relationship to the original data and how those values relate to changes in the data.

The calculator's ease of use allows investigation of statistical principles. The student has the power to easily recalculate statistical values of changing data and can test concepts and their own ideas based on practical results.

••••• Points for students to discuss •••••

Further investigation could look at how basic statistical values change with alterations in the frequency. Is there a relationship similar to that which was found between increasing the values of the basic data and changes in the mean and SD?