



# Using Sharp EL-520

## Statistical calculations

### Learning Skills

### Introduction:

This sheet will teach you how to use the Sharp EL-520 calculator to perform statistical operations. See also our handout for mathematical functions. Any further queries please contact Support Central.

### This sheet will teach you to:

- Put your calculator into statistical mode
- Enter observations
- Display the descriptive statistics
- Enter group data
- Perform linear regression

## 1. Statistical Mode

To put your calculator into statistics mode press

**MODE** **1**

A small STAT will appear on the display

To clear the statistical memory press, this should be done before entering any new data.

**2ndF** **DEL**

## 2. Entering single variable observations

To enter observations press

**M+** after entering the observation

### Example 2.1

Enter 10, 12, 13, 16

Calculator steps:      **10** **M+**      **12** **M+**      **13** **M+**      **16** **M+**

### Number of scores

The number of scores (n) is 4  
this is displayed while entering

### 3. Display the Descriptive Statistics

	Calculator symbol	Common symbol	Calculator steps	answer
mean	$\bar{x}$	$\bar{x}$ or $\mu$	$\boxed{\text{RCL}}$ $\boxed{4}$	12.75
Sample standard deviation	$s_{n-1}$	s	$\boxed{\text{RCL}}$ $\boxed{5}$	2.5
Population standard deviation	$s_n$	$\sigma$	$\boxed{\text{RCL}}$ $\boxed{6}$	2.165
Sample variance		$s^2$	$\boxed{\text{RCL}}$ $\boxed{5}$ $\boxed{x^2}$ $\boxed{=}$	6.25
Scores added up	$\sum x$	$\sum x$	$\boxed{\text{RCL}}$ $\boxed{\downarrow}$	51
Scores squared then added up	$\sum x^2$	$\sum x^2$	$\boxed{\text{RCL}}$ $\boxed{+/-}$	669

### 4. Entering observations from a frequency table

To enter observations from a frequency table type in;

Observation  $\boxed{2\text{ndF}}$   $\boxed{\text{STO}}$  frequency  $\boxed{\text{M+}}$

#### Example 4.1:

Enter the following table into your calculator

score	Frequency
10	12
12	5
13	9
16	7

#### Calculator steps:

$\boxed{2\text{ndF}}$   $\boxed{\text{DEL}}$   
 $\boxed{10}$   $\boxed{2\text{ndF}}$   $\boxed{\text{STO}}$   $\boxed{12}$   $\boxed{\text{M+}}$   
 $\boxed{12}$   $\boxed{2\text{ndF}}$   $\boxed{\text{STO}}$   $\boxed{5}$   $\boxed{\text{M+}}$   
 $\boxed{13}$   $\boxed{2\text{ndF}}$   $\boxed{\text{STO}}$   $\boxed{9}$   $\boxed{\text{M+}}$   
 $\boxed{16}$   $\boxed{2\text{ndF}}$   $\boxed{\text{STO}}$   $\boxed{7}$   $\boxed{\text{M+}}$

By using the 2ndF key you are accessing the comma which is used to separate the score from its frequency.

#### Note

1. Remember when entering new data you must clear the memory first
2. The comma (,) key is next to the M+ key
3. The total number of observations is 33

Once the observations are entered the mean and standard deviation are found as above.

<u>If the scores are a sample</u>	<u>If the scores are a population</u>
$\bar{x} = 12.394$	$\mu = 12.394$
$s = 2.263$	$\sigma = 2.228$
$s^2 = 5.121$	$\sigma^2 = 4.966$
$\sum x = 409$	$\sum x = 409$
$\sum x^2 = 5233$	$\sum x^2 = 5233$

## 5. Entering Grouped data

To enter grouped data you first have to find the midpoint of each group. This is done by adding together the lowest and highest value from each group and then dividing it by two. We then use these as our observations.

### Example 5.1:

group	frequency
> 0 up to and including 10	25
>10 up to and including 20	33
>20 up to and including 30	21
>30 up to and including 40	30

To find the midpoint of each group:

$$(0+10)/2=5$$

$$(10+20)/2=15$$

$$(20+30)/2=25$$

$$(30+40)/2=35$$

### Calculator steps:

```

2ndF  DEL
5     2ndF  STO  25  M+
15    2ndF  STO  33  M+
25    2ndF  STO  21  M+
35    2ndF  STO  30  M+

```

(n = 109)

<u>If the scores are a sample</u>	<u>If the scores are a population</u>
Approximate: $\bar{x} = 20.138$	Approximate: $\mu = 20.138$
Approximate: $s = 11.272$	Approximate: $\sigma = 11.220$
Approximate: $s^2 = 127.064$	Approximate: $\sigma^2 = 125.898$

### Note

The mean and standard deviation are only approximate because we are using each class centre to approximate the individual observations

## 6. Linear Regression Mode

To put your calculator into statistics mode press

**MODE** **2**

A small STAT will stay on the display, STAT xy will show on the display until the next key is pressed.

Again it is necessary to clear previous data before entering any new information.

**2ndF** **DEL**

## 7. Entering x and y data sets

To enter x and y observations press

x value **STO** y value **M+**

### Example 7.1

<u>x score</u> <u>(independent variable)</u>	<u>y score</u> <u>(dependent variable)</u>
5	20
8	18
6	22
7	28
10	27

### Calculator steps:

**2ndF** **DEL**

**5** **STO** **20** **M+**

**8** **STO** **18** **M+**

**6** **STO** **22** **M+**

**7** **STO** **28** **M+**

**10** **STO** **27** **M+**

### Note

When in linear regression mode the 2ndF key is not required as the key now assumes the (x,y) function shown below the key.

## 8. Regression output

**RCL**  $\frac{1}{x}$

this will give A – the y-intercept of the regression line

**A = 16.189**

**RCL**  $\frac{1}{y}$

this will give B – the slope of the regression line

**B = 0.946**

**RCL**  $\frac{1}{r}$

this will give r – the correlation coefficient

**r = 0.417**

The means and sums are found by using the RCL key and the keys as shown on the calculator.

**When you have finished your regression question it is important to get out of that mode before doing any other calculations.**

## 9. For more information

Visit our Learning Skills website at <http://www.csu.edu.au/division/studserv/learning/index.html>

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