

A Box Plot from Scratch.

This resource was written by Colin Andersen, Jan Roderick, Tony Sears and Derek Smith with the support of CASIO New Zealand. It may be freely distributed but remains the intellectual property of the authors and CASIO.

INTRODUCTION

This resource relates to Statistics Level 5-6 of Mathematics in the New Zealand Curriculum (MiNZC) document, specifically:

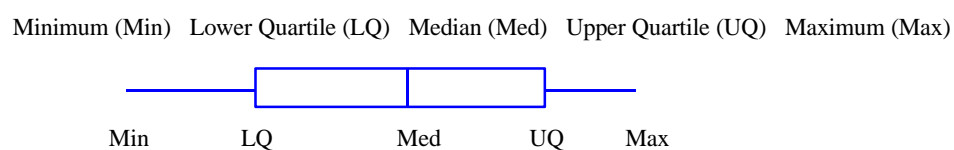
Find, and authenticate by reference to appropriate displays, data measures such as mean, median, mode, interquartile range and range.

Collect and display comparative samples in appropriate displays . . .

It demonstrates how a Box and Whisker graph can be drawn, and data values obtained using the Casio CFX-9850G or Casio FX-9750G graphics calculators.

Relevant Background Information

A Box and Whisker Plot utilises 5 values from a set of data and displays these in a graphical form:



The calculations required can be performed in STAT mode.

A Box Plot from Scratch.

PROBLEMS

Problem One

Using the following data

100	150	200	1020	640
390	280	510	920	

1. Find the minimum, maximum, lower and upper quartile and the median for the data presented above.
2. Draw a Box and Whisker Plot for the data above.

Problem Two

Using the following three sets of data:

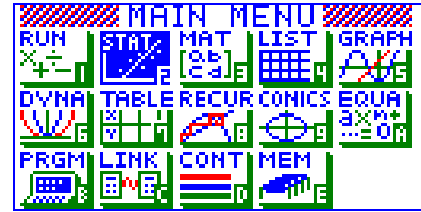
Set A	100	150	200	1020	640	390	280	510	920	
Set B	95	900	674	586	964	798	243	564	785	234
Set C	140	453	675	786	965	352	756	132		

Draw the three Box and Whisker Plots simultaneously to make comparisons between the three data sets.

A Box Plot from Scratch.

WORKED SOLUTION

Use STAT mode to draw Box and Whisker Plots.



Problem One

1. Find the minimum, maximum, lower and upper quartile and the median for the data presented above.
2. Draw a Box and Whisker Plot for the data above.

Step One:

Enter the Data set into **List 1**

	List 1	List 2	List 3	List 4
1	100			
2	150			
3	200			
4	1020			
5	640			

Step Two:

Set the calculator up to draw Box and Whisker Plots. **[F1] [F6]**

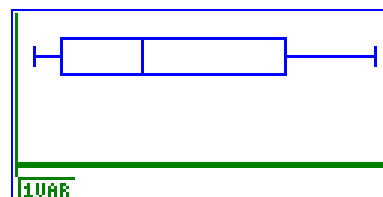
	List 1	List 2	List 3	List 4
1	100			
2	150			
3	200			
4	1020			
5	640			

```
StatGraph1
Graph Type :MedBox
XList      :List1
Frequency  :1
Graph Color:Blue
```

Then change the settings using the appropriate 'F' keys, as shown, then **EXIT** or **EXE**.

Step Three:

Draw the graph and view the numerical statistics. Press **[F1]** for graph and **[F1]** again for the numerical statistics.



```
1-Variable
Σx      =467.777777
Σx²     =2.8595e+06
x̄n      =314.493518
sxn-1   =333.570748
n        =9
```

Use the down arrow key to scroll down to the rest of the numerical statistics provided.

```
1-Variable
minX    =100
Q1      =175
Med     =390
Q3      =780
x̄-x̄n    =153.284259
x̄+x̄n    =782.271295
```

```
1-Variable
Med     =390
Q3      =780
x̄-x̄n    =153.284259
x̄+x̄n    =782.271295
maxX    =1020
Mod     =1020
```

A Box Plot from Scratch.

Problem Two

Draw the three Box and Whisker Plots simultaneously to make comparisons between the three data sets.

Step One:

Enter the Data set B into **List 2**.

Enter the Data set C into **List 3**.

	List 1	List 2	List 3	List 4
1	100	95	140	
2	150	900	453	
3	200	674	675	
4	1020	586	786	
5	640	964	965	

GPH1 GPH2 GPH3 SEL SET

Step Two:

Set the calculator up to draw a Box and Whisker Plot in **GPH2** (Graph 2) for Set B and **GPH3** (Graph 3) for Set C using **[F6] SET**.

```
StatGraph2
Graph Type : MedBox
XList      : List2
Frequency  : 1
Graph Color : Blue
```

Blue Orn3 Grn

```
StatGraph3
Graph Type : MedBox
XList      : List3
Frequency  : 1
Graph Color : Blue
```

Blue Orn3 Grn

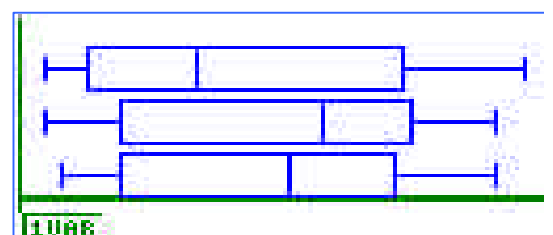
Step Three:

Draw the graphs simultaneously by key pressing **[F4] SElect** and making all StatGraphs **DrawOn**.

```
StatGraph1 : DrawOn
StatGraph2 : DrawOn
StatGraph3 : DrawOn
```

On Off DRAW

Push **[F6]** to draw the 3 graphs together.



Further Problems to Try

The lengths of the lateral stems of a pea plant species were measured and the following data was recorded in centimetres:

34, 12, 16, 41, 37, 39, 23, 53, 52, 31, 63, 24, 29, and 54.

1. Display the data in a Box and Whisker Plot.
2. Compare these two sets of data using a Box and Whisker Plot, and the 5-point data set.

Set A: 40, 6, 15, 42, 23, 25, 38, 23, 13, 34, 25, 17, 7, 19, 22

Set B: 23, 6, 45, 4, 38, 41, 16, 41, 45, 23, 34, 35, 11, 32, 30

3. Students were tested firstly in Statistics, then in Algebra. The following results were obtained:

Name	Sue	John	Tom	Georgie	Ana	Rebekah	Callum	Tracey	Fred	Jarrhyd
Statistics	10	14	17	21	24	25	27	28	30	36
Algebra	8	10	14	15	17	20	18	21	26	25

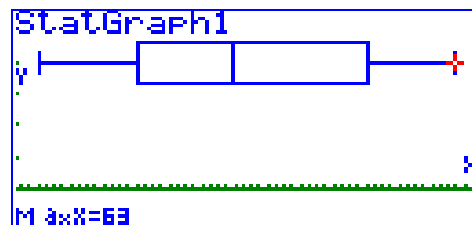
Draw box and whisker graphs to compare the Statistics results with the Algebra results.

A Box Plot from Scratch.

Further Problems to Try – Answers

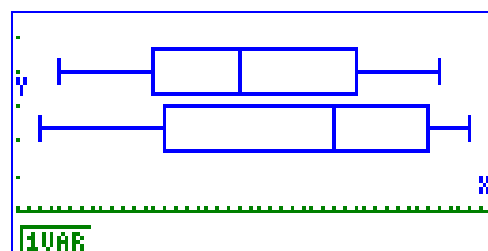
Min	LQ	Med	UQ	Max
12	24	35.5	52	63

1.



	Min	LQ	Med	UQ	Max
Set A	6	15	23	34	42
Set B	4	16	32	41	45

2.



	Min	LQ	Med	UQ	Max
Statistics	10	17	24.5	28	36
Algebra	8	14	17.5	21	26

3.

