

4.1 Box and whisker diagrams

Here are the English test percentage marks of 31 pupils

57	72	63	58	57	20	37	45	28
42	51	48	35	64	55	23	59	46
54	50	56	63	60	37	47	74	67
58	54	36	65					

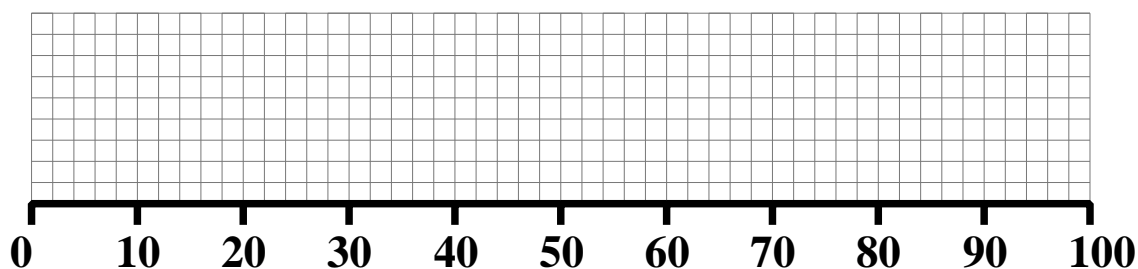
Suppose it was wished to work out the interquartile range. An immediate problem in doing so is the fact that the data is not in order. Rather than try to order the data by hand, it could be entered into a computer. Using a spreadsheet (such as Excel) ordering it is then easy.

Here is the same data, in order.

20	23	28	35	36	37	37	42	45
46	47	48	50	51	54	54	55	56
57	57	58	58	59	60	63	63	64
65	67	72	74					

4.2 Example

From the ordered English test data, work out the lower and upper quartiles, and the median. Hence plot a box and whisker diagram.



4.3 Exercise

Question 1

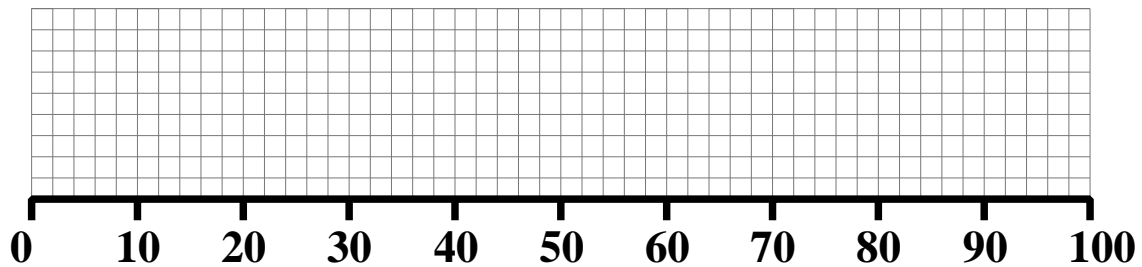
A supermarket knows the age of each person who pays for their shopping using a loyalty card. They are interested in the 'age profile' of their customers.

The data reveals that the lowest age was 18 (persons below that age cannot own a loyalty card) and the highest was 98.

The lower quartile was 30 and the upper quartile was 68.

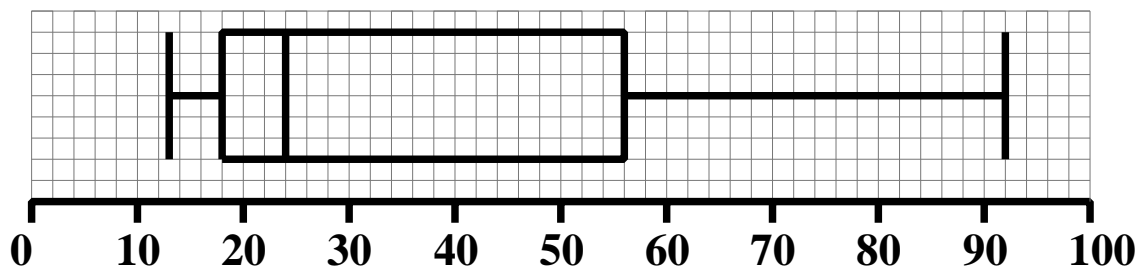
The median age of the shoppers was 44.

Plot a box and whisker diagram to show this information.



Question 2

The box and whisker diagram below shows the age profile of all persons with a facebook account. (Note: you must be 13 or over to have such an account)



Age of facebook account holder

- State
- (i) the lower quartile
 - (ii) the upper quartile
 - (iii) the interquartile range
 - (iv) the median age

The data is skewed: What do you think this might mean ?

Question 3

In a 100 metre sprint the running time (in seconds) of 23 runners was as follows.

15.8 14.2 15.7 15.3 17.0 15.2 12.9 13.8 15.7
16.1 17.6 16.4 12.9 13.4 13.6 14.8 14.6 14.1
16.4 15.7 13.4 14.4 15.2

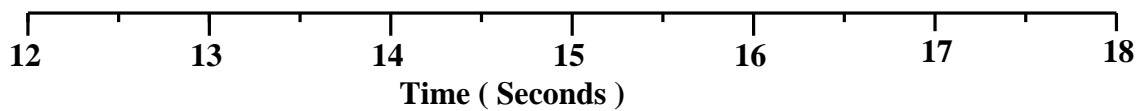
(a) Put the data in order.
 Take care to get this correct and try to get a methodical system going.

(b) Calculate the lower quartile.

(c) Calculate the upper quartile.

(d) Calculate the median.

(e) Plot a box and whisker diagram of the data.



(f) What is the interquartile range for this data ?

Question 4

Over the course of a lucky year, Lucy finds the following lucky seven coins simply sitting on the ground.

20p 50p £1 50p £2 20p 20p

Find the median of her lucky finds.

Question 5

Mr Hansen asked his lower sixth mathematics set how much pocket money they received each week.

Here are the thirteen replies;

£20 £10 £200 £25 £20 £10 £50
£20 £30 £30 £45 £20 £40

- (a) Arrange the data in order.
- (b) What is the median of the data ?
- (c) If each week, all the pocket money was put in one pile and then each of the thirteen pupils took an equal amount, (until the pile was empty) how much would each pupil get each week ?

This is called the **mean** value of the data.

- (d) Both the **median** and the **mean** can be said to be “the average”. Which of these two averages is the statistic that best represents the “average pocket money received per week” ? Explain your choice.

- (e) There is a third type of average called the mode. This is the value which occurs most often in the data. What is the mode of the pocket money data ?

Question 6

In a mathematics test the percentage marks of 31 pupils is as follows:

44	72	31	93	68	56	85	47	53
74	59	12	66	25	46	54	37	03
62	83	37	23	36	76	56	91	27
34	52	85	14					

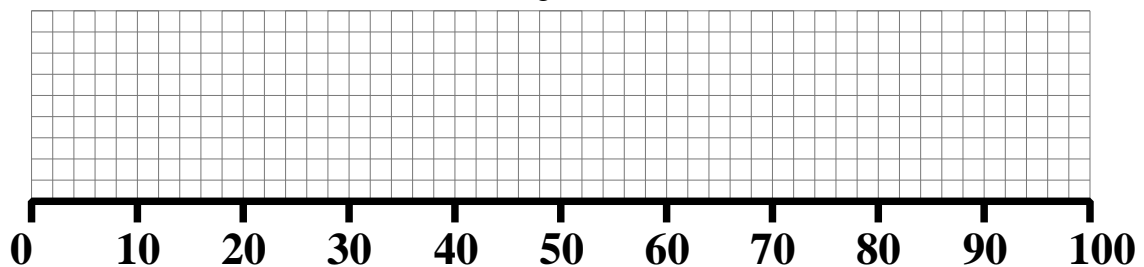
- (a) Put the data in order.
Take care to get this correct and try to get a methodical system going.

- (b) Calculate the lower quartile.

- (c) Calculate the upper quartile.

- (d) Calculate the median.

- (e) Plot a box and whisker diagram of the data.



- (f) What is the interquartile range for this data ?