

# Statistics

The aim of today's revision session is to ensure that you can find the mean, median mode and range of a data set (a list of numbers). We will also refresh your memory on how to draw and interpret stem-and-leaf diagrams and scattergraphs.

## Mean, median, mode and range

To calculate the mean of a data set (list of numbers), find the total and divide by the size of the data set (number of numbers in the list).

For example, to find the mean of 24, 36, 72, 48: -

- Find the total:  $24 + 36 + 72 + 48 = 180$
- Divide the total by 4 because there are 4 numbers in the data set:  $180 \div 4 = 45$
- The mean is 45

To find the mean of 27, 19, 19, 41, 33: -

- Find the total:  $27 + 19 + 19 + 41 + 33 = 139$
- Divide the total by 5 because there are 5 numbers in the data set:  $139 \div 5 = 27.8$
- The mean is 27.8

Notice that the mean of a group of whole numbers may not be a whole number.

Calculate the mean for these data sets: -

1) 17, 23, 19, 27

2) 60, 66, 66, 66, 72, 84

3) 46, 47, 48, 49, 53

4) 93, 95, 95, 97, 101, 101, 107, 113

To find the median of a data set, arrange it in order (smallest to largest) and select the middle number in the set: that's the median

For example, to find the median of 56, 87, 36, 29, 74:-

- Arrange the numbers in order: 29 36 56 74 87
- Find the middle number: 29 36 56 74 87
- The median is 56

If there are an even number of numbers in the set, find the middle two numbers, add them together and divide the answer by 2.

For example, to find the median of 56, 87, 36, 29, 43 and 74,

- Arrange the numbers in order: 29 36 43 56 74 87
- Find the middle two numbers: 29 36 **43 56** 74 87
- Add them together:  $43 + 56 = 99$
- Divide by 2  $99 \div 2 = 49.5$
- The median is 49.5

Now find the median for these data sets: -

5) 77, 64, 93, 81, 76

6) 4.6, 4.9, 5.1, 4.9, 4.9

7) 32, 36, 32, 37, 38, 29

8) 117, 129, 118, 132, 116, 109

The mode is the number which appears most often in a data set.

For example, for the set below, the mode is 17.

16, 17, 19, 17, 19, 17, 16

It is possible that all the numbers in a set are different. That means there is not a mode so just write "no mode".

Find the mode (if possible) for each of these data sets:-

9) 16, 18, 16, 19, 16, 15, 16

10) 78, 98, 66, 45, 106, 72

11) 33, 45, 64, 23, 34, 45, 38

12) 56, 67, 56, 56, 56, 67, 67, 78, 67, 67

The range tells us about the spread of a set of numbers.

Look at the scores two pupils received in their last five maths tests: -

Matthew: 34%, 89%, 93%, 67%, 18%

Lucy: 79% 78%, 71%, 80%, 75%

With only a few scores it is easy to see that Matthew's marks are all over the place, but Lucy's marks are pretty consistent. If there were hundreds or thousands of numbers in the set it would not be easy to notice this, so the range is calculated. To calculate the range, find the highest number in the set then the lowest number and subtract

For Matthew: -

- Highest mark = 93
- Lowest mark = 18
- Range =  $93 - 18 = 75$

For Lucy: -

- Highest mark = 80
- Lowest mark = 71
- Range =  $80 - 71 = 9$

Calculate the range for these sets of numbers: -

13) 116, 112, 117, 113, 119, 115, 118, 111

14) 46, 64, 44, 66, 46, 64, 44

15) 799, 987, 998, 978, 788, 879

16) 17, 17, 17, 17, 17, 17, 17, 17

## Stem-and-leaf diagrams

A stem-and-leaf diagram is a way of displaying a list of numbers.

For example, if you checked the price of a packet of salt and vinegar crisps in ten different shops your data may look like this:-

80 65 45 65 50 65 55 65 60 70 75 70

It is helpful to arrange the numbers in order because that makes it easier to pick out the highest and lowest prices and it is obvious if more than one shop is charging the same price.

45 50 55 60 65 65 65 65 70 70 75 80

Taking a new row for prices in the forties, fifties, sixties etc. is almost a stem-and-leaf diagram.

45

50 55

60 65 65 65 65

70 70 75

80

Organising the data in this way makes it clear that half of the shops are charging between sixty and seventy pence for the crisps.

To save writing in a stem-and-leaf diagram we only write the forty, fifty sixty or whatever once and we include the number of prices in the diagram and an explanation of what each number means (the “key”)

### Price of a packet of Salt and Vinegar Crisps

*Title* ←

4		5
5		0 5
6		0 5 5 5 5
7		0 5
8		0

n = 10      4 | 5 means 45p

↖  
*Number of prices*

↖  
*Key*

### 1) Prices of a 330ml can of Diet Coke

5		9
6		5 9
7		0 5 5 5 9 9
8		5
9		0

n = 11      5 | 9 means 59p

- a) How many prices were recorded?
- b) What is the highest price for a can of Diet Coke?
- c) What is the lowest price?
- d) What is the most common price?
- e) How many shops are charging more than 80p?
- f) How many shops are charging less than 70p?

### 2) Pay in a year

1		6 7 7 8 9 9
2		0 0 1 3 5 6 7 8 8 8 8 8 9
3		0 6 7
4		1
5		
6		7

n = 24      3 | 3 means £33 000 per year

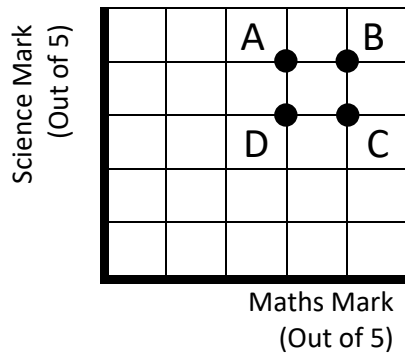
- a) How many people were asked about their pay?
- b) What is the lowest pay in a year?
- c) What is the highest pay in a year?
- d) What was the most common pay?
- e) How many people earned more than £30 000 in a year?
- f) How many people earned less than £30 000 in a year?

3) A biologist measured the length of a sample of 10 worms. Here is his data:-

4.5cm, 5.6cm, 6.2cm 5.6cm, 5.5cm, 4.9cm 3.2cm, 4.6cm, 3.9cm, 4.8cm

Display this data in a stem-and-leaf diagram. Remember to include a title, "n=" and a key.

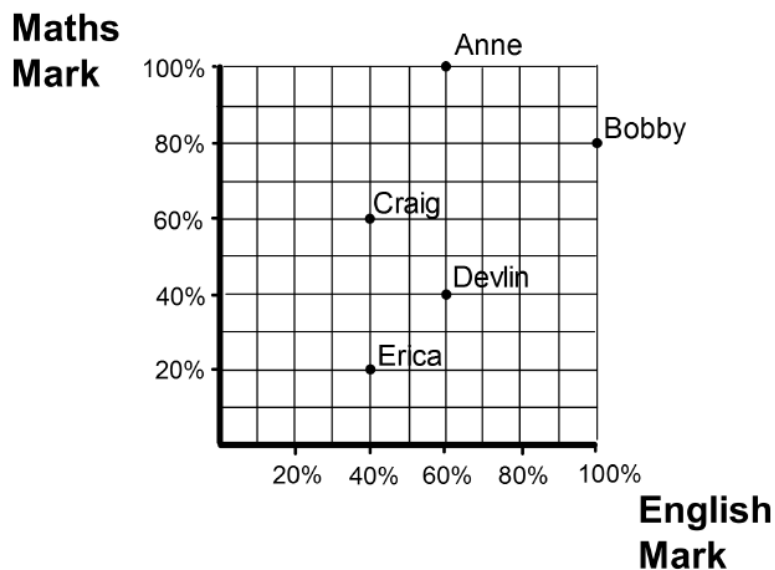
## Scattergraphs



In this scattergraph :-

- A scored 3/5 in maths and 4/5 in science
- B scored 4/5 in maths and 4/5 in science
- C scored 4/5 in maths and 3/5 in science
- D scored 3/3 in maths and 3/5 in science

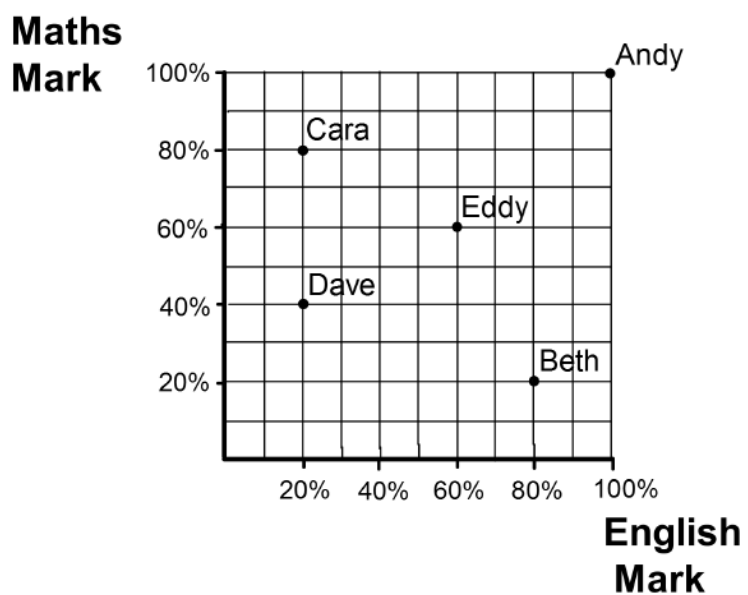
1) Look at the scattergraph below.



- Who scored 60% in English and 100% in maths?
- Who scored 20% in maths and 40% in English?
- Who scored 60% in English and 40% in maths?
- Who scored 80% in Maths and 100% in English?
- Who scored 40% in English and 60% in maths?

Continued below ↓

2) Look at the graph below and write down the maths and English marks for each person.



3) Draw a similar graph in your jotter and plot a scattergraph for the following results:-

Name	English	Maths
Amy	20%	30%
Betty	90%	50%
Cedric	60%	80%
Dawn	40%	50%
Edith	90%	90%