Analysing data (1)

- Understanding that statistics can be misleading
- Constructing a stem and leaf diagram
- Calculating the range, mean, median and mode from a stem and leaf diagram

Keywords

You should know

explanation 1a | explanation 1b | online

1 These are the masses in kilograms of 15 rugby players.

81, 110, 92, 95, 115, 118, 99, 95, 100, 102, 88, 89, 100, 111, 103

Work out these statistics for the data.

a the range **b** the mode

c the mean **d** the median

2 An Olympic 100 m sprinter ran these times, measured in seconds, in her last 8 competitive races.

12.82, 12.79, 12.02, 12.01, 12.88, 12.05, 12.52, 11.99

Work out these statistics for the data.

a the range **b** the mode **c** the mean **d** the median

3 The mean of these numbers is 6. Calculate the value of x.

3, 8, 15, 7, x, 1

4 The median of these numbers is 8. Work out the value of m.

m, 20, 1, 3, 11, 6

5 These integers are written in ascending order.

6, 7, 7, 8, a, b, 19, 20

a The mean of the eight numbers is 12. Calculate the possible values of a and b.

b It is also known that the median of the eight numbers is 11.
What are the only possible values for a and b?

6 The five players in a 5-a-side hockey team have these masses in kilograms.

60, 64, 58, 57, 61

a Calculate the total mass of the five players.

b Calculate the mean mass of the five players.

c The mean mass of the five players and the substitute is 61 kg.
Calculate the mass of the substitute.

7 Peter and Amelia, play three games. Some of their scores are given in the table. Their scores have the same mean. The range of Peter's scores is twice that of Amelia's scores. Copy and complete the table.

Peter		44	
Amelia	38	45	49

explanation 2

8 Assad scored these marks out of 20 in his last eight maths tests.

4, 5, 20, 20, 3, 6, 2, 7

a Calculate these averages for the data.

i the mean **ii** the median **iii** the mode

b Assad says that his average test score is 20. Is this true?

c In this case, which average is the best indicator of his results?
Give reasons for your answer.

9 A manufacturer of batteries tests the life of the batteries by testing ten of them.
Here are the number of hours each battery lasted.

14.5, 16.2, 17.1, 3.3, 16.0, 17.2, 17.8, 3.3, 18.1, 17.0

a Find these averages for the ten batteries tested.
Give your answers in hours and minutes.

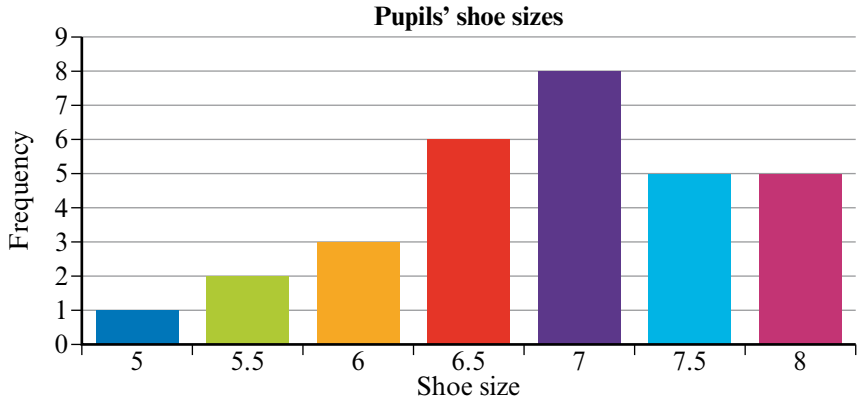
i the mean **ii** the median **iii** the mode

b A rival battery manufacturer claims that these results show that on average the batteries only last 3.3 hours.
Is this claim true? Give reasons for your answer.

c Explain, giving reasons, which is the most useful form of average for this data.

explanation 3 online

10 The shoe sizes of 30 pupils in a class are shown in the bar chart.



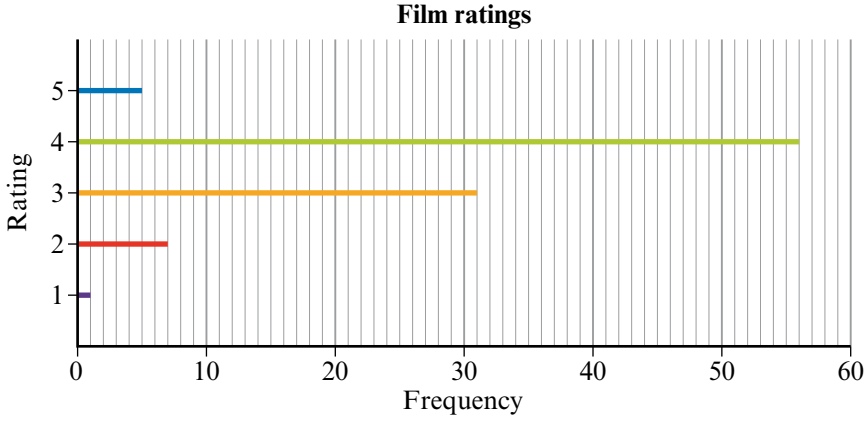
a How many pupils have a shoe size of 6?

b Calculate the mean shoe size of the 30 pupils.

c Calculate the median shoe size of the pupils.

d What is the modal shoe size of the pupils?

11 Reviewers were asked to preview a film and give it a rating from 1 to 5. A score of 1 meant it was awful and 5 meant it was excellent. Their responses are shown in the bar-line chart.



a How many people took part in the survey?

b How many people rated the film excellent?

c Calculate the mean rating for the film.

d Find the median rating for the film.

e What is the modal rating for the film?

explanation 4

12 25 caterpillars were measured.
Their lengths in millimetres are shown in this stem and leaf diagram.

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

Key: 2|1 represents a length of 21 mm

a Write the length of the shortest and the longest caterpillars measured.

b Find the modal caterpillar length.

c What is the median caterpillar length?

The caterpillars were fed for 2 weeks and their lengths recorded again.
It was found that all their lengths had increased by 5 mm.
How will this affect these statistics?

d the range of the lengths

e the modal length

f the mean and median length

13 20 girls and 20 boys sat the same maths test. These are their results out of 50.

Girls: 28, 32, 26, 21, 33, 33, 42, 7, 12, 14, 28, 50, 48, 14, 20, 38, 33, 32, 27, 22
Boys: 37, 26, 32, 32, 27, 2, 36, 7, 27, 33, 33, 36, 5, 7, 37, 36, 12, 31, 32, 12

a Draw a stem and leaf diagram for the girls' results and another for the boys' results.

b Write the modal results for the girls and for the boys.

c Calculate the median result for the girls and for the boys.

d Calculate the range of the girls' results and the range of the boys' results.

e Calculate the mean result for the girls and the mean result for the boys.

f Use your answers to write a short paragraph comparing the girls' and boys' results.

14 This back-to-back stem and leaf diagram shows the heights of two varieties of sunflower.

Calculate the mean and median heights of each variety of sunflower.

Variety A		Variety B
9 6 6 4	12	8
8 5 0	13	1 6 9
9 7 5 5 3 2 2	14	1 3 7 8
8 7 3 1 0	15	2 6 6 8 9
2	16	2 2 4 7 7
	17	3 5

Key 13|1 represents a height of 131 cm for variety B
5|13 represents a height of 135 cm for variety A

15 The table shows times in seconds in the semi-finals and final for the men's 100 m at a major athletics tournament.

	Position							
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Semi-final 1 time (s)	9.95	9.97	9.97	10.02	10.12	10.22	10.28	10.28
Semi-final 2 time (s)	10.07	10.09	10.11	10.22	10.28	10.29	10.32	10.35
Final time (s)	9.85	9.86	9.87	9.89	9.94	10.00	10.10	10.11

a Copy and complete the back-to-back stem and leaf diagram below.

Final		Semi-final
	10.3	
	10.2	
	10.1	
	10.0	
	9.9	5 7 7
6 5	9.8	

Key 9.9|5 represents 9.95 s in the semi-final
5|9.8 represents 9.85 s in the final

b By carrying out appropriate calculations comment on any differences in the distributions of the results for the semi-finals and the final.