

> 3.1 Mode, median, mean and range

We are going to ...

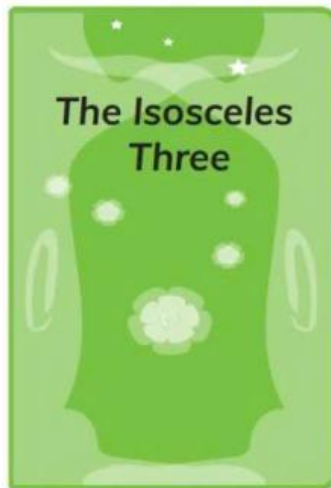
- find the mode and median of sets of data
- find the mean and range of sets of data
- use the average and range to describe sets of data and answer questions.

Averages can help you solve problems and make decisions. When people review a book out of 10 all their reviews are put together and the average number is found. Look at these book review scores:

average	bimodal
mean	median
mode	range



Average
6 out of 10



Average
7 out of 10

How do you think the averages were worked out?

Is it possible that nobody scored *The Midnight Story* 6 out of 10?

Is it possible that someone scored *The Isosceles Three* 0 out of 10?

The average represents what a typical person might think about the book.

How can you use the average score to help you decide if you want to read one of the books?

Worked example 1

What is the mean of these heights?

138 cm, 140 cm, 136 cm, 141 cm, 142 cm, 137 cm

$$138 + 140 + 136 + 141 + 142 + 137 = 834$$

Add all the heights together.

You can use mental or written methods, or use a calculator as appropriate.

There are 6 heights in the set of data.

Count how many heights there are in the set of data.

$$834 \div 6 = 139$$

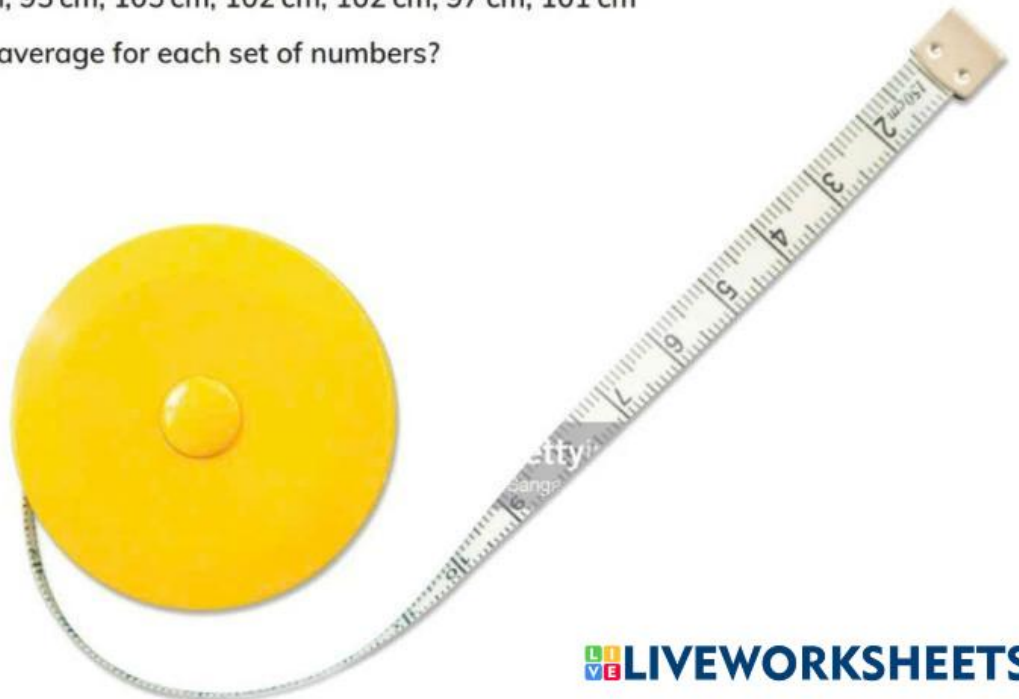
Divide the total of all the heights by the number of heights in the set of data

The mean average of the heights is 139 cm

Make sure you write your answer using the correct units.

Exercise 3.1

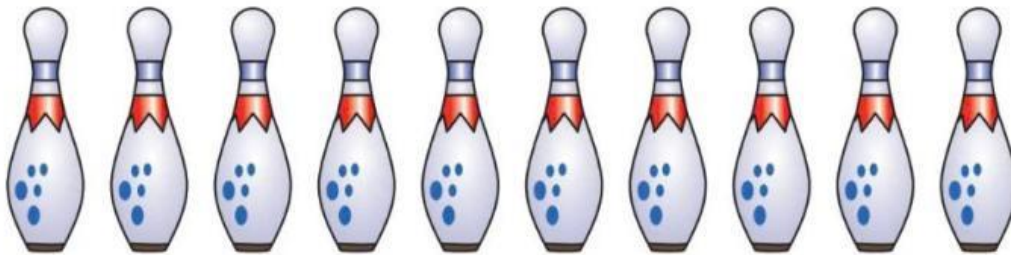
- 1 Write the modes and median of each set of measures.
 - a 4 cm, 4 cm, 5 cm, 5 cm, 6 cm, 7 cm
 - b 51 mm, 47 mm, 51 mm, 53 mm, 59 mm, 59 mm
 - c 1.2 m, 1.8 m, 1.1 m, 2.1 m, 1.2 m, 1.8 m, 1.6 m, 1.4 m
 - d 101 cm, 106 cm, 95 cm, 105 cm, 102 cm, 102 cm, 97 cm, 101 cm
- 2 What is the mean average for each set of numbers?
 - a 5, 6, 7
 - b 9, 9, 2, 8
 - c 10, 12
 - d 2, 3, 4, 5, 6



- 3 a Which of these bowlers has the highest mean average bowling score after six games?

Tip

You could use a calculator or computer to add and divide the numbers.



	Game					
	1	2	3	4	5	6
Player A	95	108	99	120	95	101
Player B	109	130	124	111	145	131
Player C	138	130	151	157	153	165
Player D	98	154	160	91	129	118

- b Players B and D both have the same average bowling score. Which do you think is the better player? Write a sentence to convince your partner that B or D is better. Use information from the table in your sentence.

- 4 Find the range of each set of numbers.

- a 1, 2, 3, 4 b 7, 7, 12, 2
 c 34, 33, 70, 5, 6, 8 d 26, 21, 35, 63, 30
 e 11, 10, 15, 13, 11 f 25, 34, 28, 29
 g 91, 105, 116

Tip

To find the range, subtract the lowest value from the highest value.



3 Averages

- 5 Find the range in heights of these two groups of children.

Group 1		Group 2	
127 cm	130 cm	137 cm	131 cm
152 cm	138 cm	129 cm	143 cm
135 cm	138 cm	136 cm	143 cm
141 cm		132 cm	

Which group has the largest range?

Describe how the two groups would look different because of their different ranges.

- 6 Kali, Summer, Benji and Kyle are learning to skip.

While they were practising they recorded how many skips they did in a row.

Here are their attempts:



	1st try	2nd try	3rd try	4th try	5th try	6th try	7th try
Kali	6	5	6	6	8	11	7
Summer	3	0	3	8	0	7	0
Benji	0	0	1	0	4	0	2
Kyle	4	7	7	6	2	5	4

- a Copy and complete this table:

	Range	Mode	Median	Mean
Kali				
Summer				
Benji				
Kyle				

- b Who do you think has been most successful at skipping?
Explain your answer using the information in your table.

Reflect on how well you are remembering which measure is which and the words mode, median, mean and range. Do you have a good strategy for remembering? If not, ask someone-else about their strategy.

- 7 Gabriella and Demi have recorded the temperature in the shade at midday on every day of their six week school holiday.

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Week 1	25 °C	20 °C	20 °C	19 °C	20 °C	24 °C	26 °C
Week 2	25 °C	25 °C	28 °C	27 °C	28 °C	31 °C	25 °C
Week 3	28 °C	27 °C	27 °C	27 °C	24 °C	22 °C	20 °C
Week 4	15 °C	19 °C	23 °C	19 °C	16 °C	15 °C	19 °C
Week 5	18 °C	19 °C	20 °C	23 °C	25 °C	28 °C	28 °C
Week 6	32 °C	32 °C	32 °C	27 °C	29 °C	28 °C	30 °C

- Design a table to record the three types of average and the range for each week of the holiday. Complete your table with the averages and range.
- Which week had the greatest range of temperatures?
- Use the information in your table to argue which was the warmest week of the holiday.
- Gabriella and Demi were taking part in a conservation project on every Tuesday of the holiday. What was the range of temperatures on Tuesdays? What was the average (mode, median and mean) temperature on Tuesdays?

Look what I can do!

- ☐ I can find the mode and median of sets of data.
- ☐ I can find the mean and range of sets of data.
- ☐ I can use the average and range to describe sets of data and answer questions.

Check your progress

1 Write the mode, median, mean and range for each set of numbers.

- a 4, 7, 5, 4, 10
- b 7, 3, 13, 1, 7, 5
- c 21, 29, 31, 40, 29, 30
- d 6, 9, 12, 15, 11, 14, 11, 6

2 Seven buckets were put out to collect money for a charity.

The amounts on the buckets show how much was collected in that bucket.



Work out the mode, median and mean of the amounts collected.

Which best describes the average amount of money collected? Why?