

Title: Averages

LO: 2ba2 calculate averages of data applying a set of data rules.

Starter

Put these sets of data in order from **smallest** to **largest**:

a) 8, 4, 6, 2, 9, 5, 3, 1

b) 7, 4, 7, 5, 4, 3, 2, 8, 9

c) 3, 5, 0, 9, 6, 7, 1, 6

d) 74, 96, 51, 63, 87, 99, 63, 80

e) 0.2, 0.21, 0.02, 0.22, 2, 1.8

Averages

An average summarises groups of data.

Median, mode and mean are types of average.

The range is how far from the smallest to the largest piece of data.

Mode

Mode is the **most** common number

1. Put the numbers in order
2. Choose the number that appears the most frequently.
3. Sometimes there may be more than one mode.

Example:

Class shoe sizes: 3, 5, 5, 6, 4, 3, 2, 5, 6

Put in order: 2, 3, 3, 4, 5, 5, 5, 6, 6



The mode is 5

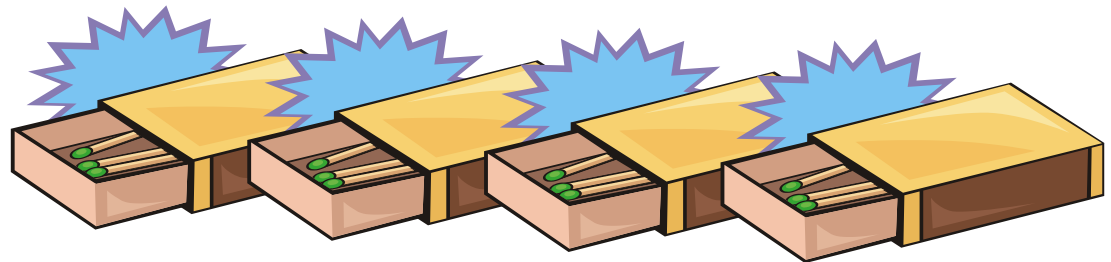
Mode

The number of matches in 14 boxes were counted and recorded below. Find the **mode** of the data.

48, 49, 50, 51, 49, 49, 55, 47, 50, 50, 50

47, 48, 49, 49, 49, 50, 50, 50, 50, 51, 55

Mode = 50



Mode

RED		AMBER		GREEN	
2, 4, 4, 6, 7, 8		16, 15, 19, 17, 16, 14		11, 13, 12, 14, 15, 13, 16	
4, 7, 9, 9, 9, 10, 11, 13		45, 54, 34, 45, 36, 40		57, 56, 52, 51, 52, 54	
3, 5, 2, 4, 5, 6, 5		99, 92, 100, 92, 97, 98		87, 82, 88, 89, 88, 82	
23, 24, 21, 23, 25		5, 6, 8, 9, 5, 8, 8, 7		23, 24, 28, 29, 31, 22	

Work out the mode for each row of numbers.

Extension: Write a set of numbers with a mode of 18.

Median

The **median** is the **middle** value

1. Put the numbers in order
2. Cross off the numbers from both ends of the list
3. The median is the one in the middle
4. If there are 2 numbers in the middle then it is halfway between them.

Example:

Class shoe sizes: 3, 5, 5, 6, 4, 3, 2, 5, 6

Put in order: ~~2~~, ~~3~~, ~~3~~, ~~4~~, 5, 5, ~~5~~, ~~6~~, ~~6~~



The class median shoe size is 5

Median

Robert hit 11 balls at Grimsby driving range. The recorded distances of his drives, measured in yards, are given below. Find the **median** distance for his drives.

85, 125, 130, 65, 100, 70, 75, 50, 140, 95, 70

~~50~~, ~~65~~, ~~70~~, ~~70~~, ~~75~~, 85, ~~95~~, ~~100~~, ~~125~~, ~~130~~, ~~140~~



Median drive = 85 yards

Median

RED	AMBER	GREEN
2, 4, 4, 6, 7, 8, 5	16, 15, 19, 17, 16, 14, 15	1, 13, 12, 14, 15, 13, 16
4, 7, 9, 9, 9, 10, 11, 13,	45, 54, 34, 45, 36, 40, 39	7, 56, 52, 51, 52, 54
3, 5, 2, 4, 5, 6, 5	99, 92, 100, 98, 97, 98	7, 82, 88, 89, 88, 82
23, 24, 21, 23, 25	5, 6, 8, 9, 5, 8, 8, 7	3, 24, 28, 29, 31, 22

Work out the median for each row of numbers and record

Extension: Write a set of numbers with a median of 12.

Mean

Mean is **mean** to work out!

1. Add all the numbers together
2. Divide that answer by the amount of numbers you had to begin with

Example:

Class shoe sizes: 3, 5, 5, 6, 4, 3, 2, 1, 5, 6

Add together: $3 + 5 + 5 + 6 + 4 + 3 + 2 + 1 + 5 + 6 = 40$

Divide by the amount we started with: $40 \div 10 = 4$

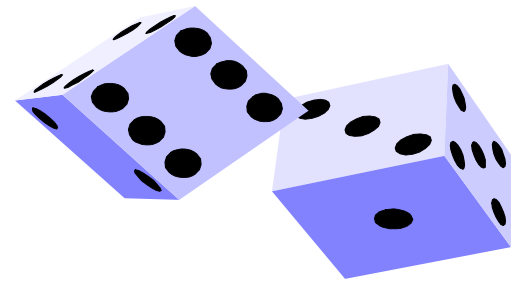
So the **mean** is 4.

Mean

Two dice were thrown 10 times and their scores were added together and recorded. Find the **mean** for this set of data.

7, 5, 2, 7, 6, 12, 10, 4, 8, 9

$$\begin{aligned}\text{Mean} &= \frac{7 + 5 + 2 + 7 + 6 + 12 + 10 + 4 + 8 + 9}{10} \\ &= \frac{70}{10} = 7\end{aligned}$$



Mean

RED		AMBER		GREEN	
2, 4, 4, 6, 7, 8, 4	<input type="text"/>	16, 15, 19, 17, 16, 14, 15	<input type="text"/>	11, 13, 12, 14, 15, 13, 13	<input type="text"/>
4, 7, 9, 9, 9, 10, 11, 5		39, 54, 34, 45, 36, 40, 39		57, 56, 52, 51, 52, 51	
3, 5, 2, 4, 5, 6, 3		99, 92, 100, 98, 97, 108		87, 82, 88, 89, 88, 82	
23, 24, 21, 23, 19		5, 6, 8, 9, 5, 8, 8, 7		23, 24, 28, 29, 31, 24	

Work out the mean for each row. Use your calculator!

Extension: Write a set of numbers with a mean of 8.

Range

Range is how **far** from biggest to smallest.

1. Put the numbers in order
2. Take the smallest number away from the largest.

Example:

Class shoe sizes: 3, 5, 5, 6, 4, 3, 2, 5, 6

Put in order: 2, 3, 3, 4, 5, 5, 5, 6, 6

Smallest number is 2, largest number is 6

$$6 - 2 = 4$$

So the range = 4

Range

Twenty students sat a Maths test. Their marks out of 10 are recorded below. Find the **range** of test results.

2, 5, 9, 3, 7, 8, 6, 3, 4, 3, 2, 7, 9, 5, 8, 7, 2, 5

Smallest number 

Largest number 

$$9 - 2 = 7$$

So the **range** is 7



Range

RED	AMBER	GREEN
2, 4, 4, 6, 7, 8, 4	16, 15, 19, 17, 16, 14, 15	11, 13, 12, 14, 15, 13, 16
4, 7, 9, 9, 9, 10, 11, 5	45, 54, 34, 45, 36, 40, 39	57, 56, 52, 51, 52, 54
3, 5, 2, 4, 5, 6, 3	99, 92, 100, 98, 97, 98	87, 82, 88, 89, 88, 82
23, 24, 21, 23, 19	5, 6, 8, 9, 5, 8, 8, 7	23, 24, 28, 29, 31, 22

Work out the range for each row of numbers

Extension: Write a set of numbers with a range of 22.

How confident do you feel with this topic?



Red worksheet/crossword – Harder



Amber Worksheet/Crossword – Medium



Green Worksheet/Crossword - Easier

Plenary

Use the information given to work out the set of data:

$$\underline{\text{Mode}} = 3$$

$$\underline{\text{Median}} = 5$$

$$\underline{\text{Range}} = 7$$

$$\underline{\text{Mean}} = 6$$