

Problems with the median

In the examples above, there are an **odd number** of data values.

E.g. Discuss with a colleague how we could deal with the issue of finding the median when there are an **even number** of data values e.g. 7, 3, 9, 4, 8, 1, 5?

Working: With an **odd number** of data values, there is **always a middle number**.
With an **even number** of values, there are **two numbers in the middle**.
To deal with this issue, we calculate the mean of the two numbers in the middle.

To find the median when there are an even number of data values:

1. Write the data values in ascending order.
2. Calculate the mean of the two data values in the middle.

E.g. 3 Find the **median** for the following sets of data:

- (a) 148, 162, 159, 158, 149, 147 (b) 18, 6, 42, 31, 29, 13, 7, 37

E.g. 4 State the **mode** for the following sets of data:

- (a) 75, 71, 86, 75, 92 (b) 23, 41, 35, 29, 18, 37, 23, 28, 34

Working: (a) 75, 71, 86, 75, 92 Mode = 75

Problems with the mode

E.g. Discuss possible solutions to these issues:

Problem 1: What happens when every data value appears the same number of times as all the others (e.g. each data value appears once: 7, 3, 9, 4, 8, 1, 5)?

Problem 2: What happens when two or more data values appear more times than the others (e.g. 7, 3, 9, 7, 8, 5, 5)?

Working: **Problem 1:** when each data value appears the same number of times, we say there is no mode.

Problem 2: a data set can have more than one mode. For 7, 3, 9, 7, 8, 5, 5, we would say the modes are 5 and 7.

N.B. When **each data value appears the same number of times**, we say there is **no mode**.
A data set **can have more than one mode**.

E.g. 5 State the **mode** for the following sets of data:

- (a) 138, 152, 119, 158, 138, 119 (b) 18, 6, 42, 31, 42, 18, 6, 31

E.g. 6 (a) For the data set 19, 3, 15, 19, 6, 61, 2, 7, calculate (i) the mean, (ii) the median and (iii) the mode.

(b) Decide which of your answers to (a) best describes the data.

Video: [Mean](#)

Video: [Median](#)

Video: [Mode](#)

Video: [Combined mean](#)

Exercise

CIMT 7B: p90 18.2 Qu 1-10

Summary

Average	How to find	Note
Mean	<i>Add up</i> the values and <i>divide by</i> the <i>number of values</i> .	Can be skewed if a small number of values are significantly different to the others.
Median	The <i>middle value when</i> the values are written <i>in ascending order</i> .	Good when a value (or small number of values) is much higher or much lower than the rest of the values.
Mode	The <i>most frequent</i> value.	Good when a value appears significantly more the others.

$$\text{Mean} = \frac{\text{Sum of values}}{\text{Number of values}}$$