Averages from lists

The Mean

A measure of average to find the central tendency… a typical value that represents the data

24, 8, 4, 11, 8,

Find the sum of the data (add the values)

55

Divide the overall total by how many pieces of data you have

55 ÷ 5

Mean = 11

The Mode (The modal value)

This is the number OR the item that occurs the most (it does not have to be numerical)

24, 8, 4, 11, 8,

This can still be easier if it the data is ordered first

Mode = 8

The Median

The value in the center (in the middle) of the data

24, 8, 4, 11, 8,

Put the data in order 4, 8, 8, 11, 24

Find the value in the middle 4, 8, 8, 11, 24

Median = 8

NOTE: If there is no single middle value find the mean of the two numbers left

For Grouped Data

The modal group – which group has the highest frequency

The range

To find the range you subtract the smallest value from the largest

Comparing distributions

Comparisons should include a statement of average and central tendency, as well as a statement about spread and consistency

Here are the number of runs scored last month by Lucy and James in cricket matches

Lucy: 45, 32, 37, 41, 48, 35

James: 60, 90, 41, 23, 14, 23

Lucy

Mean: 39.6 (1dp), **Median**: 38 **Mode**: no mode, **Range**: 16

James

Mean: 41.8 (1dp), **Median**: 32, **Mode**: 23, **Range**: 76

James has two extreme values that have a big impact on the range

"James is less consistent that Lucy because his scores have a greater range. Lucy performed better on average because her scores have a similar mean and a higher median"

Choosing the appropriate average

The average should be a representative of the data set – so it should be compared to the set as a whole - to check if it is an appropriate average

Here are the weekly wages of a small firm

£240	£240	£240	£240	£240
£260	£260	£300	£350	£700

Which average best represents the weekly wage?

The Mean = £307

The Median = £250

The Mode = £240

Put the data back into context

Mean/Median – too high (most of this company earn £240)

Mode is the best average that represents this wage

It is likely that the salaries above £240 are more senior staff members – their salary doesn't represent the average weekly wage of the majority of employers

Averages from a table

Non-grouped data- Mean

Number of people	Frequency	Number × Frequency
1	5	1 × 5 = 5
2	6	2 × 6 = 12
3	3	3 × 3 = 9
4	2	4 × 2 = 8
	n = 16	Total = 34

Mean = 34 ÷ 16 = 2.125

Non-grouped data- Median

Number of cars	Frequency	Cumulative Frequency
0	4	4
1	5	4 + 5 = 9
2	3	9 + 3 = 12
3	1	12 + 1 = 13
	Total = 13	

$\text{Median} = \frac{number\ of\ terms+1}{2}$

$\text{Median} = \frac{13+1}{2} = 7^{th}$ term

The 7^{th} term is 1 car

Gouped data- Mean

Marks scored	Frequency	Mid-point	Frequency × Mid-point
0 - 9	3	$\frac{0+9}{2} = 4.5$	3 × 4.5 = 13.5
10 - 19	5	$\frac{10+19}{2} = 14.5$	5 × 14.5 = 72.5
20 - 29	8	$\frac{20+29}{2} = 24.5$	8 × 24.5 = 196
30 - 39	4	$\frac{30+39}{2} = 34.5$	4 × 34.5 = 138
	n = 20		Total = 420

Mean = 420 ÷ 20 = 21

The median of a grouped table works exactly the same but your answer will be a group