

Mean, Median, Mode and Range

Maths **Level 2** Includes grouped frequency tables and comparing data sets · 9 questions · 30 marks

Remember

Mean = total $\div$ how many. **Median** = middle value when in order (with an even number of values, halfway between the two middle ones). **Mode** = most common. **Range** = biggest – smallest (a measure of *spread*, not an average).

Mean from a frequency table: multiply each value by its frequency, add them up, divide by the total frequency.

Estimated mean from a grouped table: use the **midpoint** of each group $\times$ frequency. It is an *estimate* because you do not know the exact values.

Section A – Raw data

1. The number of calls a receptionist took each day over two weeks was:

32, 41, 28, 41, 35, 30, 41, 26, 38, 33

(a) Find the mean. (b) Find the median. (c) Find the mode. (d) Find the range. (5 marks)

2. Six employees' weekly wages are £320, £340, £310, £360, £330 and £1,250 (the manager).

(a) Calculate the mean and the median. (b) The company says "the average wage here is over £480". Explain why this is misleading and which average gives a fairer picture. (4 marks)

3. A dance class has 8 students with a mean age of 27. A new student aged 45 joins. What is the new mean age? (3 marks)

Section B – Frequency tables

4. A survey asked 40 households how many cars they own.

Number of cars	0	1	2	3	4
Frequency	6	17	12	4	1

(a) Write down the mode. (b) Find the median. (c) Calculate the mean number of cars per household. (5 marks)

Section C – Grouped data

5. The table shows how long 50 customers waited at a pharmacy.

Waiting time, t (minutes)	Frequency	Midpoint	Midpoint $\times$ frequency
$0 \leq t < 5$	14		
$5 \leq t < 10$	21		
$10 \leq t < 20$	11		
$20 \leq t < 30$	4		

(a) Complete the table. (b) Calculate an estimate of the mean waiting time. (c) Which group contains the median? (d) The pharmacy's target is an average wait of under 10 minutes. Has it met the target? (6 marks)

6. Explain why your answer to 5(b) is only an *estimate*. (1 mark)

Section D – Comparing data sets

7. Two delivery drivers recorded their delivery times (minutes) over a week.

	Mean	Range
Driver A	34	9
Driver B	31	27

A customer wants deliveries that arrive at a **predictable** time. Which driver should the company use for that customer? Give **two** reasons using the statistics. (3 marks)

8. Marks in a Level 2 mock test for two groups were: Group 1 – median 58, range 30. Group 2 – median 58, range 12. Write one similarity and one difference between the groups. (2 marks)

9. Five numbers have a mode of 7, a median of 8 and a mean of 9. Write down a possible set of five numbers. (1 mark)

Mean, Median, Mode and Range – Answers

Level 2

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Section A

- (a) Total $345 \div 10 = \mathbf{34.5}$. (b) In order: 26, 28, 30, 32, 33, 35, 38, 41, 41, 41 → middle two are 33 and 35 → median **34**. (c) Mode **41**. (d) Range $41 - 26 = \mathbf{15}$.
- (a) Mean = $2,910 \div 6 = \mathbf{£485}$. Median: 310, 320, 330, 340, 360, 1,250 → $(330 + 340) \div 2 = \mathbf{£335}$.
(b) The manager's £1,250 is an outlier that drags the mean up; five of the six people earn less than £360. The **median (£335)** gives a fairer picture of a typical wage.
- Current total = $8 \times 27 = 216$. New total = $216 + 45 = 261$. New mean = $261 \div 9 = \mathbf{29}$.

Section B

- (a) Mode = **1**. (b) 40 values → median is between the 20th and 21st. Cumulative: 6, 23 ... both the 20th and 21st are in the "1" group → median **1**. (c) $(0 \times 6) + (1 \times 17) + (2 \times 12) + (3 \times 4) + (4 \times 1) = 0 + 17 + 24 + 12 + 4 = 57$. $57 \div 40 = \mathbf{1.425 \text{ cars}}$ (accept 1.4).

Section C

- (a) Midpoints 2.5, 7.5, 15, 25. Products: 35, 157.5, 165, 100. (b) Total $457.5 \div 50 = \mathbf{9.15 \text{ minutes}}$. (c) 50 values → 25th/26th. Cumulative: 14, 35 → median is in the $\mathbf{5 \leq t < 10}$ group. (d) **Yes** – 9.15 min is under 10 (accept "yes, but only just").
- Because we do not know each customer's exact waiting time – only which group it falls in – so we assume every value is at the midpoint.

Section D

- Driver A.** Reason 1: A's range (9) is much smaller than B's (27), so A's times are more consistent/predictable. Reason 2: although B is faster on average (31 vs 34 min), the difference is small compared with how much B's times vary. Both reasons must refer to the numbers for full marks.
- Similarity: same median (58), so the "typical" student scored the same. Difference: Group 1's range (30) is larger, so its marks are more spread out / Group 2 is more consistent.
- Any set that works, e.g. **7, 7, 8, 10, 13** (mode 7, median 8, total 45 → mean 9).

Where Level 2 students lose marks on averages

- Forgetting to put the data in order before finding the median.
- Dividing by the number of *groups* instead of the total *frequency* in a table.
- Comparing data sets by quoting numbers only – you must say what the numbers *mean* (e.g. "more consistent").