

Line Graphs and Time Series

Solutions

For AQA GCSE Mathematics (8300) • Foundation tier

Each question is shown in grey, followed by the working, one step per line. The final answer is in a box. *Marks* shows how the marks are usually given in the exam, and **Tip** points out a common mistake.

1 (3 marks)

Amy measures the height of a plant each week.

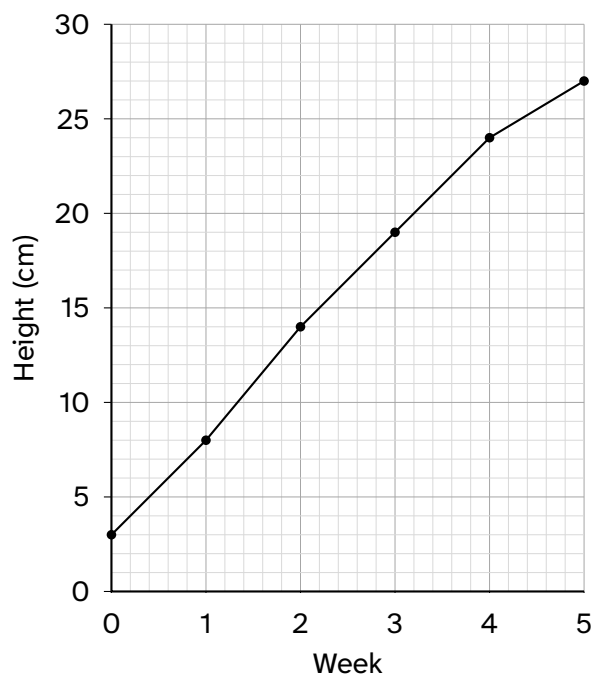
Week	0	1	2	3	4	5
Height (cm)	3	8	14	19	24	27

(a) Draw a line graph to show this information.

Plot each point from the table: (0, 3), (1, 8), (2, 14), (3, 19), (4, 24), (5, 27)

Each small square on the height axis is 1 cm.

Join the points with straight lines, using a ruler.



Answer: Points plotted and joined

Tip: Join the points with straight lines drawn with a ruler. Don't draw a curve or a line of best fit.

Marks: 2 marks for all points plotted and joined. 1 mark for four correct points.

- (b) Use your graph to estimate the height of the plant after $2\frac{1}{2}$ weeks.

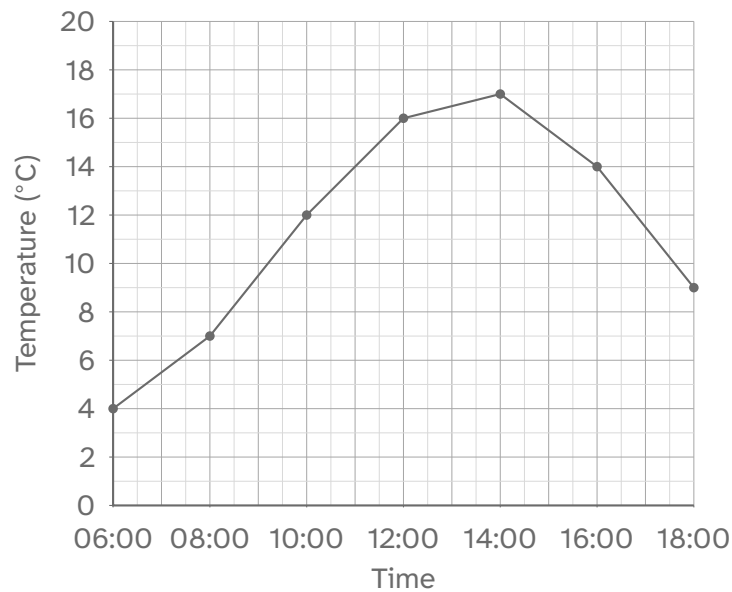
Go up from $2\frac{1}{2}$ weeks to your line, then across.

This is halfway between 14 and 19.

Answer: 16.5 (accept 16 to 17)

2 (4 marks)

The graph shows the temperature in a garden on one day.



- (a) Write down the temperature at 10:00

Go up from 10:00 to the line, then across to the temperature axis.

Each small square on this axis is 1°C.

Answer: 12

- (b) Between which two times did the temperature increase the most?

Look for the steepest line going up.

From 08:00 to 10:00 it goes from 7 to 12, a rise of 5°C.

The other rises are smaller (3, 4 and 1).

Answer: 08:00 and 10:00

- (c) Use the graph to estimate the temperature at 17:00

17:00 is halfway between 16:00 and 18:00.

Go up from 17:00 to the line and read across.

This is halfway between 14 and 9, which is 11.5.

Answer: 11.5 (accept 11 to 12)

- (d) Give a reason why your estimate of the temperature at 17:00 may not be accurate.

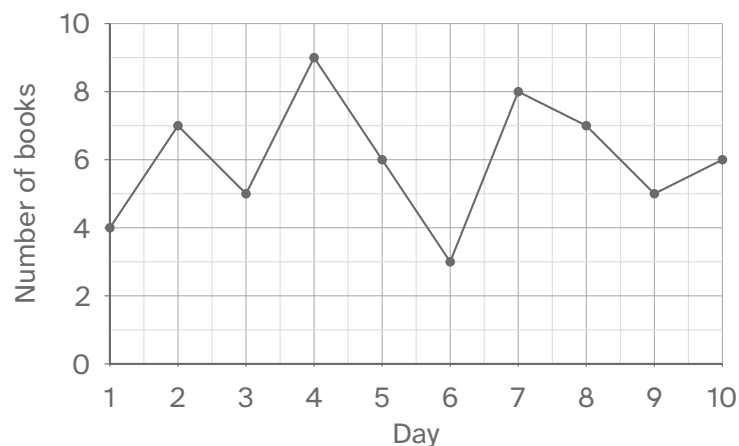
The temperature was only measured every two hours.

It may not have changed steadily between 16:00 and 18:00.

Answer: Readings only every 2 hours

3 (4 marks)

A library records the number of books returned late each day for 10 days.
The line graph shows this information.



- (a) Work out the mean number of books returned late per day.

Read the value for each day from the graph:

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

Total: $4 + 7 + 5 + 9 + 6 + 3 + 8 + 7 + 5 + 6 = 60$

There are 10 days.

$$\text{Mean} = 60 \div 10 = 6$$

Answer: 6

Tip: Use the numbers of books (on the vertical axis), not the day numbers.

Marks: 1 mark for the total 60 (or all ten values read correctly). 1 mark for 6.

- (b) On what percentage of the days were more than 6 books returned late?

More than 6 means 7 or more.

Days with more than 6: day 2 (7), day 4 (9), day 7 (8), day 8 (7).

That is 4 days out of 10.

$$\frac{4}{10} = 40\%$$

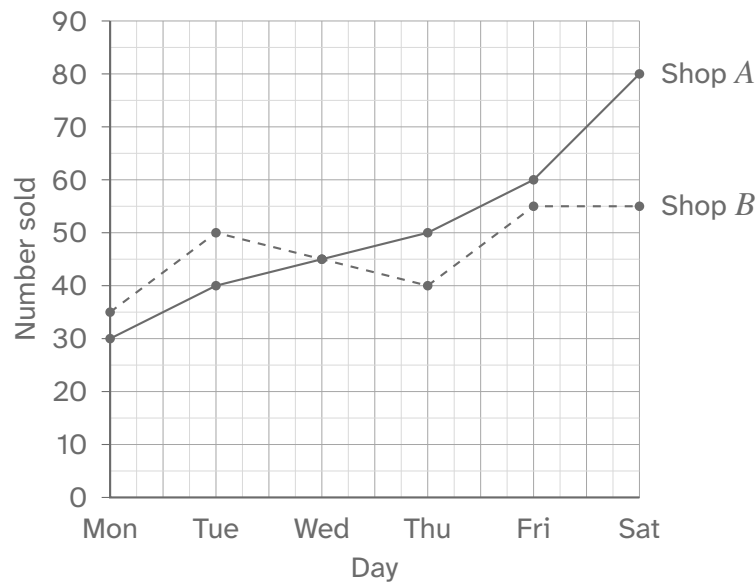
Answer: 40%

Tip: “More than 6” does not include the days with exactly 6.

Marks: 1 mark for 4 days (or $\frac{4}{10}$). 1 mark for 40%.

4 (4 marks)

The graph shows the number of ice creams sold by two shops, *A* and *B*, each day for six days.



- (a) On which day did the two shops sell the same number of ice creams?

The two lines meet on Wednesday.

Both shops sold 45 that day.

Answer: Wednesday

- (b) Work out the difference between the numbers sold by the two shops on Saturday.

Saturday: Shop *A* sold 80 and Shop *B* sold 55.

$$80 - 55 = 25$$

Answer: 25

- (c) Which shop sold more ice creams over the six days?

You must show your working.

$$\text{Shop A: } 30 + 40 + 45 + 50 + 60 + 80 = 305$$

$$\text{Shop B: } 35 + 50 + 45 + 40 + 55 + 55 = 280$$

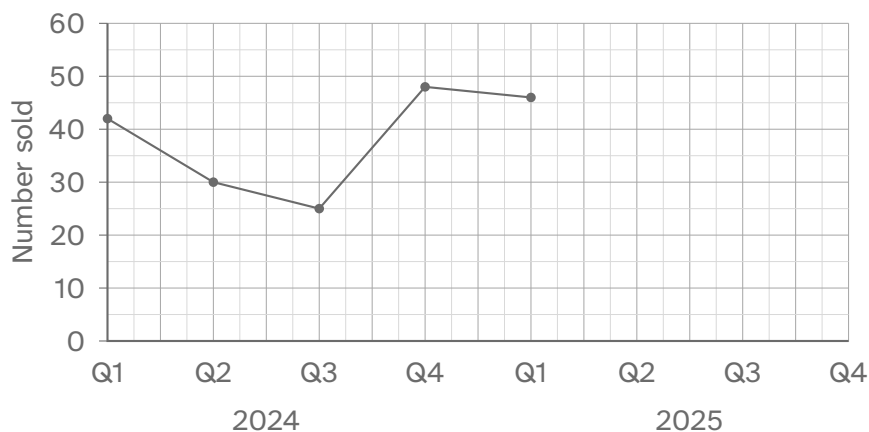
305 is more than 280.

Answer: Shop A (305 and 280)

Marks: 1 mark for one correct total. 1 mark for Shop A with both totals.

5 (3 marks)

The graph shows the number of bikes sold by a shop in each quarter of 2024 and in Quarter 1 of 2025.

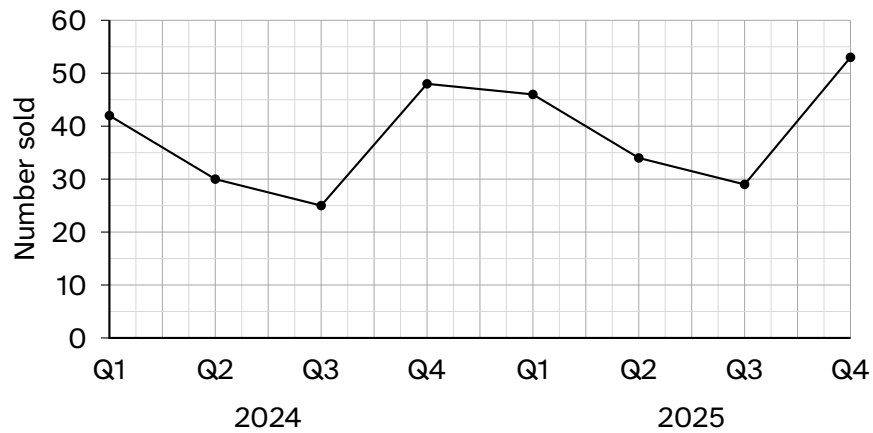


- (a) The sales for Quarters 2, 3 and 4 in 2025 were 34, 29 and 53
Complete the time series graph.

Plot the 2025 points: (Q2, 34), (Q3, 29), (Q4, 53).

Each small square on the vertical axis is 5.

Join each point to the next with a straight line.



Answer: Points plotted and joined

Marks: 2 marks for all three points plotted and joined. 1 mark for two correct points.

(b) Describe the pattern in the sales.

In both years, sales are highest in Quarter 4.

In both years, sales are lowest in Quarter 3.

Sales in 2025 are a little higher than in 2024.

Answer: Highest in Q4, lowest in Q3 each year

6 (4 marks)

A town council records the number of electric car charging points in the town at the start of each year.

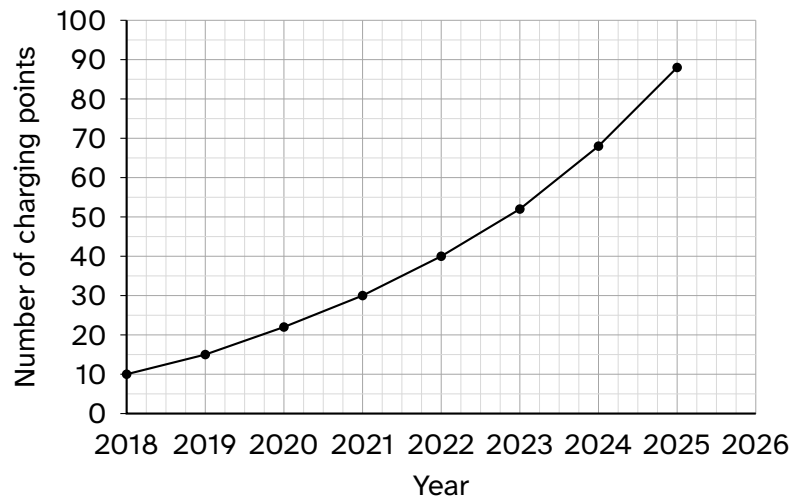
Year	2018	2019	2020	2021	2022	2023	2024	2025
Number	10	15	22	30	40	52	68	88

(a) Complete the graph.

Plot (2022, 40), (2023, 52), (2024, 68), (2025, 88).

Each small square on the vertical axis is 5 charging points.

Join the points with straight lines.



Answer: Points plotted and joined

Tip: Work out what one small square is worth before plotting. Here it is 5, so 52 is just above 50 and 68 is just below 70.

Marks: 2 marks for all four points plotted and joined. 1 mark for two or three correct points.

- (b) Describe the trend in the number of charging points.

The number goes up every year.

It also goes up by more each year: 5, 7, 8, 10, 12, 16, 20.

Answer: Increasing (by more each year)

- (c) The council says,

‘There will be more than 100 charging points at the start of 2026.’

Does the graph support this?

Give a reason for your answer.

Yes.

From 2024 to 2025 the number went up by $88 - 68 = 20$.

The increases have been getting bigger, so the increase for 2026 is likely to be at least 20.

$88 + 20 = 108$, which is more than 100.

Answer: Yes: continuing the trend gives about 108 or more
