

Scatter Graphs and Correlation

Maths

Level 2

Exam-style practice · 7 questions · 20 marks · Non-calculator

Remember

Correlation describes the relationship: **positive** (as one goes up, so does the other), **negative** (one goes up, the other goes down), or **no correlation**. Add **strong** or **weak** depending on how close to a line the points are.

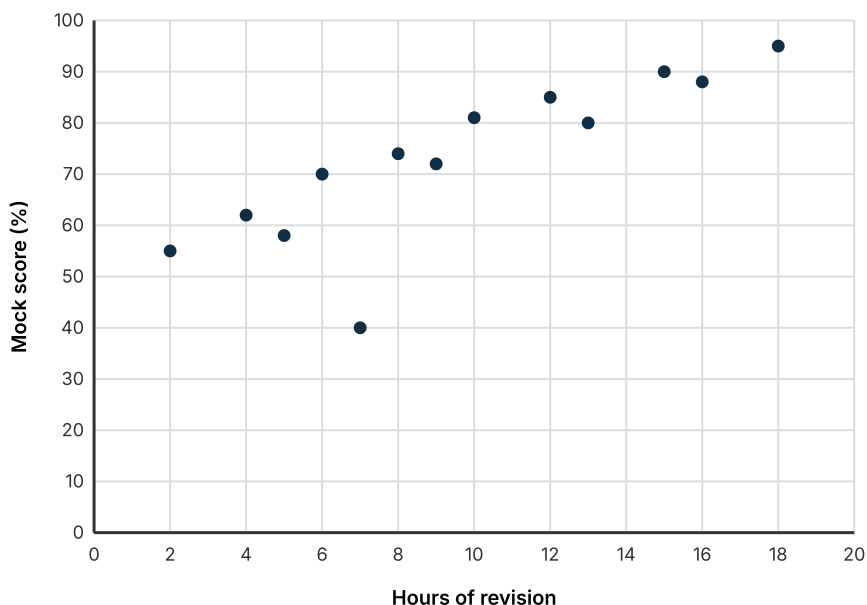
Line of best fit: a straight line, drawn with a ruler, that follows the trend with roughly equal numbers of points on each side. It does not have to go through (0, 0) or through any particular point.

Using it: read up from one axis to the line and across to the other. Reading *inside* the range of the data is reliable; *beyond* it (extrapolating) is a guess.

Outlier: a point that doesn't fit the pattern – mention it, and don't let it drag your line.

Section A – Reading a scatter graph

- The scatter graph shows the hours of revision done by 13 students and their mock exam scores.



- Describe the correlation.
- One point is an outlier. Give its coordinates and suggest a reason for it.
- Draw a line of best fit. (5 marks)

2. Use your line of best fit to estimate (a) the score of a student who revised for 11 hours (b) how many hours a student who scored 65% probably revised. (2 marks)

3. Explain why using the line to predict the score for 40 hours of revision would not be sensible. (1 mark)

4. A student says 'revising more *causes* a higher score'. Does the graph prove this? Explain briefly. (1 mark)

Section B – Plotting and describing

5. The table shows the outside temperature and the number of hot drinks sold at a kiosk on 8 days.

Temp (°C)	4	7	9	12	15	18	21	24
Hot drinks	96	88	80	72	60	51	40	33

(a) Plot the points on graph paper (or the grid below), with temperature across and drinks up.
(b) Describe the correlation. (c) Draw a line of best fit and estimate sales on a 17 °C day.

(6 marks)

6. For each pair, say whether you would expect positive, negative or no correlation: (a) a car's age and its value (b) a person's height and their shoe size (c) a house number and the household's income (d) hours of TV watched and hours of sleep. (4 marks)

7. A scatter graph of 30 employees' ages against their salaries shows no clear pattern. Write one sentence describing what this tells you. (1 mark)

Scatter Graphs and Correlation – Answers

Level 2 · Working shown so you can check your method, not just the final number.

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Section A

1. (a) **Strong positive** correlation – more revision, higher score. (b) **(7, 40)** – e.g. the student was ill on the day, or didn't revise the right topics. (c) A straight line rising from about (2, 55) to (18, 95), ignoring the outlier.
2. (a) About **80%** (accept 78–83). (b) About **4–5 hours**.
3. 40 hours is far beyond the data (max 18 hours); the line would predict over 100%, which is impossible – you can't extrapolate that far.
4. No – correlation shows the two go together, not that one causes the other. Students who revise more may also attend more, sleep better, etc.

Section B

5. (b) **Strong negative** correlation. (c) Line falls from about (4, 96) to (24, 33); at 17 °C $\approx$ **54–56 drinks**.
6. (a) negative (b) positive (c) none (d) negative (or weak negative).
7. There is no correlation between age and salary at this company – older employees are not paid more or less than younger ones in any consistent way.

Where Level 2 students lose marks on this topic

- Describing correlation as just 'positive' – add strong or weak, and say what it means in the context.
- Drawing the line of best fit through the first and last points, or forcing it through the origin.
- Reading off the graph without drawing the guide lines – examiners give a mark for the lines.