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## WJEC GCSE Mathematics and Numeracy (Double Award) – Question Pack

Plotting paired data on scatter diagrams, describing the type and strength of correlation, drawing a line of best fit through the mean point, and using it to estimate one variable from another.

**REVISE**  
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# 3.19 – Scatter diagrams & correlation

## *Spec 4.2.4, 4.2.5, 4.2.6, 4.2.7 – Unit 3 (calculator allowed)*

*Plotting paired data on scatter diagrams, describing the type and strength of correlation, drawing a line of best fit through the mean point, and using it to estimate one variable from another. Sourced from legacy WJEC GCSE Mathematics and Mathematics-Numeracy papers, organised for revision under the 2025 spec.*

2025 SPECIFICATION

### Estimated time for entire question pack: ~14 minutes

*Derived from the GCSE Higher pace of ~1.5 min/mark (9 marks across 3 questions).*

*You are advised to **not** attempt to complete all of this in one sitting.*

### ABOUT THIS QUESTION PACK

This is a **focused single-topic practice pack**, not a single mock paper. Questions are organised against the 2025 specification. Questions are ordered chronologically by sitting, with custom-written and SAM questions at the end.

### INSTRUCTIONS

Use black ink or black ball-point pen. Show all working – method marks are awarded for clear setup.

*A calculator is allowed on every question in this pack (Unit 3 is the calculator-allowed paper).*

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# Scatter diagrams & correlation – what the new spec asks

WJEC GCSE Mathematics (first teaching 2025) · Unit 3: calculator-allowed.

## Scatter diagrams 4.2.4

- Plot paired data  $(x, y)$  as points on a scatter diagram.
- Choose axes that fit the data range and label them with units.
- Use individual crosses or dots – never join them with lines.

## Types of correlation 4.2.5

- Recognise positive, negative and no correlation from a scatter diagram.
- Describe correlation by both direction *and* strength (strong/weak).
- Interpret the relationship in the context of the variables in the question.

## Line of best fit 4.2.6

- A straight line through  $(\bar{x}, \bar{y})$  that captures the overall trend.
- Roughly equal numbers of points lie above and below the line.
- Outliers should be identified and may be ignored when drawing the line.

## Interpolation & extrapolation 4.2.7

- Use the line of best fit to estimate one variable from another within the data range (interpolation).
- Recognise extrapolation as estimating outside the data range – less reliable.
- Correlation does not imply causation.

# Scatter diagrams & correlation in one page

Quick-reference notes – revisit before each question. Don't use during the questions.

## Plotting a scatter diagram

Each data point is a pair of values  $(x, y)$  – one per axis.

Use a small cross or dot; don't join the points up with lines.

Label both axes including units; scales should be even and start at a sensible value (not always zero).

## Types of correlation

- *Positive* – as one variable increases, so does the other (points rise left to right).

- *Negative* – as one increases, the other decreases (points fall left to right).

- *No correlation* – points are scattered with no clear trend.

## Strength of correlation

- *Strong* – points lie close to a straight line.

- *Weak* – points roughly follow a direction but with lots of scatter.

State both *direction* and *strength*: e.g. "strong positive correlation".

## Correlation in context

Always describe the relationship in the variables of the question, not abstractly.

E.g. "As height increases, weight tends to increase" – not just "positive correlation".

## Line of best fit

A straight line that captures the overall trend of the data.

Roughly equal numbers of points above and below; it must pass through the *mean point*  $(\bar{x}, \bar{y})$ .

Don't force it through the origin; ignore obvious outliers when judging.

## Using the line

To estimate  $y$  from a given  $x$ : read up from the  $x$ -axis to the line, then across to the  $y$ -axis.

This is the same procedure in reverse for estimating  $x$  from  $y$ .

## Interpolation vs extrapolation

*Interpolation* – estimating *inside* the data range. Usually reliable.

*Extrapolation* – estimating *outside* the data range. Treat with caution: the pattern may not continue.

## Correlation $\neq$ causation

A strong correlation does *not* mean one variable causes the other.

A third (hidden) variable could drive both; always be cautious about claims of cause and effect.

## Common traps

- Joining scatter points with lines (don't).

- Forgetting to anchor the line of best fit at  $(\bar{x}, \bar{y})$ .

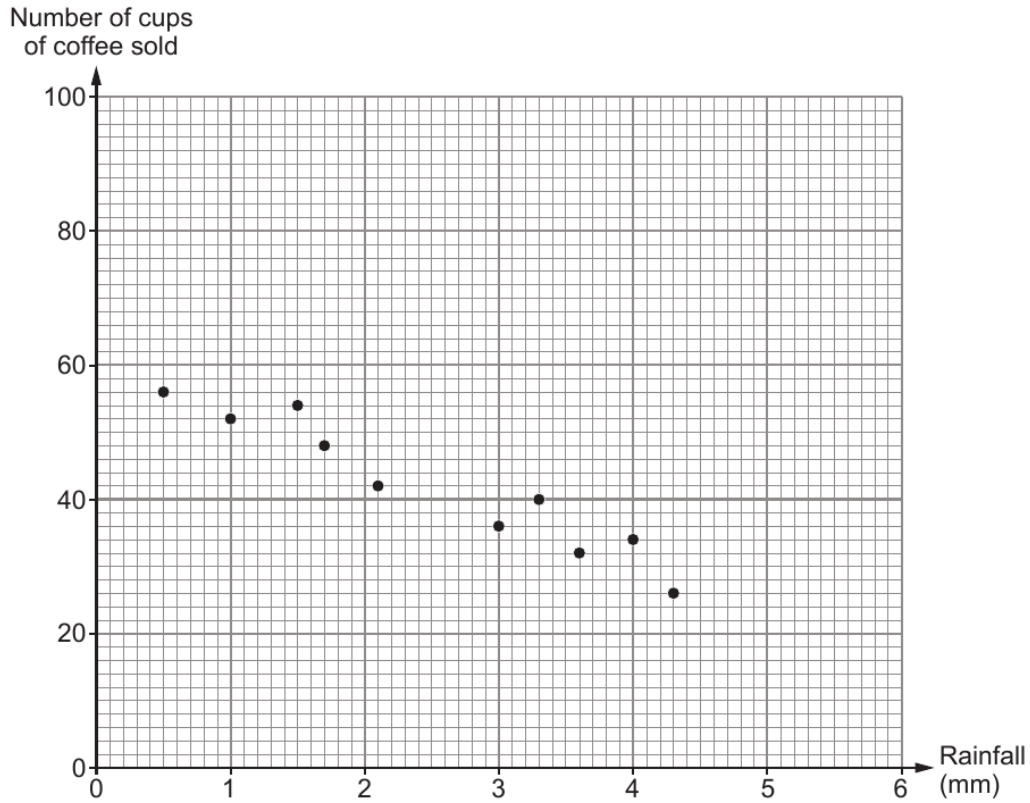
- Extrapolating wildly outside the data range.

- Describing correlation without referring to the context of the question.

Examiner only

3. Anwen has an outdoor mobile coffee stall.

- (a) It rained on each of the last 10 days. Each day, Anwen recorded the amount of rainfall and the number of cups of coffee she sold. The scatter diagram below shows her results.



For the last 10 days:

- the mean number of cups of coffee sold per day was 42
- the **total** rainfall was 25 mm.

- (i) Give the coordinates of the point through which a line of best fit should be drawn. Hence, draw a line of best fit on the scatter diagram. [2]

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Coordinates of the point are ( ..... , ..... )



Examiner  
only

- (ii) Estimate the number of cups of coffee that Anwen expects to sell on a day when the rainfall is 2.0 mm.  
Use your line of best fit to find your estimate. [1]

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Number of cups of coffee is .....

- (b) Anwen buys her coffee beans in tins.  
Each tin has a height of 18 cm, correct to the nearest 1 cm.



Calculate the maximum height of a stack of 5 of these tins. [2]

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- (c) The height of the storage space under Anwen's serving counter is 97.5 cm, correct to the nearest 0.5 cm.

Anwen is going to buy a recycling bin of height exactly 97.3 cm.  
Can Anwen be certain that she can fit this bin under her serving counter?

Yes  No  Can't decide

You must show working to support your answer. [1]

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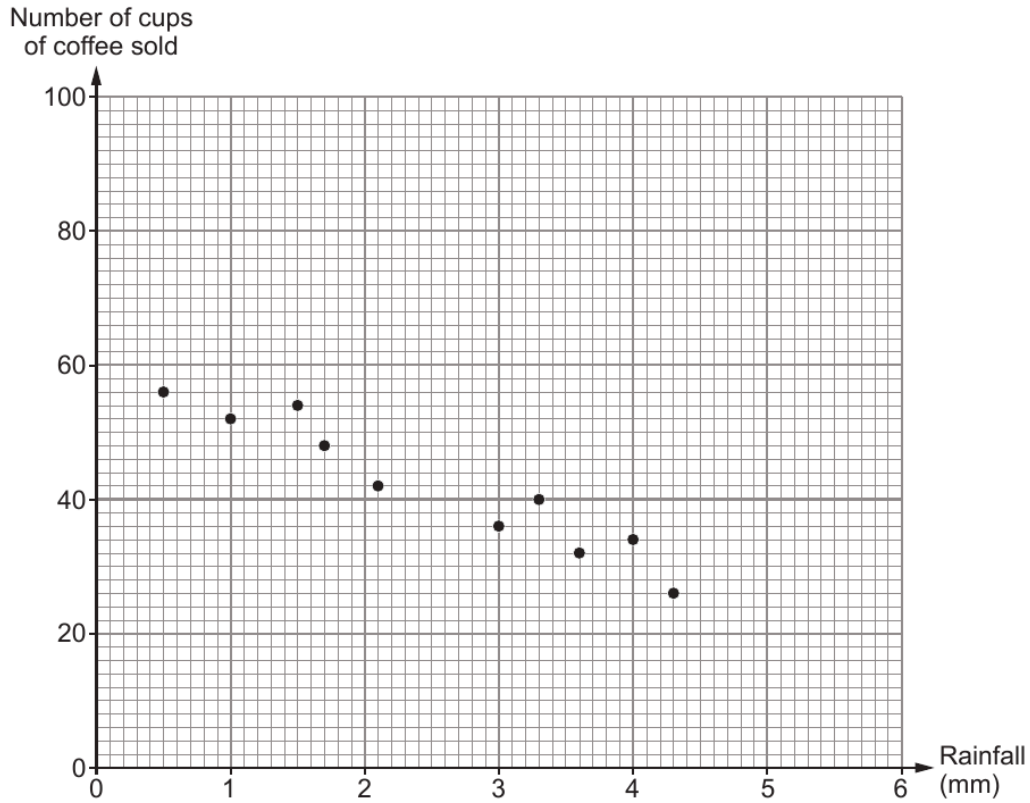
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Examiner only

8. Anwen has an outdoor mobile coffee stall.

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Examiner  
only

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Can Anwen be certain that she can fit this bin under her serving counter?

Yes  No  Can't decide

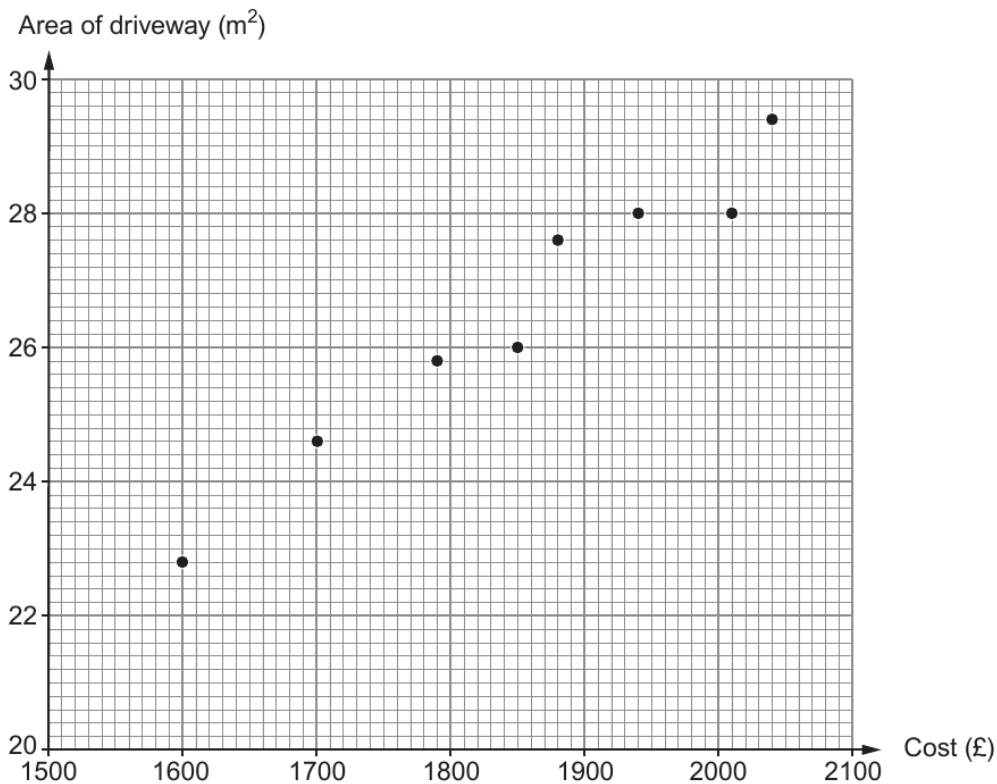
You must show working to support your answer. [1]

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Examiner only

6. Some houses in a village have new driveways laid by DriveDown. The scatter diagram shows the area and cost of each driveway.



- (a) (i) Two of these houses have the same area of driveway. Calculate the difference in the cost of the new driveway for these two houses. [2]

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- (ii) Another house in the village has a driveway of area 25 m<sup>2</sup>. Estimate the cost of having a new driveway laid by DriveDown for this house. [1]

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Examiner  
only

(b) The measurements of Gwenda's driveway are shown below.

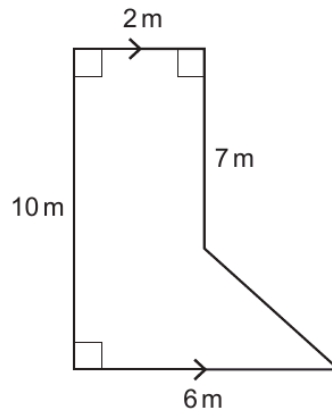


Diagram not drawn to scale

Consider the exact area of Gwenda's driveway.  
Calculate an estimate of how much it would cost Gwenda to have a new driveway laid by DriveDown.  
You must show all your working. [4]

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Examiner  
only

- (c) Tanya's driveway covers an area of  $23\text{m}^2$ .  
She decides to have her driveway repaired instead of having a new driveway.

Tanya thinks the repair will cost her 40% of the estimated cost of having a new driveway laid by DriveDown.

She has budgeted £575 for the repair of her driveway.

Will Tanya's budget cover the cost of repairing her driveway?

Yes  No

You must show all your working and give a reason for your answer.

[2]

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