

Exercise walk-through

6.2.2

Scatter Predictions

AQA · GCSE · Mathematics

35. Frequency summaries and grouped estimates · Foundation

Frequency summaries and grouped estimates · Foundation

Values 1,2,3 with frequencies 2,5,3 give total 10 and weighted sum $2+10+9=21$, so mean is 2.1. The fifth and sixth observations are both 2, giving median 2 and mode 2. For continuous classes $0 \leq x < 10, 10 \leq x < 20, 20 \leq x < 30$ with frequencies 2,5,3, midpoints 5,15,25 give estimated sum $10+75+75=160$ and estimated mean 16. The modal class is $10 \leq x < 20$. The range of individual observations cannot be recovered exactly from these intervals. For values 2,4,4,6,24, mean is 8 and median 4; the unusually large value raises the mean.

40. Scatter graphs, correlation and cautious predictions · Foundation

Scatter graphs, correlation and cautious predictions · Foundation

Plot paired observations as points, with one variable on each axis. Positive correlation rises, negative falls and no correlation has no clear trend. Strong/weak describes how tightly points follow a trend, not its steepness. Draw an estimated line of best fit through the middle of the pattern, balancing points around it; it need not pass through the origin. Interpolation stays within observed inputs; extrapolation goes outside them.

42. Scatter graphs, correlation and cautious predictions · Foundation

Scatter graphs, correlation and cautious predictions · Foundation

Observed study hours 1,2,3,4,5 with scores 44,49,53,58,61 show a positive trend. An estimated line $y=40+4.5x$ predicts 53.5 at $x=3$ and 56.2 at $x=3.6$. These inputs are inside 1–5, so the predictions interpolate. At $x=10$ the line gives 85, but this extrapolation may fail if gains flatten or the group differs. Sleep hours and tiredness may show a negative correlation; an almost horizontal cloud with no ordered pattern may show little correlation. A shared cause such as prior preparation can affect both study time and score; the plot alone does not establish causation.

Exercises 2.1·2.3

2.1 (Foundation) Use estimated $y=40+4.5x$ to predict y at $x=3$.

2.2 (Foundation) Predict at $x=10$.

2.3 (Foundation) Find the width of the observed x range 1–5.

3 Exam-style questions

Exercises 2.1·2.3

2.1 (Foundation) Use estimated $y=40+4.5x$ to predict y at $x=3$.

2.1 $40+4.5\times 3=53.5$.

2.2 (Foundation) Predict at $x=10$.

2.2 $40+4.5\times 10=85$, with extrapolation risk.

2.3 (Foundation) Find the width of the observed x range 1–5.

3 Exam-style questions

2.3 $5-1=4$; prediction at $x=10$ lies outside.

Exercise 3.1

3.1 Decide whether this claim is true. Justify with a concrete calculation or counterexample: A positive correlation proves that one variable causes the other.

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3.1 False. Ice-cream sales and swimming attendance can both increase with hot weather. The shared temperature influence explains association without either variable causing the other.

Local review guidance: show the chosen method; give the checked result; explain the condition or failed shortcut. This is authored classroom guidance.