

2 The line of best fit – Part 2

Name: _____ Class: _____ Date: _____

Vocabulary

Write each word three times.

English

Write it 3 times (English)

line of best fit

Recall

In Part A you saw scatterplots and correlation. Now summarize the pattern with a line:

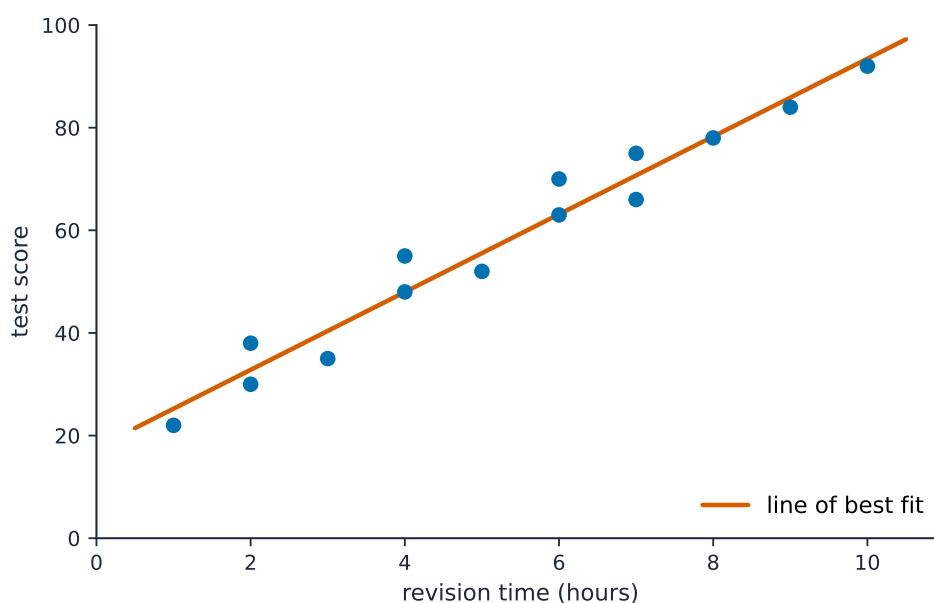
- A straight line can capture the trend in a scatterplot.
- That line lets you make predictions.

Each idea has a worked example before the Practice.

New ideas

■ 1 The line of best fit

The **line of best fit** (also called the regression line) is the straight line that best follows the trend of the points.



■ 2 Reading the line

The line has the form $\hat{y} = a + bx$. The **slope** b says how much y changes for each 1 unit of x ; the **intercept** a is the predicted y when $x = 0$.

■ 3 Making predictions

Worked example. If $\hat{y} = 50 + 5x$ predicts a test score from hours studied, then 3 hours predicts $\hat{y} = 50 + 5(3) = 65$.

■ 4 Residuals

A **residual** is the gap between an actual value and the line's prediction (actual minus predicted). Small residuals mean the line fits well.

Watch out: avoid **extrapolating** – predicting far outside the range of your data. The pattern may not continue, so a line that fits well for 1–5 study hours may give nonsense for 20 hours.

Practice

Try these in order. The methods are all above.

2.1 State what the line of best fit does.

[2]

2.2 For $\hat{y} = 50 + 5x$, state what the slope 5 means.

[2]

2.3 Using $\hat{y} = 50 + 5x$, predict y when $x = 4$. [2]

2.4 State what a residual is. [2]

2.5 Explain why predicting far outside the data range is risky. [2]