Bivariate models and prediction

Learn and practise | Free preview

A sample from this topic. The complete topic collection contains three different resources and worked solutions.

Read the explanation and worked example. Show your working; use a calculator only where asked.

What you will practise

• Fit and assess straight-line models for paired numerical data using digital tools.

• Explain a method and check the reasonableness of a result.

Useful starting skills: Use the prerequisite operations and representations shown in the worked example.

A scatterplot preserves paired measurements (x, y). Inspect its form, direction, strength and unusual points before fitting a straight line. A fitted line y=mx+b estimates a typical response; real observations can vary above and below it.

A residual is observed y minus predicted y. Compare residual size and pattern when judging a fit. Interpolation predicts within the observed input range; extrapolation goes beyond it and may be unreliable. An association, even with a close fit, does not by itself establish cause.

Worked example

A fitted model is y=2.5x+4. For an observation (6,21), find predicted y and residual.

Predicted y=2.5×6+4=19.

Residual=observed -predicted=21-19=2.

Answer: Prediction 19; residual 2

Try it yourself

Name: _____ Date: _____

1. Use $y=3x+2$ to predict y at $x=5$.

2. For the fitted line $y=4x+1$, an observation is $(3,11)$. Find its residual.

Answers and explanations

Check the method as well as the final answer. An alternative correct method is also valid.

1. 17

Substitute x=5 into the fitted equation.

2. -2

Predicted y is 13; observed minus predicted is 11-13.

Curriculum reference: VC2M10AST03

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