Regression, residuals and transformations

Learn and practise | Free preview

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

Read the worked example, then show each step in the practice questions. A scientific, statistical or financial calculator, or suitable spreadsheet, can support these calculations. Record the formula, inputs and interpretation.

What you will practise

• Investigating and modelling linear associations

Useful starting skills: Relevant General Mathematics Units 1–2 arithmetic, algebra, statistics, matrices and networks.

The least-squares line minimises the sum of squared vertical residuals. Its slope is $b=r(s_y/s_x)$, with intercept a=ybar-b xbar.

A residual is observed minus predicted. Curvature in residuals suggests the straight-line model misses structure; transformed models need interpretation on the original scale.

Worked example

r=0.8, $s_x=2$, $s_y=5$, xbar=4, ybar=20. Find fitted line.

$b=0.8\times5/2=2$

$a=20-2\times4=12$.

Answer: yhat=12+2 x.

Try it yourself

Name: _____ Date: _____

1. Using yhat=3+4 x, find prediction at x=5 and residual if observed y=25.

2. If r=-0.7, calculate and interpret r^2.

Answers and explanations

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

1. Prediction 23; residual 2.

Residual 25-23=2.

2. 0.49; 49% of response variation is explained by the fitted linear relationship.

Square r; this is not 49% of individual observations.

Curriculum reference: General Mathematics Units 3–4 — Investigating and modelling linear associations

Independent original resource. Not published or endorsed by VCAA. This focused set supports the listed skills; it is not a complete course or an official assessment.

This free preview may be shared intact with attribution. Not for sale.