Interpreting slope/intercept

6 questions | 18 marks

Equivalent correct methods earn the corresponding marks.

1. A fitted crop yield is $Y = 2 + 0.4R$, with Y in tonnes and R in mm rainfall. Interpret 0.4. [3 marks]

State response units per explanatory unit.

Qualify the statement as a model prediction.

Answer: The model predicts 0.4 more tonnes for each additional mm of rainfall.

2. A model $T = 90 - 2.5x$ predicts test time in minutes from weeks of training. Interpret -2.5. [3 marks]

The negative sign indicates a decrease.

Answer: Each extra training week predicts a 2.5-minute decrease in test time.

3. A tree model $h = 1.2 + 0.7t$ was fitted only for ages 5-12 years. Is 1.2 m a reliable measured height at birth? [3 marks]

Zero is outside the observed age range.

Answer: No. It is the extrapolated prediction at age zero, not a measured birth height.

4. Change $y = 4 + 12x$ from x hours to t minutes. [3 marks]

Substitute $x = \frac{t}{60}$.

$\frac{12}{60} = 0.2$.

Answer: $y = 4 + 0.2t$.

5. The model $y = 5 + 0.03x$ uses x in dollars. Express it with z in hundreds of dollars. [3 marks]

$x = 100z$.

$0.03 \times 100 = 3$.

Answer: $y = 5 + 3z$.

6. A regression gives an intercept of -8 for mass predicted from length. Must the entire model be useless? [3 marks]

A negative extrapolated zero-length prediction does not alone invalidate a local fitted relationship.

Answer: No. The intercept may be outside the relevant length range; inspect fit and predictions within that range.