

Exercise walk-through

Confidence Intervals for the Slope of a Regression Model ■ 9.2

eXercise

You must be able to

- construct the interval $b \pm t^* \cdot SE(b)$
- use degrees of freedom $n - 2$
- compute the margin of error

Method — The interval for the slope

$$b \pm t^* \cdot SE(b),$$

where b is the sample slope, $SE(b)$ is its standard error (from computer output), and the degrees of freedom are $n - 2$.

Method — Example

$$b = 2.5, SE(b) = 0.5, t^* = 2.05: ME = 2.05 \times 0.5 = 1.025.$$

Practice 2.1 ■ 1 mark

Write the confidence-interval formula for the slope.

Solution 2.1

Method: The interval for the slope

Worked steps

$$b \pm t^* \cdot SE(b) \quad \text{B1}.$$

Practice 2.2 ■ 1 mark

State the degrees of freedom for slope inference with $n = 30$.

Solution 2.2

Method: The interval for the slope

Worked steps

$$n - 2 = 28 \quad \text{B1}.$$

Practice 2.3 ■ 2 marks

$b = 2.5$, $SE(b) = 0.5$, $t^* = 2.05$. Find the margin of error.

Solution 2.3

Worked steps

$$\text{ME} = 2.05 \times 0.5 = 1.025 \quad \text{M1} \quad \text{A1}.$$

Exam-style 3.1 ■ 1 mark

A confidence interval for the slope uses

A z^*

B t^* with $df = n - 2$

C χ^2

D no critical value

Solution 3.1

Method: The interval for the slope

A z^*

B t^* with $df = n - 2$



C χ^2

D no critical value

Worked steps

B.

Exam-style 3.2 ■ 1 mark

The degrees of freedom for inference about a slope is

A n

B $n - 1$

C $n - 2$

D $2n$

Solution 3.2

Method: The interval for the slope

A n

B $n - 1$

C $n - 2$



D $2n$

Worked steps

C.

Exam-style 3.3 ■ 2 marks

$b = 1.8$, $SE(b) = 0.4$, $n = 25$, $t^* = 2.07$.

- (a) Find the margin of error.
- (b) Give the confidence interval.

Solution 3.3

Method: The interval for the slope

Worked steps

(a) $ME = 2.07 \times 0.4 = 0.828$ **M1** **A1**. (b) $(0.97, 2.63)$ **B1**.