

Course > Ch3 Linear Regression > 3.2 Hypothesis Testing and Confidence Intervals > 3.2 Review Questions

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3.2.R1

1/1 point (graded)

We run a linear regression and the slope estimate is 0.5 with estimated standard error of 0.2. What is the largest value of b for which we would NOT reject the null hypothesis that $\beta_1 = b$? (assume normal approximation to t distribution, and that we are using the 5% significance level for a two-sided test; need two significant digits of accuracy)

0.892

✓ Answer: 0.892

5% significance level for 2-sided test
=> confidence interval = 95%
= $\beta_1 \pm 1.96 \cdot SE$
= $0.5 \pm 1.96 \cdot 0.2$
= $[0.108, 0.892]$

0.892

Explanation

The 95% confidence interval $\hat{\beta}_1 \pm 1.96 S.E.(\hat{\beta}_1)$ contains all parameter values that would not be rejected at a 5% significance level.

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3.2.R2

1/1 point (graded)

Which of the following indicates a fairly strong relationship between X and Y?

☒ $R^2 = 0.9$ ✓

☐ The p-value for the null hypothesis $\beta_1 = 0$ is 0.0001

☐ The t-statistic for the null hypothesis $\beta_1 = 0$ is 30

✓

Explanation

The R^2 is the correlation between the two variables and measures how closely they are associated. The p value and t statistic merely measure how strong is the evidence that there is a nonzero association. Even a weak effect can be extremely significant given enough data.

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