

Recitation 8 - P8130 Fall 2017

November 4, 2017

Problem 1

Kutner 2.1

A student working on a summer internship in the economic research department of a large corporation studied the relation between sales of a product (Y , in million dollars) and population (X , in million persons) in the firm's 50 marketing districts. The normal error regression model (2.1) was employed. The student first wished to test whether or not a linear association between Y and X existed. The student accessed a simple linear regression program and obtained the following information on the regression coefficients:

Parameter	Estimated Value	95% CI
Intercept	7.43119	(-1.18518, 16.0476)
Slope	0.755048	(0.452886, 1.05721)

The student concluded from these results that there is a linear association between Y and X . Is the conclusion warranted? What is the implied level of significance?

Problem 2

Kutner 2.2

In a test of the alternatives $H_0 : \beta_1 \leq 0$ versus $H_a : \beta_1 > 0$, an analyst concluded H_0 . Does this conclusion imply that there is no linear association between X and Y ? Explain.

Problem 3

Kutner 2.4

Refer to Grade point average Problem 1.19 (GPA dataset).

- Obtain a 99 percent confidence interval for β_1 . Interpret your confidence interval. Does it include zero? Why might the director of admissions be interested in whether the confidence interval includes zero?
- Test, using the test statistic t^* , whether or not a linear association exists between student's ACT score (X) and GPA at the end of the freshman year (Y). Use a level of significance of 0.01. State the alternatives, decision rule, and conclusion.
- What is the P-value of your test in part (b)? How does it support the conclusion reached in part (b)?

Problem 4

Kutner 2.13

Refer to Grade point average Problem 1.19 (GPA dataset).

- a. Obtain a 95% interval estimate of the mean freshman GPA for students whose ACT test score is 28. Interpret your confidence interval.
- b. Mary Jones obtained a score of 28 on the entrance test. Predict her freshman GPA-using a 95% prediction interval. Interpret your prediction interval.
- c. Is the prediction interval in part (b) wider than the confidence interval in part (a)? Should it be?