

STAT 269 – Winter 2009

Homework Assignment 7

Assignment 7 — due Friday, March 13 (in the class or in the mail-box for office 511 during the day)

Problem numbers refer to Freund's textbook.

1. **Problems 14.43, 14.54**
2. **Problems 14.44, 14.52**
3. **Problem 14.50**
4. **Problem 14.60 Hint: class notes**
5. A study was conducted to determine the effects of sleep deprivation on people's ability to solve problems. A total of ten subjects participated in the study, two at each sleep deprivation level. After a specified period without sleep, each subject was administered a set of similar problems, and the number of errors was recorded. The following results were obtained.

Number of hours without sleep	8	12	16	20	24
Number of errors	8; 6	6; 10	8; 14	14; 12	16; 12

- a) Fit a simple linear model to the data.
 - b) Find an unbiased estimate of the error variance σ^2 .
 - c) Test the significance of the intercept at the significance level $\alpha = 0.05$.
 - d) Find the corresponding P -value.
 - e) Find a 95% confidence interval for the slope.
6. Suppose the grades on a midterm x_i and the grades on a final exam y_i have a correlation coefficient of 0.5 and both exams have an average score of 75 and a standard deviation of 10.
- a) If a student's score on the midterm is 95, what would you predict his score on the final to be?
 - b) If a student scored 85 on the final, what would you guess that her score on the midterm was?