

## Homework Assignment 4

### PROBLEM 1: The WarmUp Company

Planners for The WarmUp Company want to estimate how much damaged inventory they will have throughout the year. In particular they are concerned with the “number of broken coffee mugs per shipping crate of mugs.” Looking at recent shipments they found that, on average, 4.7 mugs were broken per crate. This estimate was obtained from a sample of 60 crates. The sample standard deviation was  $s = 2.1$  mugs. WarmUp projects future shipments to have the same breakage rate as this sample.

What is the 95% confidence interval for the average number of broken mugs per shipping container?

### PROBLEM 2: We Insure Fun

Markel is a specialty insurance company that covers leisure products such as motorcycles, boats, RV's, high-end bicycles, and even wedding events. They are interested in knowing the average dollar-amount of damage done to a bicycle when it is damaged by an airline company. The file `bike-damage.xls` displays a sample of 100 (high-end) bicycles that were recently damaged during air transport. Each observation lists the damage amount and the age of the bicycle.

- A. What is the 95% confidence interval for the average dollar-amount of damage done to a bike?
- B. The firm had been pricing insurance on the assumption that average damage does not exceed \$4800 per incident. Is this sample cause for concern? To answer this question, calculate the significance level for your sample data with respect to the null hypothesis:  $H_0: \mu \leq 4800$ .
- C. What's the correlation between damage and bicycle age?

### Problem 3: The Last Mile

A finance company is interested in the mileage accrued on leased cars to help them determine appropriate leasing terms. They are focusing on three-year leases. The company's current terms were chosen based on very old data, in which the average mileage of a 3-year old leased vehicle was 50,000 miles. The company is concerned that driving habits may have changed, and that the current average may no longer be 50,000. The recession may have caused people to drive less, or improved gas mileage may cause people to drive more. If the current average mileage is either higher or lower than 50,000, the company should re-examine its leasing terms.

The company has obtained a recent sample (`odometer.xls`) of odometer readings on 50 cars that were leased for three years.

- A. Use the data to address the company's concerns. To do this, you will need to:
  - a) Clearly state your null hypothesis.
  - b) Calculate the relevant significance level.
- B. Suppose you had only the first 25 observations in the data set, instead of all 50. Repeat part (A.b) with this limited data set (i.e. find the new significance level).