STAT 8010–001 Statistical Methods I
Homework 2

Instructor: Whitney Huang (wkhuang@clemson.edu)

Due Date: February 27, 09:30am

Problem 1

The transportation department of a city remodeled one of its parking garages and increased the hourly parking rates. From the city's records, the average parking time over the past 5 years was 180 minutes. The department wants to know whether the remodeling and rate increases have changed the mean parking time. Over a 3-month period after the changes were made, a random sample of 100 cars had an average parking time of 168 minutes with a standard deviation of 45 minutes.

(a) State the null and alternative (research) hypotheses for the study?

(b) Construct a 95% confidence interval (using $t_{0.025,99} = 1.984$) for the average parking time after the changes were made to the garage.

(c) Do the data support the research hypothesis if $\alpha = 0.05$?

(d) What is the p-value of the test?

Problem 2

Answer "true" or "false" for each question.

(a) Given one particular random sample, if we form the 95% confidence interval for the sample mean, there is a 95% chance that the population mean lies in this confidence interval.

(b) If a larger number of random samples are selected and we form the 95% confidence interval for each sample mean, the population mean will lie in about 95% of these confidence intervals.

(c) The 95% confidence interval around a given sample mean is wider than the 90% confidence interval around that mean.

(d) If we reject the null hypothesis at the $\alpha = 0.05$ level, then we should also reject it at the $\alpha = 0.01$ level.

Problem 3

Answer "true" or "false" for each question. If your answer is "false," change the statement to make it true. Change only the underlined words.

(a) A <u>Type I error</u> is committed when we fail to reject the null hypothesis H_0 when $\overline{H_0}$ is actually false.

(b) If we make a <u>Type II error</u>, we have missed detecting an event or effect when there actually was one.

(c) The probability of making a <u>Type I error</u> is equal to β

(d) If we increase the probability of making a Type II error, we <u>increase</u> the probability of making a Type I error.