**EE3211 Modelling Techniques**

**Week 3 Assignment**

Diabetes: Plasma-glucose levels are used to determine the presence of diabetes. Suppose the mean ln (plasma-glucose) concentration (mg/dL) in 35- to 44-year-olds is 4.86 with standard deviation = 0.54. A study of 100 sedentary people in this age group is planned to test whether they have a higher or lower level of plasma glucose than the general population.

Q1. If the expected difference is 0.10 ln units, then what is the power of such a study if a two-sided test is to be used with α=0.05? (1 point)

Q2. How many people would need to be studied to have 80% power under the assumptions in Q1. (1 point)

Renal disease: the mean serum-creatinine level measured in 12 patients 24 hours after they received a newly proposed antibiotic was 1.2 mg/dL.

Q3. If the mean and standard deviation of serum creatinine in the general population are 1.0 and 0.4 mg/dL, respectively, then, using a significance level of 0.05, test whether the mean serum-creatinine level in this group is different from that of the general population. (1 point)

Q4. What is the p-value for the test? (1 point)

Q5. Suppose the sample standard deviation of serum creatinine in Q3 is 0.6 mg/dL. Assume that the standard deviation of serum creatinine is not known, and perform the hypothesis test in Q3. Report a p-value. (1 point)

Q6. Compute a two-sided 95% CI for the true mean serum-creatinine level in Q5. (1 point)

Q7. How does your answer to Q6 relate to your answer to Q5? (1 point)

Q8. Suppose = -1.52 and a one-sample t test is performed based on seven subjects. What is the two-tailed p-value? (1 point)

Iron-deficiency anemia is an important nutritional health problem in the United States. A dietary assessment was performed on 51 boys 9 to 11 years of age whose families were below the poverty level. The mean daily iron intake among these boys was found to be 12.50 mg with standard deviation 4.75 mg. Suppose the mean daily iron intake among a large population of 9- to 11-year-old boys from all income strata is 14.44 mg. We want to test whether the mean iron intake among the low-income group is different from that of the general population.

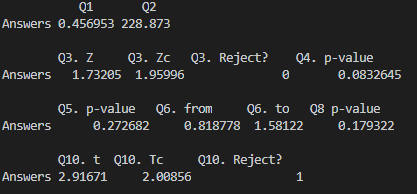
Q9. State the hypotheses that we can use to consider this question. (1 point)

Q10. Carry out the hypothesis test in Q9 using the critical-value method with an α level of .05, and summarize your findings. (1 point)

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Week 2 Assignment

Name:



Q3.

Conclusion: The sample mean is not significantly different from that of the population.

Q7. We can have 95% confident that the population mean (μ) falls between [0.8187782, 1.581222] while the sample mean does not have significant confident that it is different from the population mean.

Q9.

Q10.

Conclusion: The sample mean is significantly different from that of the population.

