6G7Z1020
Assignment 4

Refer to the work you have done in the lab practical, the relevant examples and the exercises given in the lecture notes. For each answer, include your results in a formatted PDF document that contains your graph, one small paragraph with your comments and a separate section that includes your `SAS` code.

Questions

1 Pitch drop experiment

One of the longest running experiments in science started in 1927 at University of Queensland. The experiment studies the viscosity of pitch and it involves the observation of the flow of pitch through a funnel. The time spent (in years) for each drop to occur is recorded and the measurements of the first seven recorded drops are given below:

$$8.1 \quad 8.2 \quad 7.2 \quad 8.1 \quad 8.3 \quad 8.7 \quad 9.2.$$

After the seventh drop air conditioning was added which keeps the temperature constant. The next few drops occurred after 12.85 years on average. We want to investigate whether the air conditioning had a significant impact on the experiment.

(a) State the null and the alternative hypothesis both in words and with mathematical notation. [10]

(b) Comment on the assumption that the data are normally distributed. [10]

(c) Report the p-value. [10]

(d) Decide if there is sufficient evidence to reject the null hypothesis or not. Justify your response. [10]

(e) Write a final conclusion on the impact of the air conditioning to the experiment. [10]

2 Dice

A casino suspects that one of the dice is loaded. After 190 trials it records 56 occurances of "six". Using the appropriate hypothesis test, investigate whether the particular dice is loaded or not:

(a) State your null and alternative hypothesis. [15]

(b) Report a p-value. [10]

(c) Using the p-value, decide on your hypothesis. [10]

(d) Write an informative conclusion. [15]