MATH 2310
Hypothesis Testing

This lab will deal with hypothesis tests. In this lab, you will use software to calculate summary statistics for data, and then use those summary statistics to conduct a hypothesis test by hand.

Goals for this assignment:

- Use R to generate summary statistics
- Practice calculations for hypothesis tests by hand
- Interpret results of hypothesis tests

Grading: there are four possible points for each skill objective and analysis objective.

Activity 1

In previous labs, we looked at a research paper from 1983 by Chambers, Cleveland, Kleiner, and Tukey examining the effectiveness of cloud seeding using silver nitrate. Total rainfall (in acre-feet) was measured for 26 seeded clouds and 26 unseeded clouds. We will again be examining this data set further.

We would like to use a hypothesis test to assess whether cloud seeing is effective. As we have small sample sizes, we need to be able to assume our data is approximately normally distributed. In a previous lab, you showed that the histograms for this data are extremely skewed. However, many of you noted that using a log transformation resulted in data that looked approximately normally distributed.

Skill Objective: Use R to take a log transformation of the rainfall data. Then, use R to calculate the means and standard deviations for the log of rainfall for seeded clouds, and for unseeded clouds.

Analysis Objective: Using these results, conduct a hypothesis test to determine whether there is evidence that cloud seeding increases rainfall.