The purpose of this assignment is to give you practice with simple data analysis and report writing. Your performance should be viewed in a diagnostic manner, helping you to determine areas in which you may be weak and may require extra effort. The data in these problems are not entirely "real" and have been edited and manipulated. The emphasis is on statistical problem solving and report writing, not quite solving a real client's problem.

Your reports should not exceed six pages for each problem, one page summary and up to five pages of text. Essential figures and tables should be fully integrated in the text.

Submit your reports on Brightspace by 11:59pm on February 8. Please do not put your name on your reports, as those would go to two of your peers for their comments.

1. An experiment is conducted to compare the effects of four different soil additives on the accumulation of a particular complex molecule in the roots of corn plants. The concentration (ppm) of this molecule is determined by a laborious chemical analysis on a 5 milligram portion of ground-up root material.

Each of the treatments is applied to three randomly selected large pots that are otherwise identically prepared. Newly germinated corn plants are planted in the pots. The twelve pots are randomly located in an environmentally controlled growth chamber. The pots are all watered daily.

At the end of 15 days the roots from each plant are removed and ground up. Two 5 milligram portions from each plant are randomly taken from the ground-up root material and analyzed.

The data are in an R data frame with elements trt, pot, and conc. Determine the effect of the soil additive treatments.

2. A group of bacterial pathogens is known to cause damage to soybeans. Twenty four different soybean fields were scored on a 10-level system for pathogen damage based on visual examination from a small airplane flying overhead; the damage levels range from negligible (score 1) to severe (score 10).

Factors of interest that might affect pathogen damage include the following:

Rainfall Total precipitation (in.) for the 30 days prior to scoring.

Wind Average wind speed (mph) for the 30 days prior to scoring.

Temperature Average daily high $({}^{o}F)$ for the 30 days prior to scoring.

Crop history Crop planted the previous season: 1 soybeans; 2 oats; 3 snap beans.

The data are in an R data frame pathogen with elements score, rain, wind, temp, and hist. Find a useful model relating damage score to the factors of interest.