## Homework 11
Due Tuesday, December 9

1. Two procedures for sintering copper are to be compared by testing each procedure on six different types of powder. The measurement of interest is the porosity (volume percentage due to voids) of each test specimen. The results of the tests are as shown in the accompanying table.

| Powder | Procedure I | Procedure II |
|:------:|:-----------:|:------------:|
| 1 | 21 | 23 |
| 2 | 27 | 26 |
| 3 | 18 | 21 |
| 4 | 22 | 24 |
| 5 | 26 | 25 |
| 6 | 19 | 16 |

Is there sufficient evidence to claim that procedure II produces higher mean porosity values? Compute the p-value and test at the level $\alpha = 0.05$.

2. A plant manager, in deciding whether to purchase a machine of design A or design B, checks the times for completing a certain task on each machine. Eight technicians were used in the experiment, with each technician using both machine A and machine B in a randomized order. The times (in seconds) required to complete the task are given in the accompanying table.

| Technician | A | B |
|:----------:|:--:|:--:|
| 1 | 32 | 30 |
| 2 | 40 | 39 |
| 3 | 42 | 42 |
| 4 | 26 | 23 |
| 5 | 35 | 36 |
| 6 | 29 | 27 |
| 7 | 45 | 41 |
| 8 | 22 | 21 |

Test to see if there is a significant difference between mean completion times, at the 5% significance level (provide the p-value).

3. Consider the dataset `warpbreaks` in R (built-in, just type in R). The response is `breaks` and the factors are `wool` and `tension`. Please perform a one-way ANOVA, one with `wool` as the factor and anther with `tension` as the factor, providing boxplots and ANOVA tables. Interpret and comment.

4. Consider the dataset `twins.txt`. Take `IQf` as the response and `C` as the factor. Perform the one-way ANOVA by writing down the model, providing a boxplot and ANOVA table. Interpret and comment.

5. Consider the dataset `WeightLoss.txt`. Take `wl3` as the response and `group` as the factor. Perform the one-way ANOVA by writing down the model, providing a boxplot and ANOVA table. Interpret and comment.