# MATH 204 - ASSIGNMENT 1

## *Deadline: Midnight, February 7th 2013*
## *Please submit your solutions via myCourses*

On the course website, the folder

`www.math.mcgill.ca/dstephens/204/Assignments/Assign1/`

contains a personalized data set with your McGill ID number as the filename. This data set represents the results of an experiment conducted under a completely randomized design. For this assignment, you must carry out an analysis of variance of your data set to test whether there is any significant difference between the group means.

The data file contains two columns; the first contains a group label (`Group`), the second an observed response value (`Y`).

In your solutions, you should

(a) Give a brief description of the study data, giving the total sample size, the number of treatments, and the number of observations per treatment.

4 Marks

(b) Present the analysis of variance (ANOVA) table in standard format.

4 Marks

(c) Report the result of the test, including an appropriate critical value for the test.

4 Marks

(d) Comment on the validity of the test result from (c).

4 Marks

(e) Append a relevant boxplot and a means plot. Use these plots to interpret the results in (c) and (d).

4 Marks

You may use the template on p. 2 of this Assignment sheet to present your answers.

| Name: | ID: |
|---|---|

(a) **Description**
*Here the students should give a breakdown of the data into groups, and the total sample size.*

(b) **ANOVA table:**
*Here they should report the ANOVA table in the usual format, such as*

```
            Df Sum Sq Mean Sq F value  Pr(>F)
Group        4 164.87  41.217  3.3439 0.01931 *
Residuals   38 468.40  12.326
---
```

*If they don't use the standard format like this, you may subtract marks, depending on how difficult it is to extract the results.*

(c) **Result of the test:**
*Here they should succinctly report the result of the test (null hypothesis etc.) and also state what the critical value in the F-test is.*

(d) **Comment on test result from (c):**
*Here they need to assess the three assumptions, independence, normality and equal variances. They should do the last one by looking at Levene's test, for example*

```
Levene's Test for Homogeneity of Variance (center = median)
      Df F value Pr(>F)
group  4  0.1461 0.9636
Levene's Test for Homogeneity of Variance (center = "mean")
      Df F value Pr(>F)
group  4  0.1098 0.9784
```

(e) **Boxplot and means plot (comment below and append separate plots):**
*Here they need to append boxplots for the data in the different groups, and a means plot demonstrating the differences in means across the groups. If the plots give insight into the assumptions from (c) and (d) (e.g. where a significant result comes from etc.), they should comment accordingly.*