STA 4211 – Exam 1 Take-Home Portion
Due at 10:40 AM 2/9/18

A manufacturer buys chemicals from three vendors (A,B,and C). You sample n_I=6 units from each vendor and make an assessment of the purity of the sample. You fit the model:

$$Y_{ij} = \mu_i + \varepsilon_{ij} \qquad \varepsilon_{ij} \sim NID(0, \sigma^2) \qquad i = 1,2,3 \quad j = 1,\ldots,6$$

Complete the following parts:

1) Give unbiased estimates of all model parameters.

$\hat{\mu}_1 =$ _____ $\hat{\mu}_2 =$ _____ $\hat{\mu}_3 =$ _____ $s^2 =$ _____

2) Obtain the Analysis of Variance

Source	df	SS	MS	F*	F(.95)	P-value
Vendors						
Error						
Total						

3) Test whether there are differences among the three vendors (α=0.05)

H_0: _____ H_A: _____

Test Statistic: _____ Rejection Region: _____

Conclude (Circle One): Reject H_0 Fail to Reject H_0

4) Give a contrast that compares vendor A with vendors B and C. Is vendor A's mean significantly different from the average of vendor's B and C at α=0.05 significance level? Conduct the F- test and obtain a confidence interval to make this decision.

H_0: _____ H_A: _____

Test Statistic: _____ Rejection Region: _____

95% Confidence Interval: _____

Conclude (Circle One): Reject H_0 Fail to Reject H_0

5) Obtain Simultaneous 95% CI's for the true differences in all pairs of treatment means based on Bonferroni's, Scheffe's, and Tukey's methods. Which pairs are significantly different based on each method?

Method	MSD	Yb_A-Yb_B	CI for μ_A-μ_B	Yb_A-Yb_C	CI for μ_A-μ_C	Yb_B-Yb_C	CI for μ_B-μ_C
Bonferroni							
Scheffe							
Tukey							

6) Test whether the population variances are equal, based on Bartlett's test with α=0.05.

Test Statistic_____ Rejection Region _____