

# STAT 516 - Spring 2002 - Homework 4

Due: Thursday, March 7th

1) (1 point) Indicate whether each of the following is true or false. If false, correct it so that it is a true statement

a) In a one-way ANOVA, you are more likely to reject the null hypothesis that the means are equal if the  $s^2_{\text{wit}}$  is large.

b) If the value of every observation is multiplied by 2, then the value of the F statistic in an ANOVA table is multiplied by 2.

2) (1 point) Why is the assumption that “the mean of the errors is zero for every value of the independent variable” always met for one-way ANOVAs?

3) (4 points) A 1995 study in the *Journal of Personality and Social Psychology* looked at the relationship of physical attractiveness to other characteristics of college students. A sample of college students was rated on physical attractiveness, and broken into quartiles. They were then asked the number of dates they had been on in the past four months. The data below is for the upper and lower quartiles of women in the sample.

	“Most Attractive” Quartile	“Least Attractive” Quartile
n	33	27
mean	17.8	10.4
s.d.	14.2	16.6

(Just for curiosity’s sake, the means for the two groups of men were 9.7 and 9.9 respectively).

Answer the following, **doing all calculations by hand**, and showing all of your work.

a) Perform a two-sample t-test (at  $\alpha=0.05$ ) for testing whether there was a difference in the number of dates between the groups. Write down the null and alternate hypothesis you are testing, being careful to identify the parameters you are using. What is your conclusion? What assumptions must you make for this test to be valid?

b) Perform a one-way ANOVA for testing whether there was a difference in the number of dates between the groups. Write down the model equation you are using, the null and alternate hypotheses, and carefully identify the parameters. What is your conclusion?

4) (4 points) The data set on the web is based on a study at the University of Melbourne concerning the relationship of hair color to pain thresholds.

Use SAS to perform the one-way ANOVA to test that there is an effect on pain threshold due to hair color. State your conclusion and check the assumptions (including using Levene’s test).