Stat 151.003 Fall 2006 (Kozdron)
Assignment #7

This assignment is due by 3:30 pm on Friday, December 1, 2006, in Dr. Kozdron's office (College West 307.31). You may also hand it in before class that day. You must submit all problems that are marked with an asterix (*). You are encouraged to form study groups and collaborate with others on this assignment. However, the final work you submit must be your own. A piece of advice: *the assignments are worth very little in the computation of your final grade. It is better to suffer through not understanding something now, rather than copying from a friend just for the sake of completion. You will not have that luxury on the exams.* YOUR ASSIGNMENT MUST BE STAPLED AND PROBLEM NUMBERS CLEARLY LABELLED. UNSTAPLED ASSIGNMENTS WILL NOT BE ACCEPTED! DO NOT CROWD YOUR WORK. DO NOT WRITE IN MULTIPLE COLUMNS..

1. * A popular magazine has published an article where it states that, in Canada, a married male is usually older than his wife. Statistics Canada collects data on the ages of married people. Suppose that 40 married couples are randomly selected and their ages are recorded. How would you analyse the collected data to see whether or not the claim of the magazine holds? State clearly:

- the null hypothesis;
- the alternative hypothesis;
- the statistical procedure you would use;
- the experimental design upon which this analysis would be based;
- the assumptions necessary for the analysis you propose to hold.
- Comment on the adequacy (or inadequacy) of this design.

2. * An experimenter is interested in analyzing $\mu_1 - \mu_2$, the difference between two population means. Random samples were taken from each population and produced the following data:

	Sample 1	Sample 2
$\overline{X}$	30.0	20.0
S^2	77	35
n	7	7

(a) Conduct an hypothesis test of $H_0 : \mu_1 - \mu_2 = 0$ vs. $H_1 : \mu_1 - \mu_2 > 0$ at the $\alpha = 0.05$ significance level.

(b) Determine the P-value of the test in **(a)**. (If you cannot find the P-value exactly, then bracket it.)

(continued)

3. * Starting annual salaries for individuals with master's and bachelor's degrees were obtained from two independent random samples. Use the data shown below to test at the $\alpha = 0.10$ significance level whether or not there is evidence to suggest that individuals with a master's degree have a higher starting annual salary than those with a bachelor's degree.

Master's degree	Bachelor's degree
$\overline{X}_1 = \$41\ 000$	$\overline{X}_2 = \$38\ 000$
$S_1 = \$2500$	$S_2 = \$2000$
$n_1 = 60$	$n_2 = 80$

4. * (If you submitted this problem on Assignment #6, you do not need to resubmit it.) The historian Raymond Dumett of Purdue University was examining British colonial records for the Gold Coast in Africa, and he suspects that the death rate was higher among African miners than among European miners. In the year 1936, incomplete records show there were 223 deaths among 33,809 African miners and 7 deaths among 1541 European miners on the Gold Coast. Determine if there is good evidence that the proportion of African miners who died during 1936 was higher than the proportion of European miners who died during that year by answering the following questions.

(a) Define your notation, and clearly state an appropriate null hypothesis and an appropriate alternative hypothesis.

(b) Calculate the test statistic.

(c) Using your test statistic, give the corresponding P-value.

(d) Clearly state your conclusion in words. That is, explain whether or not there is good evidence at the $\alpha = 5\%$ significance level that the proportion of African miners who died during 1936 was higher than the proportion of European miners who died that year. Your response must include the phrases *African miners*, *European miners*, *Gold Coast*, and *evidence*.