STAT505 Assessment #5

1. J&W Exercise 6.19, parts a and c. The file "milk.dat" contains the data with columns fuel, repair, capital, and truck, respectively.

2. The Swiss government believes that the printer is not meeting their specifications for the 1000 franc notes. The following table gives the government specifications for six different dimensions of the notes:

Dimension	Specification
Length	215 mm
Left Width	130 mm
Right Width	130 mm
Bottom Margin	9 mm
Top Margin	10 mm
Diagonal Length of Printed Area	141.354 mm

   Measurements were obtained on the above variables for a random sample of 100 notes from the printer. These data are stored in the "swiss.dat" data set.

   (a) Use Hotelling's T-squared statistic to test the null hypothesis that the printer meets government specifications on average. Give the values for the statistic, critical value, degrees of freedom, and p-value.

   (b) Find simultaneous 95% confidence intervals for the population means of the six variables. Are these intervals consistent with your conclusion in part a) above? Explain why or why not.

   (c) Give a profile plot for the ratios of the dimensions over their specifications.

   (d) What can you conclude from these results? Is the printer meeting the government specifications?

3. At the start of a study to determine whether exercise or dietary supplements would slow bone loss in older women, an investigator measured the mineral content of bones. Measurements were recorded on 25 women for three bones on the dominant and non-dominant sides. The data is given in "mineral.dat". The column headings, in sequence, are dominant radius, radius, dominant humerus, humerus, dominant ulna, and ulna.

   (a) Test the equality of mean mineral contents between the dominant and non-dominant bones at the $\alpha = 5\%$ level of significance.

   (b) Construct 95% simultaneous confidence intervals for the mean differences.

   (c) Are your answers from the two previous parts consistent with each other? What can you conclude about the dominant bones compared with the non-dominant bones?