STA 302/1001 Summer 2001 Assignment 2

Quiz on May 30th. Do this assignment in preparation for the quiz. It is not to be handed in.

These problems are based mostly on Chapter 2, so start by reading Chapter 2. You are *not* responsible for the Gauss-Markov Theorem (p. 48), confidence bands (Section 2.6) or expected means squares. The general linear test (Section 2.8) will be very important for multiple regression so take a look, but there will be no questions based on this material yet. The quiz will be closed book, but you will have access to a formula sheet. It's on the Web page. If you have suggestions or comments about this formula sheet, please let me know; it can be changed.

1. For the simple regression model (2.1) and starting with the formula sheet,
   (a) Show $Cov(Y_i, Y_j = 0)$ for $i \neq j$.
   (b) Prove b_1 is unbiased.
   (c) Show $b_1 = \sum_{i=1}^{n} k_i Y_i$. What is k_i?
   (d) Prove expressions 2.5 and 2.7 on p. 46.
   (e) Derive (2.14) from (2.12).
2. Do problems 2.1, 2.3, 2.9, 2.10, 2.11, 2.12, 2.17, 2.18, and exercises 2.36 through 2.41. Some of these are very short. Some others are answered in the class notes, or in the text, or both.
3. Using the SAS output below, do problems 1.19, 2.4 and 2.23. Most of the answers are directly on the printout. for a few you will probably need a calculator, so **bring a calculator to the quiz**. In the output below, the independent variable is called `test` and the dependent variable is called `gpa`.

```
                          GPA data: Problem 1.19                           1
                                                 12:50 Friday, May 18, 2001

                             The REG Procedure
                               Model: MODEL1
                          Dependent Variable: gpa

                            Analysis of Variance

                                     Sum of           Mean
Source                   DF         Squares         Square    F Value    Pr > F

Model                     1         6.43373        6.43373      34.00    <.0001
Error                    18         3.40627        0.18924
Corrected Total          19         9.84000


             Root MSE              0.43501    R-Square     0.6538
             Dependent Mean        2.50000    Adj R-Sq     0.6346
             Coeff Var            17.40057


                            Parameter Estimates

                          Parameter       Standard
     Variable      DF      Estimate          Error     t Value     Pr > |t|

     Intercept      1      -1.69956        0.72678       -2.34       0.0311
     test           1       0.83991        0.14405        5.83       <.0001
```