Stat 615/415 (Regression)

Remedies (chap. 5 [5.1-5.3, 5.5-5.6, 5.10]).
Multiple linear regression (chap. 6 [6.1-6.3]).

1. **(5.2)** For the matrices below, obtain (1) $A + C$, (2) $A - C$, (3) $B'A$, (4) AC', (5) $C'A$.

$$A = \begin{pmatrix} 2 & 1 \\ 3 & 5 \\ 5 & 7 \\ 4 & 8 \end{pmatrix}, \quad B = \begin{pmatrix} 6 \\ 9 \\ 3 \\ 1 \end{pmatrix}, \quad C = \begin{pmatrix} 3 & 8 \\ 8 & 6 \\ 5 & 1 \\ 2 & 4 \end{pmatrix}$$

2. (**5.10**). Find the inverse of each of the following matrices:

$$A = \begin{pmatrix} 2 & 4 \\ 3 & 1 \end{pmatrix}, \quad B = \begin{pmatrix} 4 & 3 \\ 6 & 5 \end{pmatrix}$$

   Check that these are correct inverse matrices by calculating AA^{-1} and $B^{-1}B$.

3. (**6.2**) set up the X matrix and $\boldsymbol{\beta}$ vector for each of the following regression models (that is, write the model as $Y = X\boldsymbol{\beta} + \varepsilon$ and write the vector Y and matrix X explicitly):

   (a) $Y_i = \beta_1 X_{i1} + \beta_2 X_{i2} + \beta_3 X_{i1}^2 + \varepsilon_i$

   (b) $\sqrt{Y_i} = \beta_0 + \beta_1 X_{i1} + \beta_2 \log_{10} X_{i2} + \varepsilon_i$