AMS 394 Homework 4

1. A marketing manager conducted a study to determine whether there is a linear relationship between money spent on advertising and company sales. The data are listed in the following table.

Advertising expenses (1000s of $), x	2.4	1.6	2.0	2.6	1.4	1.6	2.0	2.2
Company sales (1000s of $), y	225	184	220	240	180	184	186	215

   Some summary statistics are as follows: $\sum x = 15.8$, $\sum y = 1634$, $\sum xy = 3289.8$ and $\sum x^2 = 32.44$
   (1) What is the correlation coefficient between these two variables?
   (2) Write down the least squares regression equation.
   (3) What is the coefficient of determination of your regression?
   (4) At $\alpha = 0.01$ is there a significant linear relationship betweem these two variables?
   (5) Suppose a company plans to spend $1,800 on advertisement, what is the expected sales?

2. Use the d_logret_6stock data set to answer the questions.
   (1) Regress the return of Intel on the return of Citigroup (with intercept). Report the estimated coefficients.
   (2) Regress the return of Intel on the return of Citigroup (without intercept). Report the estimated coefficients.
   (3) Compute the correlation of Intel and Citigroup, and test if their correlation is zero.

3. With the rmr data set (ISwR package), plot metabolic rate versus body weight. Fit a linear regression model to the relation. According to the fitted model, what is the predicted metabolic rate for a body weight of 80kg?