Homework 5. Due Tuesday April 5.

1. Greene (7th edition from now on).
Exercise 5.

2. Greene (7th edition from now on).
Exercise 7.

3. (16% of a Brown econometrics final that I posed)
Assume that you have estimated the model

$$Y_i \; = \; \beta_1 X_{1i} \; + \; \beta_2 X_{2i} \; + \; \beta_3 X_{3i} \; + \; \epsilon_i$$

by OLS, and that the standard assumptions for OLS - inclusive of normality - hold. We are interested in testing the following restriction

$$\beta_1 + \beta_2 = 1 \qquad \text{and} \qquad \beta_3 = 0$$

(in other words, you test the 2 restrictions on the coefficients simultaneously). Assume that the $X'X$ matrix is given as

$$X'X \; = \; \begin{pmatrix} 15 & 10 & 0 \\ 10 & 20 & 0 \\ 0 & 0 & 1 \end{pmatrix}.$$

and that your estimated coefficients (using n=18 observations) are

$$\hat{\beta}_1 = .5 \quad \hat{\beta}_2 = .8 \quad \hat{\beta}_3 = 3$$

and that you also found

$$s^2 = 3$$

a) Explain which test you would use to test the restriction and give the formula for the test and state the distribution of the test.
b) Perform the test at a 5% level.