Problemset 6

1. Exercise 9.1 from Greene.

2. Exercise 9.2 from Greene.

3. Consider the following two models for \( i = 1, \ldots, n \):

\[
y_i = \beta_1 + \beta_2 x_{2i} + \beta_3 x_{2i} + \varepsilon_i
\]

(1)

\[
y_i - x_{2i} = \alpha_1 + \alpha_2 x_{2i} + \alpha_3 x_{2i} + \varepsilon_i
\]

(2)

(a) Prove that the OLS estimates satisfy

\[
\hat{\alpha}_1 = \hat{\beta}_1 \\
\hat{\alpha}_2 = \hat{\beta}_2 - 1 \\
\hat{\alpha}_3 = \hat{\beta}_3
\]

(b) Prove that the residual from the two regressions are identical.

(c) Under what condition is \( R^2_1 > R^2_2 \)? The subscript indicates the equation number.