Extra-Credit Questions for Homework Assignment #1

To get any credit for an answer to a question, you must FULLY EXPLAIN you answer. Note that such a “full explanation” can be based on citation of a result stated in one of the appendices in the text.

1. Does equation (2.6) on p. 25 of the text imply that $u$ and $x$ are uncorrelated? FULLY EXPLAIN your answer.

2. On p. 27 of the text it’s claimed that “the first equality in (2.11) follows from (2.10).” FULLY EXPLAIN why this is a true statement.

3. Give the “necessary condition” for equation (2.18) to fail to hold. FULLY EXPLAIN your answer.

4. On p. 29 of the text it’s claimed that, “from basic properties of the summation operator,” the following is true:

$$
\sum_{i=1}^{n} x_i (y_i - \bar{y}) = \sum_{i=1}^{n} (x_i - \bar{x})(y_i - \bar{y}).
$$

Prove why this is a true claim.

5. In order to obtain the decomposition of $SST$ given in equation (2.36), it is necessary for equation (2.37) to be true. Prove that equation (2.37) is a true statement.