

**ECON 257**  
**EXERCISES 2**  
**Classical linear model**

1. Describe the classical linear model.
2. In the context of the classic linear model, define what is meant by:
  - (a) the least squares estimator of the regression coefficients;
  - (b) a linear unbiased estimator of the regression coefficients;
  - (c) the best linear unbiased estimator of the regression coefficients.
3. State and prove the Gauss-Markov theorem.
4. Respond by TRUE, FALSE or UNCERTAIN to each one of the following statements and explain your answer (Maximum: 1 page per statement).
  - (a) In the classical linear model, the number of observations must be smaller than the number of regression coefficients.
  - (b) In the classical linear model, the sum of the squared least squares residuals is never larger than the sum of the squared true errors.
  - (c) In the classical linear model, the sum of the squared least squares residuals is a biased estimator of the true error variance.
  - (d) In the classical linear model, the fitted values and the residuals are uncorrelated.