Checklist for ECON 351* Mid-Term Exam, Fall Term 2003

Coverage of exam  Part I: Sections 1-5 on Course Outline; NOTES 1-9.

Format of questions
Part 1:  Definitions, Proofs, and Derivations
Part 2:  Short Answer Questions (some requiring numerical answers)

Proofs and Derivations to Know  for regression model \( Y_i = \beta_1 + \beta_2 X_i + u_i \)

- Derivation of OLS normal equations, the first-order conditions for the OLS coefficient estimators \( \hat{\beta}_1 \) and \( \hat{\beta}_2 \)
- Proof of unbiasedness of \( \hat{\beta}_2 \), i.e., proof that \( E(\hat{\beta}_2) = \beta_2 \)
- Derivation of OLS decomposition equation
- Derivations of the t-statistic and F-statistic for \( \hat{\beta}_2 \)
- Basic concepts of hypothesis testing
- Derivation of two-sided 100(1–\( \alpha \)) percent confidence interval for \( \beta_2 \) or \( \beta_1 \)

Important Things to Know

- Assumptions A1-A8 of the Classical Linear Regression Model.
- Definition and meaning of the following statistical properties of estimators: (1) unbiasedness; (2) minimum variance; (3) efficiency; and (4) consistency.
- Statistical properties of the OLS coefficient estimators \( \hat{\beta}_1 \) and \( \hat{\beta}_2 \).
- Computational properties of the OLS sample regression equation.
- How to compute and interpret OLS coefficient estimates \( \hat{\beta}_1 \) and \( \hat{\beta}_2 \).
- How to compute and interpret the coefficient of determination \( R^2 \).
- The error normality assumption A9 and its implications for (1) the distribution of the \( Y_i \) values and (2) the sampling distributions of \( \hat{\beta}_1 \) and \( \hat{\beta}_2 \).
- How to construct and interpret two-sided confidence intervals for \( \beta_1 \) and \( \beta_2 \).
- How to perform two-tail and one-tail hypothesis tests for \( \beta_1 \) and \( \beta_2 \).