

系別：財務金融學系 B 組

科目：統 計 學

准帶項目請打「V」

✓

簡單型計算機

本試題共 1 頁，3 大題

1. (40 points) In multiple regression, the following three conditions would affect the results we obtain from the regression. Please define the three conditions, discuss their effects on the regression results, and provide a solution to the problem.

- i. Multicollinearity
- ii. Heteroskedasticity
- iii. Autocorrelation

2. (30 points) Assume that Y is a random variable with the following p.d.f.

$$f(y) = \begin{cases} 3y^2 & \text{for } 0 \leq y \leq 1, \\ 0 & \text{otherwise.} \end{cases}$$

- i. Find the value of $E(Y)$ and the value of $\text{Var}(Y)$.
- ii. Find the value of t such that $\Pr(Y > t) = 1/2$.
- iii. Suppose that X is also a random variable and X and Y have a continuous joint distribution with the following p.d.f. Are X and Y independent?

$$f(x, y) = \begin{cases} \frac{2}{3}y^2 & \text{for } 0 \leq x \leq 2 \text{ and } 0 \leq y \leq 1, \\ 0 & \text{otherwise.} \end{cases}$$

3. (30 points) Consider a regression model, $Y_i = a + bX_i + \varepsilon_i$, for which all the classical regression assumptions hold.

- i. Find the expected value and the variance of the residuals, ε_i .
- ii. List four assumptions of the classical regression model.
- iii. What is the R^2 ? And what is the purpose of calculating R^2 ?