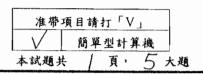
系別:財務金融學系 B 組

科目:統 計 學



- 1. (15 points) Suppose that  $Y_1$ ,  $Y_2$ ,  $Y_3$  is a sample or observations from a  $N(\beta, \sigma^2)$  population, but that  $Y_1$ ,  $Y_2$  and  $Y_3$  are not independent. In fact suppose,  $cov(Y_1, Y_2) = cov(Y_2, Y_3) = cov(Y_1, Y_3) = 0.5\sigma^2$ , Let  $\overline{Y} = (Y_1 + Y_2 + Y_3)/3$
- (a) Find  $E(\overline{Y})$ .
- (b) Find  $var(\overline{Y})$ .
- 2. (20 points) Suppose that X and Y are continuous random variables with the joint probability density function.

$$f(x,y) = \begin{cases} k(x+y) & for & 0 \le x \le 1, 0 \le y \le 2\\ 0 & otherwise \end{cases}$$

- (a) Find k
- (b) Find the var(X), var(Y)
- (c) Find the E (XY), cov (XY)
- (d) Are X and Y independent? Explain why?
- 3. (15 points) Algebraically show that the fitted least squares line

$$\hat{y}_i = b_1 + b_2 x_i$$
 passes through the point of the means,  $(x, y)$ 

4. (30 points) Consider the following estimated regression equation:

$$y_i = 5.83 + 0.869x_i$$
  $R^2 = 0.756$  (1.23) (0.117)

Rewrite the estimated equation that would result if:

- (a) all values of  $x_1$  were divided by 10 before estimation.
- (b) all values of y<sub>i</sub> were divided by 10 before estimation.
- (c) all valued of  $y_i$  and  $x_i$  were divided by 10 before estimation.
- 5. (20 points) Examine whether the following statements are **true** or **false**. Explain your answer briefly.
- (a) A significance level tells you how important the null hypothesis is.
- (b) It is always better to use a significance level of 0.01 than a level of 0.05.