※ 考生請注意：本試題可使用計算機。　請於答案卷(卡)作答，於本試題紙上作答者，不予計分。

1. A stockbroker wants to compare mean returns and risk (measured by variance) of two stocks and gets the following results:

First stock	Second stock
$N_1 = 31$	$N_2 = 31$
$\bar{X}_1 = 0.45$	$\bar{X}_2 = 0.35$
$S_1 = 0.60$	$S_2 = 0.40$

Clearly describe how to examine the significance of differences in the mean returns and risks. (10%)

2. Suppose that X and Y are continuous random variables with the joint probability density function:

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

(a) Find k, E(X), E(Y) (10%)

(b) Find V(X), V(Y) and Cov(X, Y). Are X and Y independent? (10%)

(c) Find the marginal densities of X given Y=1/2 and hence E(X|Y=1/2) and V(Y|X=1/2) (10%)

3. Consider the results of the time-series data (the values in parentheses are standard errors)

(1) $Y_t = 2.227 + \underset{(0.009)}{0.965} X_t$

$R_1^2 = 0.991 \qquad DW = 0.234$

(2) $\Delta Y_t = 2.626 + \underset{(0.189)}{0.161} \Delta X_t$

$R_0^2 = 0.007 \qquad DW = 2.09$

The Durbin-Watson (DW) test is the most often used to test for the presence of autocorrelation.

(a) Clearly describe how to use the DW test to detect the autocorrelation problem. The Equation (1) or (2) has the autocorrelation problem? (10%)

(b) Clearly identify the limitations of the DW test. (10%)

（背面仍有題目，請繼續作答）

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(c) The Equation (1) gets higher R^2 and the Equation (2) gets lower R^2. Therefore, we should estimate the equations in levels (i.e., the Equation (1)) rather than in first differences (i.e., the Equation (2)). Do you agree? Why? (10%)

4. Consider the results of the following regression:

Variable	Coefficient	Std. Error	t-statistic
Intercept	-0.1941	0.2005	-0.9679
X_1	-0.1507	9.7930	-0.0153
X_2	3.1831	9.6800	0.3288

$R^2=0.9888$

F-statistic=1201.386

Prob.(F-statistic)=0.0000

The R^2 is very high and the F-statistic is highly significant but the individual t-statistics are all insignificant. The inconsistent results between the F-statistic and the individual t-statistics show the evidence of the multicollinearity problem.

(a) Clearly define the F-statistic and the individual t-statistic as well as make a comparative analysis between them. (10%)

(b) Apart from the comparison between the F-statistic and the t-statistics, there are several alternative methods to detect the multicollinearity problem. Please describe them. (10%)

(c) What are the solutions of the multicollinearity problem? (10%)