

逢甲大學104學年度碩士班考試入學試題

編號：017 科目代碼：306

科目	統計學	適用系所	經濟學系	時間	100 分鐘
----	-----	------	------	----	--------

※請務必在答案卷作答區內作答。

共2頁第 / 頁

一、選擇題 (50分)

1) Analyzing the behavior of unemployment rates across 6 municipal cities of Taiwan in March of 2014 is an example of using

- A) time series data. B) panel data. C) experimental data. D) cross-sectional data.

2) Analyzing the wage changes of newly-graduated college students across the OECD countries from 2000 to 2014 is an example of using

- A) cross-sectional data. B) time series data. C) experimental data. D) panel data.

3) The conditional expectation of Y given X , $E(Y|X=x)$, is calculated as follows:

- A) $\sum_{i=1}^k Y_i \Pr(X=x_i|Y=y)$ B) $\sum_{i=1}^k y_i \Pr(Y=y_i|X=x)$
 C) $\sum_{i=1}^l E(Y|X=x_i) \Pr(X=x_i)$ D) $E[E(Y|X)]$

4) The correlation between X and Y

- A) cannot be negative since variances are always positive.
 B) can be calculated by dividing the covariance between X and Y by the product of the two standard deviations.
 C) is given by $\text{corr}(X, Y) = \frac{\text{cov}(X, Y)}{\text{var}(X) \text{var}(Y)}$
 D) is the covariance squared.

5) Assume that Y is normally distributed $N(\mu, \sigma^2)$. Moving from the mean (μ) 1.96 standard deviations to the left and 1.96 standard deviations to the right, then the area under the normal p.d.f. is

- A) 0.05 B) 0.95 C) 0.33 D) 0.67

6) Assume that Y is normally distributed $N(\mu, \sigma^2)$. To find $\Pr(c_1 \leq Y \leq c_2)$, where $c_1 < c_2$ and $d_i =$

$$\frac{c_i - \mu}{\sigma}, \text{ you need to calculate } \Pr(d_1 \leq Z \leq d_2) =$$

- A) $\Phi(d_2) - (1 - \Phi(d_1))$ B) $1 - (\Phi(d_2) - \Phi(d_1))$
 C) $\Phi(1.96) - \Phi(-1.96)$ D) $\Phi(d_2) - \Phi(d_1)$

7) $\sum_{i=1}^n (ax_i + by_i + c) =$

- A) $a \sum_{i=1}^n x_i + b \sum_{i=1}^n y_i + n \times c$ B) $a \sum_{i=1}^n x_i + b \sum_{i=1}^n y_i$
 C) $a \sum_{i=1}^n x_i + b \sum_{i=1}^n y_i + c$ D) $a\bar{x} + b\bar{y} + n \times c$

8) The critical value of a two-sided t -test computed from a large sample

- A) cannot be calculated unless you know the degrees of freedom.
 B) is 1.64 if the significance level of the test is 5%.
 C) is the same as the p -value.
 D) is 1.96 if the significance level of the test is 5%.

- 9) When the sample size n is large, the 90% confidence interval for μ_Y is
 A) $\bar{Y} \pm 1.96$. B) $\bar{Y} \pm 1.64SE(\bar{Y})$. C) $\bar{Y} \pm 1.96SE(\bar{Y})$. D) $\bar{Y} \pm 1.64\sigma_Y$.
- 10) Assume that you have 125 observations on the height (H) and weight (W) of your peers in college. Let $s_{HW} = 68$, $s_H = 3.5$, $s_W = 29$. The sample correlation coefficient is
 A) 0.67
 B) 0.50
 C) 1.22
 D) Cannot be computed since males and females have not been separated out.

二、問答計算題(50分)

1. A researcher plans to study the effect of distance to school on rent using data from a random sample of Feng Chia University. He plans to regress student's monthly rent for an apartment (y) on the distance (x) as the following:

$$y_t = \alpha_0 + \alpha_1 x_t + \varepsilon_t$$

- a) How will you predict the value of α_1 ? Specifically, will it be positive, negative, or indifferent from 0? Why? (5)
 b) Explain why the estimation of α_1 is very likely to be biased. (5)
 c) Which variables would you add to the regression to improve the estimation? List two potential variables and explain the reasons. (10)
2. Consider the following estimated regression equation based on annual data for 18 years ($n=18$):

$$\hat{y} = -58.9 + 0.20x_2 - 0.10x_3, \quad R^2 = 0.96$$

(se)	(0.0092)	(0.084)
(t)	(21.74)	(-1.19)

Testing the significance of the model by the following steps. (Note: $F_{(1,15)} = 4.54$, $F_{(2,15)} = 3.68$)

- a) Calculate the \bar{R}^2 . (10)
 b) Write down the null and alternative hypotheses. (5)
 c) Determine the rejection region at the 5% significance level. (5)
 d) Calculate the sample value of test statistic. (5)
 e) Make conclusion. (5)