

國立中央大學102學年度碩士班考試入學試題卷

所別：資訊管理學系碩士班 甲組(一般生) 科目：統計學 共 2 頁 第 1 頁
 資訊管理學系碩士班 丙組(一般生)

本科考試禁用計算器

*請在試卷答案卷(卡)內作答

參考用

1. (18%) Please answer the following questions.
 - a. What are the purposes of linear regression? (4%)
 - b. What are the required conditions for the validity of multiple linear regression? How can you diagnose these required conditions? What are the remedies to violations of these required conditions? (14%)

2. (15%) Julie wanted to know how to achieve high score in her MIS course. She collected the final exam mark, assignment mark and midterm test mark for 30 students who took the MIS course last year. A multiple regression analysis was performed with the results following. Please state the hypotheses and the regression equation when Julie performing this analysis. Please interpret the information in this table as much as you can. What can Julie infer from these results?

	A	B	C	D	E
1	SUMMARY OUTPUT				
2					
3	Regression Statistics				
4	Multiple R	0.8734			
5	R Square	0.7629			
6	Adjusted R Square	0.7453			
7	Standard Error	3.75			
8	Observations	30			
9					
10	ANOVA				
11		df	SS	MS	F
12	Regression	2	1223.2	611.6	43.43
13	Residual	27	380.2	14.1	
14	Total	29	1603.4		
15					
16		Coefficients	Standard Error	t Stat	P-value
17	Intercept	13.01	3.53	3.69	0.0010
18	Assignment	0.194	0.200	0.97	0.3417
19	Midterm	1.112	0.122	9.12	0.0000

3. (17%) In order to use one-way ANOVA F test, you must make three assumptions about the data being investigated.
 - a. Please list the three assumptions and explain their meanings. (9%)
 - b. Please conduct a research design which is suitable to apply one-way ANOVA F test. Please describe clearly regarding the sampling method, treatment and hypothesis. (8%)
4. (16%)
 - a. Under what conditions should the χ^2 test of independence be used? Please describe a scenario and state the hypothesis.
 - b. Under what conditions should the χ^2 test be used to examine possible differences in the proportions of c independent populations? Please describe a scenario and state the hypothesis.

注意：背面有試題

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5. (18%) For a statistical analysis, in general, the distribution of a data set for a variable is examined to determine if the set of data follows a normal distribution closely. You may examine how the collected data are distributed. For example, in case there are approximately two-thirds of the collected data lie between the mean and a standard deviation away from the mean on both sides. Explain in details on the following conditions. The explanation may incorporate the contents, the advantages and disadvantages, and the application of your exempted approaches.
- Describe at least 3 approaches to build charts/graphs to roughly determine if a set of data closely follow a normal distribution. (4%)
 - Compare at least 3 sets of the computed summary statistics for the collected data set with the corresponding theoretical properties of the normal distribution. (4%)
 - State how to build a normal probability plot for the collected data set. (6%)
 - What is the statistical test you choose to use? Describe how to perform the chosen statistical test for the normality in details. (4%)
6. (16%) You are assigned to perform a hypothesis testing on the mean and the proportion of a survey. In real world, it is rarely that the mean, the standard deviation, and the proportion of a population are given. You may use the following symbols to brief your statement: n =sample size, N =population size, μ =population mean, \bar{x} =sample mean, π =population proportion, p =sample proportion, σ = population standard deviation, s =sample standard deviation, e =margin of errors, and $1-\alpha$ = confidence coefficient. You may also use other well-defined symbols to brief your statement. Please answer the following questions.
- With a prescribed $1-\alpha_0$ and e_0 , what would you do to start your survey? Describe the procedure and the expected results at the very beginning process. Hint: You may start with a pilot survey and have to consider the procedures for both the mean and the proportion. (8%)
 - With the given null hypothesis $H_0: \mu = \mu_0$, and $H_0: \pi \leq \pi_0$ and the results obtained in the last question, a, How would you perform your testing for the mean and the proportion. Explain your procedures in details. (8%)

注意：背面有試題