

大同大學 九十四 學年度研究所碩士班入學考試試題

考試科目：統計學

所別：事業經營研究所

共兩頁 第1/2頁

註：本次考試 不可以參考自己的書籍及筆記； 不可以使用字典； 不可以使用計算器。

1. Why should we examine the data before applying statistical techniques and how to do it?
(10%)
2. How to use statistics to describe the characteristics of the set of data: {1, 2, 3, 3, 4, 5}?
(10%)
3. What is the sampling distribution of a statistic, for example, the sample mean? How do you use it to make inferences about the population mean μ when the population variance is known?
(10%)
4. In addition to normal distribution, please list and describe three another continuous distributions and describe how to use them in statistics.
(10%)
5. Describe the components of a time series.
(10%)
6. A standard regression package was run on the data including dependent variable y and two predictors, x1 and x2 with sample size n=20. The outputs are shown in the following tables.
 - a. What is the population regression model and what is the sample regression model?
 - b. What information or conclusion can you draw from each of the tables below?
(25%)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.557	0.310	0.229	0.603

ANOVA

	Sum of Squares	df	Mean Square	F	Sig.
Regression	2.779	2	1.389	3.827	0.042
Residual	6.171	17	0.363		
Total	8.950	19			

Coefficients

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
(Constant)	0.366	1.302		0.281	0.782		
x1	0.268	0.264	0.237	1.015	0.324	0.747	1.339
x2	0.537	0.313	0.399	1.714	0.105	0.747	1.339

- a. Dependent Variable: y. b. Predictors: (Constant), x2, x1.

<背面繼續>

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共兩頁 第2/2頁

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7. (1) Define the terms factor, level, and treatment used in ANOVA. (2) Two factors A and B are investigated at $a=2(a_1 \text{ and } a_2)$ and $b=3(b_1, b_2, \text{ and } b_3)$ levels, respectively. A standard ANOVA package was run on the data including the factors A, B and the dependent variable y with 5 observations for each of the six treatments (cells). What information or conclusion can you draw from the outputs shown in the following tables? When you compare the cell means with plots, what information can you draw? (25%)

Levene's Test of Equality of Error Variances

F	df1	df2	Sig.
0.582	5	24	0.714

Dependent Variable: y.

Descriptive statistics for dependent Variable: y

A	B	Mean	Std. Deviation	n
a1	b1	7.00	2.000	5
	b2	3.00	1.225	5
	b3	6.00	2.121	5
a2	b1	5.00	2.121	5
	b2	4.00	1.581	5
	b3	10.00	1.581	5

Tests of Between-Subjects Effects

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Intercept	1020.833	1	1020.833	314.103	0.000
A	7.500	1	7.500	2.308	0.142
B	101.667	2	50.833	15.641	0.000
A * B	45.000	2	22.500	6.923	0.004
Error	78.000	24	3.250		
Total	1253.000	30			
Corrected Total	232.167	29			

Dependent Variable: y; R Squared = .664 (Adjusted R Squared = .594)

Multiple Comparisons (LSD)

(I) B	(J) B	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
b1	b2	2.50(*)	0.806	0.005	0.84	4.16
	b3	-2.00(*)	0.806	0.021	-3.66	-0.34
b2	b3	-4.50(*)	0.806	0.000	-6.16	-2.84

Dependent Variable: y. Based on observed means.

* The mean difference is significant at the 0.05 level.