

# 國立中央大學九十一年度碩士班研究生入學試題卷

所別： 財務金融學系甲類乙組丙組科別：

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1. Let  $f(x, y)$  denote the joint probability density function of two continuous-type random variables  $x$  and  $y$ . If  $E[(2y+1)|x] = 5+3x$ ,  $E[y^2|x] = 5x^2 + 6x + 6$ , and the marginal probability density function of  $x$  is  $g(x) = \frac{1}{\sqrt{2\pi}} \exp\left[-\frac{(x-6)^2}{2}\right]$ , then

- (a)  $E[y] = ?$  (8分)  
 (b)  $Var[y|x] = ?$  (7分)

2. 李老師對其得意門生林、陳、王同學，進行四項不同學科的考試，其成績如下表：

學生	國際關係	行銷學	台灣史	財務管理
林	91	58	75	80
陳	82	95	61	77
王	67	74	89	74

請在 5% 的顯著水準下檢定以下假設。

- (a) 各學科的難易程度相當。(10分)  
 (b) 三位同學之學習能力相同。(10分)

附表：F(m, n) 分配之臨界值表：累積機率 .95

m \ n	1	2	3	4	5	6	7	8	9	10
1	161.447	199.500	215.707	224.583	230.161	233.986	236.768	238.882	240.543	241.881
2	18.512	19.000	19.164	19.246	19.296	19.329	19.353	19.371	19.384	19.395
3	10.128	9.552	9.276	9.117	9.013	8.940	8.886	8.845	8.812	8.785
4	7.708	6.944	6.591	6.388	6.256	6.163	6.094	6.041	5.998	5.964
5	6.607	5.786	5.409	5.192	5.050	4.950	4.875	4.818	4.772	4.735
6	5.987	5.143	4.757	4.533	4.387	4.283	4.206	4.146	4.099	4.060

3. 令今天的股價為  $S_0$ ，1 年後的股價為  $S_1$ ，2 年後的股價為  $S_2$ ，且  $\ln S_1 = \ln S_0 - \sigma \varepsilon_1$ ， $\ln S_2 = \ln S_1 + \sigma \varepsilon_2$ ，其中  $\sigma > 0$ ， $\varepsilon_1$  和  $\varepsilon_2$  為相互獨

參考用

注意：背面有試題

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所別: 財務金融學系甲乙丙組 科目: 統計 共 2 頁 第 2 頁

立的標準常態分配，若  $K_1 > K_2$ ，

$$A = \begin{cases} \max(S_2 - K_1, 0) & \text{if } S_1 \geq K_2 \\ \max(S_2 - K_2, 0) & \text{otherwise} \end{cases}$$

$$B = \text{Prob}(S_1 \geq K_2) \cdot E[\max(S_2 - K_1, 0)] \\ + \text{Prob}(S_1 < K_2) \cdot E[\max(S_2 - K_2, 0)]$$

則  $E[A] = B$  是否正確？若否，則何者較大？(15 分)

4. For the joint pmf in the table below:

(a) Find the conditional expectation function  $E(Y|X)$ . (10 分)

(b) Find the best linear predictor  $E^*(Y|X)$ . (10 分)

	$x = 1$	$x = 2$	$x = 3$
$y = 0$	0.1	0.15	0.1
$y = 1$	0.1	0.1	0.1
$y = 2$	0.05	0.15	0.15

5. Suppose a professor wants an estimate of the proportion of the students who would like to take his course. The professor wants the estimate to be within 0.05 of the true proportion with a 95 percent level of confidence. The department estimated the proportion to be 0.7.

(a) How large a sample is required? (7 分)

(b) How large would the sample have to be if the estimate by the department is not available? (8 分)

6. You want to estimate  $\theta = \mu_1 + \mu_2$ , where  $Y_1 \sim N(\mu_1, 80)$  and  $Y_2 \sim N(\mu_2, 150)$ . Due to budget constraints, you can only afford a total of 200 observations. Determine how many you should draw on  $Y_1$  and how many you should draw on  $Y_2$ . (15 分)