

淡江大學 105 學年度日間部寒假轉學生招生考試試題

系別：管理科學學系三年級

科目：統計學

23-1

考試日期：12月3日(星期六) 第1節

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本試題雙面印刷

1. 若連續隨機變數 X 的機率分配函數如 $f(x) = \begin{cases} k(x-1), & 1 < x < 2 \\ 0, & \text{otherwise} \end{cases}$ 試求

- (A) $k = ?$ (5%)
 (B) 期望值 $E(3X+1) = ?$ (5%)

2. Let $\{X_1, X_2, X_3\}$ be a random sample obtained from the iid $N(u, \sigma^2)$. Let the estimators $\hat{u}_1 = \frac{X_1 + X_2 + X_3}{3}$, $\hat{u}_2 = \frac{2X_1 + X_2 + X_3}{4}$ and $\hat{u}_3 = \frac{X_1 + 2X_2}{4}$, then

- (A) Which estimator is an unbiased estimator? (5%)
 (B) Which estimator is more efficient? (10%)

3. 下表為民眾對市政府滿意程度之機率分配：(X 表年齡層， Y 表滿意分數：最低分 1 分；最高分 5 分)，試求：(A) $E(Y)$ (5%) (B) $E(XY)$ (10%)。

X \ Y	1	2	3	4	5	總和
0 (表小於 30 歲)	0	0.05	0.15	0.2	0.1	0.5
1 (表大於、等於 30 歲)	0	0.1	0.2	0.2	0	0.5
總 和	0	0.15	0.35	0.4	0.1	

4. A test was conducted to find the number of hours a particular brand of battery lasts. Refer to the data given below: 200, 204, 197, 191, 203, 198, 216, 210, 202, 204, 198, 203, 181, 205, 194, and 194.

- (A) Find the mean hours of operation of the battery. (5%)
 (B) Find the standard deviation of hours of operation of the battery. (5%)

5. A telephone company wants to estimate the mean number of minutes people in a city spend talking long distance, to within 5 minutes with 95% confidence. From past records, an estimate of the standard deviation is 12 minutes. What is the minimum sample size? (10%)

6. In a department store, it is found that out of a randomly selected 64 customers, 21 buy cards. Construct a 95% confidence interval for the proportion of customers buying cards. (10%)

7. A certain weather forecaster is correct 80% of the time when he forecasts rain, and 90% of the time when he forecasts sun. In the area he's forecasting for, the weather is rainy 30% of the time and sunny 70% of the time. If the forecast is for rain today, what is the probability it will actually rain? (10%)

背面尚有試題

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8. The probability of a person liking an advertisement is 0.6. Ten individuals are interviewed at random.
- (A) What is the probability that exactly five like the advertisement? (5%)
- (B) What is the probability that at least one likes the advertisement? (5%)
9. In fifty different localities, the cable company gives free access to all cable channels for a weekend, as a promotional gesture. The mean proportion of customers who had the premium channels before the promotion was 20%. The mean proportion of customers who had the premium channels after the promotion was 26%. Is the increase significant at $\alpha = 0.05$? (10%)

提供統計查表值 $z_{0.025} = 1.96$, $z_{0.05} = 1.645$, $z_{0.1} = 1.282$