

本試題是否可以使用計算機: 可使用, 不可使用 (請命題老師勾選)

I. True or False (20 points, 2 pts each)

Notes:

- (1) Answer questions using "T" or "F".
- (2) Write down your answers along with associated questions.
- (3) Label questions in numerical order.

1. The sample median is an unbiased and consistent estimator for the population mean in random samples.
2. The variance of the sum of N variables could be larger than the sum of individual variance of N variables.
3. If we standardize a random variable x with mean μ and variance σ^2 using $z = \frac{x-\mu}{\sigma}$, then z will be normally distributed.
4. If the correlation between two variables is zero, then we are sure that these two variables are independent.
5. The sample correlation is independent of units of measurement.
6. An analyst computed a chi-square test and concluded he should reject the null hypothesis at significance level of 5%. Consequently, we know that the p -value of this chi-square test should be larger than 5%.
7. The sum of random variables which are independently identically distributed is normally distributed as the sample size becomes large.
8. In a supermarket, there are five cashiers awaiting customers. Given five minutes, there is a 10% chance that one cashier completes service of one customer and these services are independent. Therefore, the probability that at least one cashier completes service of one customer is 50%.
9. The inferential statistics, not descriptive statistics, make use of sample data to predict population and are for the decision-making purpose.
10. The nonparametric tests are distribution free but suffer the data dependency problem.

(背面仍有題目,請繼續作答)

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II. Choose the BEST answer (45 points, 3 pts each)

Notes:

- (1) Answer questions using "A", "B", "C", or "D".
- (2) Write down your answers along with associated questions.
- (3) Label questions in numerical order.

1. A financial manager held a portfolio with a market value of \$100,000 in 2002. At the end of next four years, the market values of this portfolio were \$105,000, \$102,900, \$105,987, and \$107,046.87, respectively. Therefore, the geometric and arithmetic mean returns of this portfolio were:

	Geometric Mean	Arithmetic Mean
(A)	1.51%	1.62%
(B)	1.72%	1.75%
(C)	1.70%	1.81%
(D)	1.25%	1.62%

2. Use the following information to answer Questions 2 and 3.

The Ministry of Transportation and Communications (MOTC) reports that over 10-year period the probability is 0.0012 per month that a car will be involved with an accident. Suppose there are 20,269,604 registered cars over this month, then the expected number of cars are involved in accidents is:

- (A) 24,323.52
 - (B) 24,434.42
 - (C) 23,412.23
 - (D) 24,044.23
3. Based on information in question 2, what is the standard deviation of car accidental rate?
- (A) 24,295.24
 - (B) 24,296.45
 - (C) 24,294.34
 - (D) 24,290.12
4. The probability that the stock price of Company A rises 5% is 15% and the probability that the stock price of Company B rises 5% is 25%. Hence, the probability that the stock price of at least one company will rise 5% is:
- (A) 3.75%
 - (B) 36.25%
 - (C) 40%
 - (D) 10%

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5. Use the following information to answer Question 5 to Question 7.

The following probability tables are for the economy and stock market performance:

State of Economy	Good	Neutral	Poor
Probability	0.45	0.25	0.3

State of Economy	Stock Market Performance		
	Rising	Neutral	Decreasing
Good	0.6	0.2	0.2
Neutral	0.4	0.4	0.2
Poor	0.4	0.3	0.3

The probability of neutral stock market performance is:

- (A) 0.28
(B) 0.25
(C) 0.90
(D) 0.10
6. Based on information in question 5, the probability for simultaneous good economy and rising stock performance is:
- (A) 0.60
(B) 0.49
(C) 0.27
(D) 0.45
7. Based on information in question 5, an investor has the following additional information about his portfolio:

Stock Market Performance	Rising	Neutral	Decreasing
Return Rate	5%	2%	-1.5%

What is the expected return of his portfolio under stock market performance?

- (A) 1.833%
(B) 2.300%
(C) 2.365%
(D) 2.665%
8. Use the following information to answer Question 8 to Question 10.
- The expected sample mean and sample variance of bulb duration are 36.5 months and 25 months. What is the coefficient of variation for bulb duration?
- (A) 1.46
(B) 7.30
(C) 0.14
(D) 0.68

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9. Based on information in question 8, a quality control inspector would like to know whether the bulb duration is greater than 36 months or not and calculated t -statistic of bulb duration to be 2.1. What is the sample size?
- (A) 20
(B) 22
(C) 441
(D) 442
10. Based on information in questions 8 and 9, is the bulb duration significantly greater than 36 months at significance level of 2.5%? (The critical values of normal distribution at significance levels of 2.5% and 5% equal 1.96 and 1.645, respectively, for the right tail)
- (A) Significantly.
(B) Insignificantly.
(C) Undetermined.
(D) Insufficient information to determine.
11. Use the following information to answer **Question 11 to Questions 13**.
- Two random variables x and y . x has mean 130.45, variance 121.33, and the sample size of 25 while y has mean 135.01, variance 160.35, and the sample size of 16. If we want to test if x and y have the same means using t test, then what are the values of t -statistic and the degree of freedom assuming equal variance between x and y ?
- | | t -statistic | Degree of freedom |
|-----|----------------|-------------------|
| (A) | 1.1562 | 41 |
| (B) | 1.2234 | 41 |
| (C) | -1.1823 | 39 |
| (D) | -1.2198 | 39 |
12. Based on information in question 11, assuming unequal variance, then what are the values of t -statistic and the degree of freedom assuming unequal variance between x and y ?
- | | t -statistic | Degree of freedom |
|-----|----------------|-------------------|
| (A) | -1.2198 | 29 |
| (B) | -1.1823 | 29 |
| (C) | 1.1562 | 31 |
| (D) | 1.2234 | 31 |
13. Based on information in question 11, if the correlation between x and y is -0.35, what is the variance of the sum of x and y ?
- (A) 184.0542
(B) 184.0245
(C) 184.0425
(D) 184.0254

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14. Use the following information to answer Questions 14 and 15.
An analyst has the following table for weekly Taiwan Stock Exchange (TSE) weighted index returns:

	Sample size	Mean	Median	Standard Deviation
TSE weighted	104	0.014	0.012	0.062

If weekly returns are normally distributed, give 95% confidence interval for true mean μ ? (The critical values of normal distribution at significance levels of 2.5% and 5% equal 1.96 and 1.645, respectively, for the right tail)

- (A) $0.00400 < \mu < 0.02400$
(B) $0.00208 < \mu < 0.02592$
(C) $-0.00166 < \mu < 0.02966$
(D) $-0.00214 < \mu < 0.02582$
15. Based on information in question 14, test the null hypothesis that the mean return is zero. (The critical values of normal distribution at significance levels of 2.5% and 5% equal 1.96 and 1.645, respectively, for the right tail)
- (A) Insignificantly different from zero at significance level of 5%.
(B) Insufficient information to determine at significance level of 5%.
(C) Insignificantly different from zero at significance level of 10%.
(D) Significantly different from zero at significance level of 10%.

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III. Fill in the Blanks (35 points, 5 pts each)

Notes:

- (1) Write down your answers along with associated blanks.
- (2) Label blanks in alphabetical order.

1. Below are shown the investment performance results of three pension fund managers who deal with three identical pension programs for past five months.

Months	Manager 1	Manager 2	Manager 3
August	0.120	0.130	0.020
September	0.010	-0.010	0.012
October	0.050	0.001	0.014
November	0.015	0.020	0.011
December	0.020	0.030	0.001

The following ANOVA table has been prepared by an analyst:

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	F
Between Managers	(a)	2	####	(c)
Error (within managers)	####	12	(b)	
Total	0.023646	14		

Therefore, what are values shown in (a), (b), and (c)?

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2. In order to understand the relationship between large-cap stock return and TSE (Taiwan Stock Exchange) weighted index return, an analyst has run a simple linear regression line and results are shown as follows:

	Coefficient	Standard Error of Coefficient	t-value
Intercept	1.25	1.73	0.72
TSE weighted index	2.12	0.25	8.48

The correlation coefficient between large-cap stock return and TSE weighted index return equals 0.882.

- (d) If the relationship between large-cap stock return and TSE weighted index return is believed to follow the regression line above in the future, then what is the expected return on large-cap stocks if the expected return on the TWS weighted index is 5% for the next period? (d)
- (e) What is the R-squared of the regression line? (e)

3. A dice was tossed 240 times and results are shown as follows:

Outcome	1	2	3	4	5	6
Frequency	32	32	34	47	50	45

And the critical value of chi-square distribution with the degree of freedom equal to 5 at significance level of 5% is 11.07.

- (f) If we construct a chi-square statistic using Kolmogorov-Smirnov test, what is the value of calculated chi-square statistic? (f)
- (g) Do we have strong evidence showing that this dice is unfair at significance level of 5%? (Please answer "yes" or "no")? (g)