國立臺灣大學 112 學年度碩士班招生考試試題

1. Please answer the following questions about standard error (25 分)
    a. What is the equation for standard error? (5 分)
    b. Describe the differences between standard deviation and standard error. (5 分)
    c. Why is standard error important? (5 分)
    d. What is Central Limit Theorem? (10 分)

2. Given a sample data, y = {8, 6, 5, 10, 9}, please answer the following questions (25 分):
    a. Calculate the arithmetic mean of y. (4 分)
    b. Calculate the geometric mean of y. (4 分)
    c. Calculate the harmonic mean of y. (2 分)
    d. Calculate the standard deviation of y. (4 分)
    e. Calculate the standard error of y. (3 分)
    f. Calculate the median of y. (3 分)
    g. Calculate the 95% confidence interval of y. (5 分)

3. Please answer the following questions above hypothesis testing (25 分):
    a. What is a non-parametric hypothesis test for one-sample data? (2 分)
    b. What is a non-parametric hypothesis test for unpaired two-sample data? (2 分)
    c. What is a non-parametric hypothesis test for paired two-sample data? (2 分)
    d. What is a non-parametric hypothesis test for testing Normality assumption? (2 分)
    e. The following is an ANOVA table, please fill in the blank (17 分)

Source of Variation	Degree of Freedom	Sum of Squares	Mean Square	F-Ratio
Treatment	1		2528.95	
Days	2		6124.48	
Treatment × Days		11747.21		
Residual		45335.10		
Total	43			

4. For a simple linear regression model $y = \beta_0 + \beta_1 x + \varepsilon$, prove the estimated slope equation is $\hat{\beta_1} = \dfrac{\sum_{i=1}^{n}(x_i - \bar{x})(y_i - \bar{y})}{\sum_{i=1}^{n}(x_i - \bar{x})^2}$ using Normal equation approach. (25 分)

試題隨卷繳回