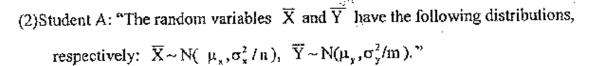
- —. Suppose two random samples $(x_1, x_2, ..., x_n; y_1, y_2, ..., y_m)$ are drawn independently from the populations with means and standard deviations, μ_x and μ_y,σ_x and σ_y , respectively. Some statements are made by two students, Aand B.
- (1) Student A: "All of the $x_1, x_2, ...x_n$, y_1, y_2 , ...and y_m are independently distributed. They are also distributed identically as their respective populations." Student B: " $x_1, x_2 \dots$ and x_n are distributed identically and independently. So are $y_1, y_2, ...$ and y_m ."

How would you modify the statements to make them correct, if necessary? State it!(15%)



Student B: "Statistics \overline{X} and \overline{Y} are the unbiased estimators of the respective population means."

Are the above statements correct? If not, how would you modify them?(10%)

- (3) Students A and B want to test the hypothesis about the population variances. So they set up the following hypothesis: $H_0: S_x^2 = S_y^2$ v.s. $H_a: S_x^2 \neq S_y^2$.
 - Empirically, since $S_x^2/S_y^2 \le F_{i\Omega}(n-1, m-1)$, they claim that the population variances should be the same. (15%)
- (a) Is there any problem with this test procedure and their conclusion?
- (b) What errors could be involved in this hypothesis?
- (4) The two students also want to test the hypothesis about the population means. Student A claims that he needs to test the equality of $|\sigma_x|^2$ and $|\sigma_y|^2$ While student B said it is more appropriate to employ a paired difference test.

What's your opinion on their claims?(15%)



國立中央大學八十八學年度碩士班研究生入學試題卷

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統計學

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According to the regression outcomes shown below, answer the following questions:

$$\hat{Y} = 56.36 + 0.036 \, X_1 - 0.508 \, X_2 - 0.088 \, X_3$$

$$R^2 = 0.641$$
; Number of observations = 80

Values in the parenthesis are standard errors.

- (1) What is the $\overline{\mathbb{R}}^2$ of this regression? How is the fitness of this model, if it is a cross-sectional one?(15%)
- (2) What is the F-statistic corresponding to the hypothesis test: H₀: all coefficients except the intercept = 0 v.s. Ha: at least one coefficient (other than the intercept) = 0? According to the above test statistic, how is the fitness of this model?(15%) F_{0.025}(3, 60)=3.34; F_{0.025}(3, 120)=3.23.
 F_{0.025}(4, 60)=3.01; F_{0.025}(4, 120)=2.89.
- (3) What is the significance of X₃? Write down its corresponding hypothesis test and make your conclusion.(15%)

