

MTH 4230 Lab 5 Answer Sheet

Due Wed., Mar. 4

1 Part A

1.1 Patient Satisfaction Data Set

1. NA
2. NA
3. Give the following values:

$$\text{SSR}(X_2) = \text{-----}$$

$$\text{SSR}(X_1|X_2) = \text{-----}$$

$$\text{SSR}(X_3|X_1, X_2) = \text{-----}$$

4. State the hypotheses tested by the partial F test:

Please answer the following questions:

The observed value of the partial F test statistic is $F = \text{-----}$

The p-value = -----

Based on the partial F test, using $\alpha = 0.025$, would it be useful to add X_3 to the model if it already includes X_1 and X_2 (Yes/No)? -----

5. Show that $F = t^2$, where F is the partial F test statistic of Step 4 and t is the t test statistic for β_3 . Also verify that the p-value for the t test is the same as that for the F test.

6. The partial R^2 value is $R^2_{X_3|X_1, X_2} = \text{-----}$

2 Part B

2.1 Nigeria Household Refuse Data Set

1. NA
2. NA (*don't* print the plot).
3. NA
4. NA
5. *Don't* print the plot, just answer the following question: Base on the scatterplot of Step 2 and the residual plot of this step, do you think a simple linear regression model is appropriate? Explain.

6. NA
7. NA
8. Based on the t tests for the β_k 's, which, if any, of the predictors X, X^2, X^3 and X^4 are statistically significant?

Based on the overall model F test, is at least one of the coefficients $\beta_1, \beta_2, \beta_3$ or β_4 different from 0?

9. Give the following values of the partial F tests:

$$F_{X^2|X} = \text{-----} \quad \text{and the p-value is } \text{-----}.$$

$$F_{X^3|X, X^2} = \text{-----} \quad \text{and the p-value is } \text{-----}.$$

$$F_{X^4|X, X^2, X^3} = \text{-----} \quad \text{and the p-value is } \text{-----}.$$

Based on the partial F tests, which of the polynomial terms X , X^2 , X^3 and X^4 should be kept in the model?

10. NA

11. Write out the equation of the fitted third order polynomial below.

12. *Don't* print the scatterplot, just describe how well the polynomial fits the data.