

MTH 4230 Lab 3 Answer Sheet

Due Wed., Feb. 19

1 Part A: Regression Through the Origin

1.1 Real Estate Data

1. NA
2. NA (*don't* print the plot).
3. Write the equation of the **fitted model** below.

4. *Don't* print the plot, just answer this question. Does it appear that forcing the line to go through the origin is appropriate for this data set (Yes/No)? _____

5. *Don't* print the plot, just describe any **pattern** that you see.

6. Do the residuals sum to zero (Yes/No)? _____

Give the value of the sum of the residuals: $\sum e_i =$ _____

2 Part B: Matrix Approach to Regression

2.1 Real Estate Data (Cont'd)

1. NA

2. Write the matrix $(\mathbf{X}^T \mathbf{X})^{-1}$ below.

3. NA

4. Write the vector \mathbf{b} below.

Are the coefficients in \mathbf{b} the same as those reported in the output of `summary()`
(Yes/No)?

5. Are the fitted values in $\hat{\mathbf{Y}}$ the same as those returned by `my.reg$fitted.values`
(Yes/No)?

6. Are the residuals in \mathbf{e} the same as those returned by `my.reg$residuals`
(Yes/No)?

7. Are the **square roots** of the **diagonal** elements of $\mathbf{MSE} \cdot (\mathbf{X}^T \mathbf{X})^{-1}$ equal to the **standard errors** the output of `summary()` (Yes/No)?

3 Part C: Linearly Dependent Design Matrix

3.1 Hypothetical Snakes Data

1. What property of the (hypothetical) `snakes` data set prevented R from being able to fit the regression model?