Exam No. 3 on Topics from Chapters 2 through 6 (1 hour)

I.
You have data on the sale price (PRICE) in thousands of dollars, square feet of living area (SQFT), and square feet of the yard size (YARD) for a sample of 59 single family homes sold recently. The basic model you first estimated was

$$\text{PRICE} = b_1 + b_2 \text{SQFT} + b_3 \text{YARD} + u$$

You suspect that the terms ln(SQFT) and ln(YARD) should be added to the above model. To perform an LM test for the addition of these variables, you obtained the following auxiliary regression.

$$\hat{u}_t = \underset{(0.01)}{3265} + \underset{(0.012)}{0.255}\,\text{SQFT} - \underset{(0.917)}{0.000485}\,\text{YARD} - \underset{(0.011)}{507}\,\ln(\text{SQFT}) + \underset{(0.886)}{6.765}\,\ln(\text{YARD})$$

Unadjusted $R^2 = 0.115$, $n = 59$, and the values in parentheses are *p*-values for a two-tailed test.

1. (6 points)
Carefully describe how you must have obtained $\hat{u}_t$.

2. (2 + 3 + 3 points)
Compute the test statistic and state its distribution and d.f.

3. (3 + 3 points)
Use a 5 percent level of significance and actually carry out the test. What do you conclude?

4. (5 points)
From the information given above, write down a model you should estimate. Carefully justify your choice (Note: this should not be "kitchen sink" model.)

II.
State whether each of the following statements is valid. Provide appropriate justification.

1. (5 points)
"Multicollinearity raises the standard errors of regression coefficients and hence *t* and *F* tests are invalid."

2. (5 points)
"If there is multicollinearity among independent variables, then a variable that appears significant may not indeed be so."

3. (5 points)
"Because multicollinearity lowers *t*-statistics making some regression coefficients insignificant, all the corresponding variables should be dropped from the model because they are redundant."