Answers to Exam No. 3 on Topics from Chapters 2 through 6

I.

1. First regress PRICE against a constant, SQFT, and YARD and obtain b_1, b_2, and b_3. Then compute $\hat{u}_t$ as PRICE $-\hat{b}_1 - \hat{b}_2$ SQFT $-\hat{b}_3$ YARD.

2. The test statistic is LM = nR^2 = 59 $\times$ 0.115 = 6.785. It is distributed as chi-square with 2 d.f.

3. From the chi-square table we have LM^* = 5.99146. Since LM > LM^*, we reject the null hypothesis and conclude that either ln(SQFT), or ln(YARD), or both belong in the model.

4. The rule of thumb for inclusion is any new variable with *p*-value less than 0.50. By this rule, ln(SQFT) should be included. The new model is

$$\text{PRICE} = b_1 + b_2\,\text{SQFT} + b_3\,\text{YARD} + b_4\,\ln(\text{SQFT}) + v$$

II.

1. This statement is wrong. Although multicollinearity (MC) does raise the standard errors, the estimates are unbiased and consistent and the *t*- and *F*-distributions are valid. Therefore the tests are valid.

2. This statement is erroneous, just the opposite is true. MC increases the standard errors and <u>lowers</u> *t*-statistics. A lower *t*-statistic is likely to make a variable insignificant rather than significant.

3. The statement is wrong. Although *t*-tests might indicate individual insignificance, several variables may be jointly significant. If all the insignificant variables are dropped, we are likely to introduce serious omitted variable bias. We saw in Table 5.8 that both LG and LP are insignificant. But when LP was omitted in Model B, LG became significant. If we had eliminated both, we would have committed the specification error of omitting a variable (LG) that belongs in the model.