Stat-440/640 Regression and Time Series Analysis
Fall 2018

Homework 6A

Name _____

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1. Quarterly Australian beer production (in megalitters) form 1992 to 2008 is presented in the file ausbeer1.txt (posted on D2L). Use R to fit a regression model of the beer production by using the model

$$y_t = \beta_0 + \beta_1 t + \beta_2 Q_2 + \beta_3 Q_3 + \beta_4 Q_4 + \epsilon_t$$

where Q_2, Q_3 , and Q_4 are the appropriately defined dummy variables for quarters 2,3, and 4.

   (a) Write out definitions of the dummy variables Q_2, Q_3 , and Q_4.

   (b) Plot the data, what kind of trend and seasonal variation appear to exist? Is a transformation needed to obtain a series that displays constant variation?

   (c) Find the predicted values for beer production in year 2009. Find and identify $\hat{y}_{68}$, $\hat{y}_{69}$, $\hat{y}_{70}$, $\hat{y}_{71}$, and $\hat{y}_{72}$.

   (d) Write the prediction equation for the model, and use it to calculate $\hat{y}_{68}$ and $\hat{y}_{69}$.

   (e) Find the 95% prediction intervals for y_{69}, y_{70}, y_{71}, and y_{72},