I need help with the following questions. I have the data on an excel spreadsheet.

1. Using the data for the monthly number of airline tickets sold, answer the following:
a. Fit a linear trend to this data. Estimate and interpret the coefficients of this model.
Does the linear model fit well? Interpret the coefficient of determination and standard error of estimate.
b. Provide three measures of forecast accuracy.
c. Is data seasonal? Please discuss.

2. Using the monthly data related to U.S. national debt (in $) answer the following questions:
a. Fit an exponential growth model to this data. Hint: Use LN(Y).
b. If the national death continues at the same rate estimate its value in 2020.

3. The table provides data for the proportion of the Americans under the age of 18 that are living below the poverty level. Please answer the following:
a. Find the first six autocorrelations of this time series (TS)?
b. Fit an autoregressive model with four lags.
c. Propose the best autoregressive model.
d. Using the model of part c, calculate the MSE, MAE, and MAPE.
e. Find the forecast for the proportion of American children living below poverty level in the next year.

4. Consider the 30-year mortgages rates in the U.S. Answer the following:
a. Develop a good autoregressive model based on autocorrelations.
b. Using the model of part a, forecast the monthly mortgage rates for the next three years.

5. Using the daily closing prices of American Express stock for a one year period, answer the following:
a. Using moving average method with span of 3, forecast the price of stock for the next trading day.
b. Repeat part a with a span of 10.
c. Which of the above two models do you recommend? Justify your answer.

6. The closing prices for DJIA for each trading day of the year is given in the table.
a. Using moving average method with span of 3 forecast the price of this index on the next trading day.
b. Repeat the model of part a with 10 and 15 day spans.
c. Which of the three spans appear to be more appropriate? Why?

7. Re-considering the airline ticket data, answer the following:
a. Graph the time series data. Based on the graph of part a, which exponential smoothing model do you recommend? Why?
b. Use simple exponential smoothing to make a forecast for the next 12 months, with no holdout period.
Use the default smoothing constant of 0.10.
c. Repeat part b, using the optimizing smoothing constant feature of the software. Does it result in a significant improvement in the model? Explain.

8. Re-consider the poverty level data and answer the following:
a. Plot the time series data. Based on the graph, which exponential smoothing model do you propose and why?
b. Using simple exponential smoothing technique forecast for three future periods. Make sure that you use default smoothing constant (a=0.10) and no holdout periods.
c. Repeat part b using the optimize feature for the smoothing constant. Graph the models of part b and c superimposed. Is the model of part c preferable to the model of part b?
d. Write a short report to summarize the results.

9. Using the monthly retail sales (in millions) of beer, wine and liquor in the U.S., answer the following:
a. Is seasonality present in this data? If so, deseasonalize the time series data using the ratio-to-moving-
average method.
b. If you decided to deseasonalize the data, forecast the deseasonalized data for each month of the next year using the moving average method with an appropriate span.
c. Redo part b using Holt's model. Is the Holt's model preferable to the moving average method? Why or why not?

10. Continue the previous problem and answer the following:
a. Deseasonlize the data again and use Winters' method to handle seasonality. Forecast for the next 12 months.
b. Which of the moving average, Holt's exponential smoothing, or Winters' method do you prefer? Why?