

Case Problems #4, Due 7/29(or 7/30)/2026

1. Solve one of the following two case studies:

Case #1. Musical Instrument Sales with Seasonality. The Costello Music Company has been in business for five years. During that time, sales of pianos increased from 12 units in the first year to 76 units in the most recent year. The quarterly sales data follow.

Year	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Total Yearly Sales
1	6	15	10	4	35
2	10	18	15	7	50
3	14	26	23	12	75
4	19	28	25	18	90
5	22	34	28	21	105
6	24	36	30	20	110
7	28	40	35	27	130

- Use the following dummy variables to develop an estimated regression equation to account for any seasonal and linear trend effects in the data: Qtr1 = 1 if Quarter 1, 0 otherwise; Qtr2 = 1 if Quarter 2, 0 otherwise; and Qtr3 = 1 if Quarter 3, 0 otherwise.
- Compute the quarterly forecasts for next year.
- Using time series decomposition, compute the seasonal indexes for the four quarters.
- When does Costello Music experience the largest seasonal effect? Does this result appear reasonable? Explain.

Case #2. Boat Trailer Sales. Hudson Marine provides boat sales, service, and maintenance. Boat trailers are one of its top sales items. Suppose the quarterly sales values for the seven years of historical data are as follows.

Year	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Total Yearly Sales
1	6	15	10	4	35
2	10	18	15	7	50
3	14	26	23	12	75
4	19	28	25	18	90
5	22	34	28	21	105
6	24	36	30	20	110
7	28	40	35	27	130

- (a) Use the following dummy variables to develop an estimated regression equation to account for any season and linear trend effects in the data: $Qtr1 = 1$ if Quarter 1, 0 otherwise; $Qtr2 = 1$ if Quarter 2, 0 otherwise; and $Qtr3 = 1$ if Quarter 3, 0 otherwise.
 - (b) Compute the quarterly forecasts for next year.
 - (c) Compute the centered moving average values for this time series.
 - (d) Construct a time series plot that also shows the centered moving average and original time series on the same graph. Discuss the differences between the original time series plot and the centered moving average time series.
 - (e) Compute the seasonal indexes for the four quarters.
 - (f) When does Hudson Marine experience the largest seasonal effect? Does this result seem reasonable? Explain.
2. Some says that “*Prediction is the process of estimating the outcomes of unseen data. Forecasting is a sub-discipline of prediction in which we use time-series data to make forecasts about the future.*” There are two techniques used in accounting forecasting: qualitative and quantitative.
- (a) Qualitative forecasting methods are subjective, based on the opinion and the judgment of consumers and experts. Give some examples of frequently used qualitative forecasting methods.
 - (b) Quantitative forecasting is different from qualitative forecasting because it is objective and based on statistics and mathematics. There are various quantitative strategies and provide some of your popular choices.