Math 120R

Revenue Lab

Furniture Barn is a chain of furniture in the northeastern corner of South Dakota. In the past few weeks, the revenue produced from the sale of their luxury recliners has disappointed them. In an effort to find a solution to their revenue problems, they have compiled the following data relating the prices at which the recliners are sold and the corresponding demand.

Recliner ($)	399	459	499	569	599
Demand (recliners per day)	62	58	56	52	50

Everyone in management seems to agree that revenue would increase by raising the price of the recliner somewhat, but there is a disagreement as to how far the price should be raised. You have recently been hired by Furniture Barn to deliver furniture. Having just taken a precalculus class, you see your opportunity to move up in the organization. You volunteer to research their problem and write up a report that will allow the management of Furniture Barn to decide how they should price the recliners so that the revenue from the sales of these recliners is maximized.

You decide to begin by plotting the demand for the recliners as a function of price. Does the collection of data points appear linear? Use linear regression to find an approximate formula for the number of recliners demanded, q, as a function of the price of the recliner, p, in dollars. Does your equation fit the data points exactly? Explain. Use your formula to predict the number of recliners that would be demanded at selling prices of $650, $700, and $750. According to your formula, is there a price at which the recliner is so expensive that there would be no demand?

Now, focus on the question of the daily revenue earned from sales of the recliner at various prices. Explain how you would compute Furniture Barn's daily revenue from recliner sales at selling prices of $399 and $650. Do you think that revenue will continue to increase as the price of the recliner is raised higher and higher, or is there evidence to suggest otherwise? Justify your answer by constructing a table showing revenue, R, (in dollars) as a function of recliner price, p, (in dollars), for an appropriate chosen list of selling prices.

Finally, find a formula, $R = f(p)$, which gives the revenue as a function of recliner price. Construct a graph of your function using an appropriate domain and range. What type of function do you get? Based on your revenue function, find the selling price for the recliner that will maximize Furniture Barn's daily revenue. What is the maximum daily revenue they can expect?

Note: Keep in mind that this is a lab *report,* not just a disjoint collection of questions to be answered. Remember that you should clearly communicate the problem and solution procedure to the reader, with one idea following the next in a smooth and natural fashion. **Though you need to include the pertinent calculations, the majority of the report should consist of words and graphs**. The report should also contain an introduction that presents the problem to the reader and describes the ultimate goal. You also need to include a conclusion that sums up the results obtained. Graphs and tables should be placed at the appropriate places in the report.