Decision Report 5

Team: _____

MATH 144 Applied Calculus for Business
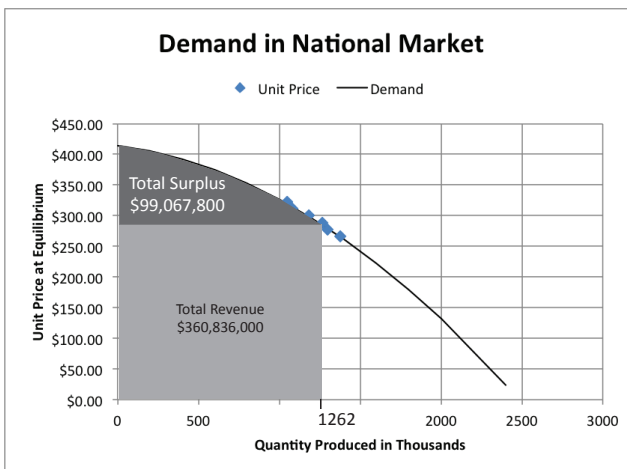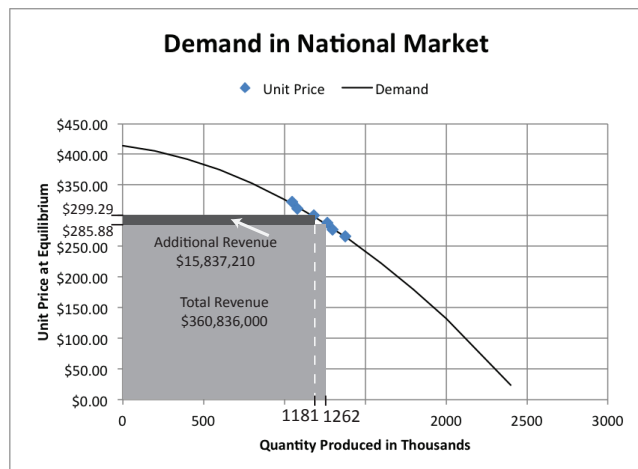
Price Discrimination

Score: [   ]

In your previous decision, your team set an optimal quantity and price for producing your product. At this price point, a maximum amount of profit would be made. However, your solution assumes that every consumer pays the same price for your product. When you set your price point in the previous decision report, there were some consumers who would buy at your price but *would have been willing to pay more*. The example data below compares one test market to the optimal solution:

	National Quantity q (thousands)	Price p (\$/unit)	Total Revenue R (\$thousands)	Total Cost C (\$thousands)	Total Profit P (\$thousands)
Market #4	1181	299.29	353,457	311,768	41,688
(Optimal)	1262	285.88	360,836	318,678	42,158

If we choose to set a price of $p = \$285.88$ for our product, we'll sell $q = 1,262$ thousand units. But Test Market #4 shows that, *even at a higher price* of $p = \$299.29$, *we still would have sold* most of those units, $q = 1,181$ thousand. If we could identify consumers who were more like those in this test market, and charge them a higher price, we could make additional revenue. This practice is known as **price discrimination**, and is one factor that helps explain (for example) why gasoline is more expensive on Cape Cod than it is 10 miles away in Plymouth. If we charged the higher price for the first 1,181 thousand units and the lower price for the remaining units, we would still sell all our quantity, but would make an *additional* revenue of

$$\Delta R = q\,\Delta p = (1181)\big(299.29 - 285.88\big) = (1181)(13.41) = 15837.21 \text{ thousand dollars}$$

as shown in the diagrams below. This additional revenue is known as **consumer surplus,** and since no additional costs are incurred, this revenue can be thought of as pure profit.

After your last recommendation, your Vice President of National Sales has come back to your team with a challenge. He's satisfied with your analysis but wants to know if there's any way that a price discrimination scheme could generate an additional **\$100 million** of sales revenue for your product. That additional revenue, he says, could make or break whether your product is approved for production.

Decision: Respond to your VP's request: can price discrimination for your product generate an additional \$100 million of sales revenue? In your memo, include both a recommendation for a two-tier price discrimination scheme such as in Figure (a), and a prediction of the *total* amount of consumer surplus for your product as in Figure (b).

Deliverable: Your team should generate graphs similar to those in Figures (a) and (b) for your price discrimination plans. (Annotate them using the Drawing Tools in Excel.) Also, completely show the calculations you used to determine the revenue for each plan, including the definite integral that computes total consumer surplus.