

Math 1525 LAB 7: VA Tech Lapel Pin Money Making Project

The problems below describe a hypothetical business scenario and poses questions related to that scenario. You will use your answers to make a decision regarding the feasibility of the opportunities presented. Answer each question in complete sentences, on a separate sheet of paper.

You belong to a Virginia Tech service club whose members have decided to help sponsor economic disadvantaged students coming to VA Tech. You have been told that 30,000 dollars is desperately needed. Therefore, your club will have a money-making project. One member checks with the Tech Bookstore for data concerning sales of VA Tech Lapel Pins. The company that usually supplies the pins to the bookstore has agreed to supply them to the club at cost in return for appreciation advertising by club members. Tech Bookstore also will give data concerning the sell of pins at different prices. The Bookstore's experience indicates that the demand curve for VA Tech Lapel Pins responds to market conditions as follows:

At a price of \$5.98 the demand is about 12,000; at a price of \$8 demand is about 9,000; at a price of \$9.98 the demand is about 8,000; and at a price of \$12.98 demand is about 1,000. In calculating your costs, you come up with a variable cost of \$5 and fixed costs of about \$5,000 [Let q = the number of pins and p = the price of each pin. Let q be the independent variable and p be the dependent variable. An example of a point is $(q, p) = (12,000, 5.98)$.]

- 1) Graph the given demand points and find the demand equation using pencil and paper. Then use Trendline to find the demand equation again. How do they compare? Now use the trendline equation to finish the work below.
 - 2) Find by hand the revenue function .
 - 3) Find by hand the cost function and use Excel to graph the cost and revenue functions on the same axis. Use the break even points as a guideline for the domain (you may need to use a domain from 0 to 1500 items. You may also remember to use a step value of say 50 or more.)
 - 4) Find by hand the profit function and use Excel to graph the profit function.
 - 5) Find the derivative to determine where your maximum profit would occur, and what your maximum profit would be.
 - 6) What price should be charged to sell the number of hats required in 5)?
2. Building on the first problem, you decide to investigate another possible company in Seoul Korea. This supplier will sell you Lapel Pins at a cost of \$4.50 per item plus a flat \$500 per order. Total storage costs will run about \$2.50 on an average inventory, since you will store all pins in a locker in Squires Student Center.
 - 1) Find by hand the cost function.
 - 2) Find by hand the profit function and use Excel to graph the profit function..
 - 3) Use the derivative to find where your maximum profit would occur, and what your maximum profit would be.
 - 4) What price should be charged to sell the number of hats required in 3)?
3. After consulting the Bookstore, you realize that you may only receive orders for about 3500 pins during the year.
 - 1) Evaluate the profit from scenario 1 at 3500 items.
 - 2) Evaluate the profit from scenario 2 at 3500 items.
 - 3) What price should be charged in 1) and 2)?

Write up a presentation (on another sheet of paper) to present to your club members giving your opinion as to the best of the three scenarios for this money-making situation. Do you feel the first scenario is best where you try to make and sell the number of hats required to make maximum profit. Do you make enough money for the trip? Perhaps you feel the second scenario is better. How does the first scenario work out if you can only sell 3500 hats? What about the second scenario with only selling 3500 hats. Discuss the pros and cons of the four different situations and explain why you made the choice you did. Remember you are making a presentation to members who have not seen any of this work before. Be thorough in your presentation so that they can follow your reasoning. Include your charts and your calculations. Be sure to draw from your data

and equations to support your opinion. Discuss each profit scenario and why support or reject that approach to making the money needed. This discussion should be about a page long.