Commerce 398-201 Winter 2014-2015 Term

Assignment 4 ANSWERS
Due at beginning of class March 31, 2013

Please do all questions in order. Marks in parenthesis is the maximum mark for answers to the questions;

1. What are the pro and cons of relocating a small or midsized manufacturing firm (that makes mature products) from the Canada to Mexico in the post-NAFTA environment? (6)

Answer
According to the product life cycle concept, mature products require more of a cost orientation due to price competition and low product differentiation. As a result in the post-NAFTA environment, firms are evaluating the cost/benefit trade-offs associated with moving to Mexico. Labour costs are much lower in Mexico. Land is relatively cheap and there is less regulation. The cons are a less-educated workforce, and possibly increasing the distance from suppliers and marketplace.

2. A newly created NorthEast Airways (NE) flight from Philadelphia to Boston has 300 seats. The high fare on the flight is $800 and the restricted/low fare is $300. There is ample demand for the low fare class but high fare demand is random. Further, the customers who buy low fares buy their tickets well in advance before high fare customers. Assume the demand for the high fare is normally distributed with mean 120 and standard deviation of 50. Mr. Wright is in charge of the flight booking operations and decides to set a protection level for the high fare. What is the optimal protection level for the high fare? (9)

Answer
Cost of underage C_u=800-300=500.
Cost of overage C_o=300.
The critical ratio=500/(300+500)=0.625.
Lookup the z-statistic in the Standard Normal Distribution Function Table that corresponds to the critical ratio: z = 0.32.
*Therefore, Q=120+0.32*50=136 ~ 135 seats.*

3. The publisher of the Vancouver Sun incurs $0.20 for each copy of newspaper it prints, and charges $0.75 to Safeway for each copy that Safeway purchases. Readers pay $1 to Safeway for each copy of the Vancouver Sun. Thus, the publisher and Safeway constitute a two tier supply chain. Suppose the daily demand for the Vancouver Sun at a Safeway store is normally distributed with mean 100 and standard deviation 30.

    a. How many newspapers should Safeway purchase to maximize its own

profit? (5)

b. How many newspapers should Safeway keep so that the supply chains profit is maximized? (5)

Answer

(a) For Safeway, $C_o = 0.75$ and $C_u = 1.00 - 0.75 = 0.25$. Thus, the newsvendor fractile is $p = C_u/(C_u + C_o) = 25\%$, and the corresponding z-value is $z = 0. - 0.67$. Then, the optimal quantity is $Q = 100 + 30 \cdot z = 79.8$ to maximize Safeway's own profit.

(b) Now, consider the supply chain consisting of both Safeway and the publisher. Each paper that is not sold incurs this supply chain the cost of $C_o = 0.20$. Each paper that is sold earns the supply chain the profit of $C_u = 1.00 - 0.20 = 0.80$. Thus, $z = 0.84$ and the optimal quantity is $100 + 30 \cdot z = 125.2$ to maximize the supply chain's profit.

4. Sukhi Kaur's Satellite Emporium wishes to determine the best order size for its best selling satellite dish (model TS111). Sukhi has estimated the annual demand for this model at 1000 units. His cost to carry one unit is $100 per year, and he has estimated that that each order cost $25 to place. How many units of the TS111 should Sukhi order each time she places an order? (5)

Answer

$$Q_{opt} = \sqrt{\frac{2DS}{H}} = \sqrt{\frac{2(1000)25}{100}} = 22.36 \rightarrow 22$$

Total 30