

# **EXAM 1**

NAME: \_\_\_\_\_

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**AEM 4160: STRATEGIC PRICING  
CORNELL UNIVERSITY  
PROFESSOR JURA LIAUKONYTE**

**MARCH 3, 2016**

100 points = 100%  
103 points = 103% !

**Show all work. Write legibly.**

**Calculators permitted.**

**No computers.**

**1. (25 points total)** Consolidated Salt Company sells table salt to both retail grocery chains and commercial users (e.g., bakeries, snack food makers, etc.). The demand function for each of these markets is:

$$\text{Retail grocery chains: } P_1 = 180 - 8Q_1$$

$$\text{Commercial users: } P_2 = 100 - 4Q_2$$

where  $P_1$  and  $P_2$  are the prices charged and  $Q_1$  and  $Q_2$  are the quantities sold in the respective markets. Consolidated's total cost function for salt is:

$$TC = 50 + 20Q$$

a) **(12 points)** Assuming that Consolidated is effectively able to charge different prices in the two markets, what are the profit-maximizing price and output levels for the product in the two markets? What is Consolidated's total profit under this condition?

b) **(2 points)** This is an example of what kind of price discrimination?

c) **(8 points)** Calculate the price elasticities in each of the markets at their equilibrium levels. Explain the relationship between the price and price elasticity in each of the markets.

d) **(3 points)** Assuming that Consolidated is required to charge the same price in each market, what would happen to the total profits? (No need to provide calculations here, just indicate the direction of change, if any). Explain why.

**2. (Total 22 points)** You are the head of the marketing division of Sirius XM radio. The marketing department has provided you with the following key items of information:

- Monthly ARPU (average revenue per unit): \$30
- Monthly Cost-to-Serve: \$14
- Acquisition cost of each additional customer: \$120
- Interest rate: 5%
- Loss of customer base per month (churn rate): 2%

a) **(13 points)** In the satellite radio industry, the monthly margin is relatively fixed across periods. Calculate the Lifetime Value of a Customer (LTV).

b) **(6 points)** How would the LTV change if Sirius XM was able to cut their churn rate in half?

c) **(3 extra points – OPTIONAL)** show how to derive the LTV formula.

**3. (Total 12 Points)** The table below represents the number of handsets that the manufacturers sold to their distributors, operators (service providers) and individual customers and their market shares in the 2<sup>nd</sup> quarter of 2011.

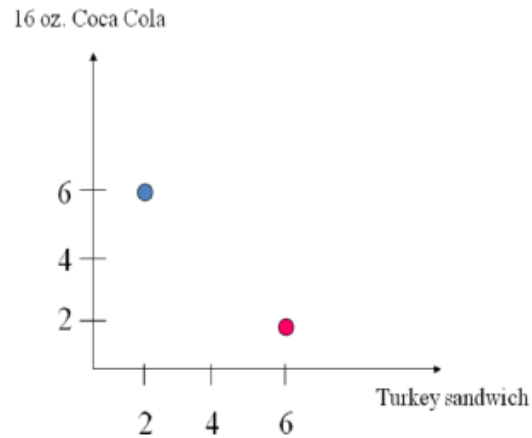
**Handset market share information.**

| <b>Brand</b>  | <b>Units Sold<br/>(in millions)</b> | <b>Market<br/>share</b> |
|---------------|-------------------------------------|-------------------------|
| Nokia         | 103.2                               | 40.47 %                 |
| Samsung       | 52.3                                | 20.51 %                 |
| LG            | 29.8                                | 11.69 %                 |
| Motorola      | 14.9                                | 5.84 %                  |
| Sony Ericsson | 13.8                                | 5.41 %                  |
| Other         | 41                                  | 16.08 %                 |

a) **(8 points)** Calculate the Herfindahl-Hirshman Index in this industry. What does HHI measure? What can you tell about this industry from your calculated HHI?

b) **(4 points)** What kind of information does HHI reflect that CR4 does not?

**4. (Total 14 Points)** *Subway* believes that there are 2 groups of consumers with differing valuations for turkey sandwich and 16 oz. coke. One consumer segment has a \$6 reservation price for turkey sandwich and \$2 for coke, another consumer segment has a \$2 reservation price for sandwich and \$6 for coke. Suppose there are 10 consumers of each type.

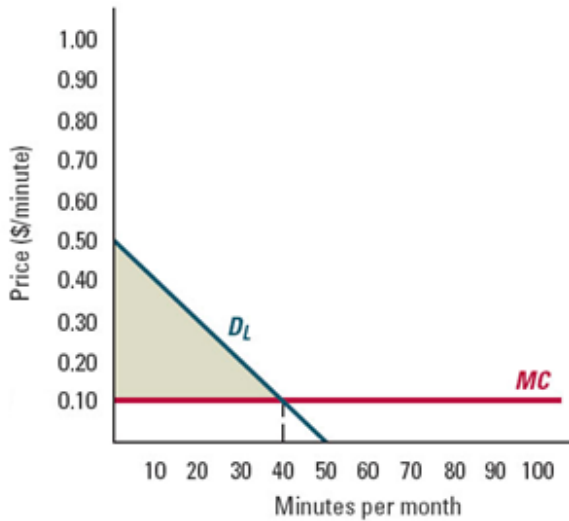


a) **(7 points)** If *Subway* were to price these food products **only separately**, propose the revenue maximizing pricing plan. What would be the total *Subway revenues* under this pricing plan?

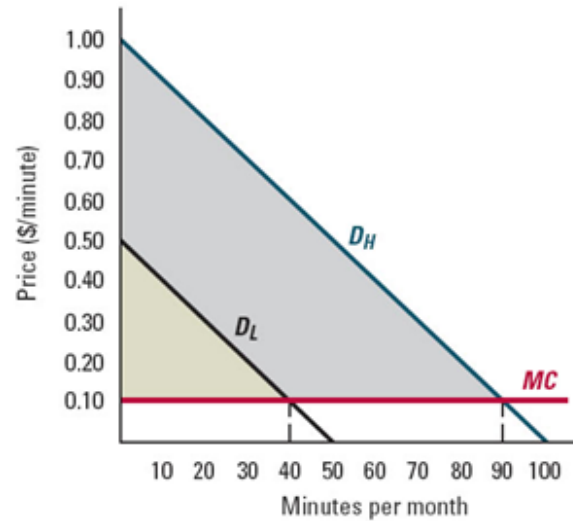
b) **(7 points)** Is this the best *Subway* can do (in terms of maximizing revenue) under these consumer preferences? Propose a pricing plan that would improve the revenue from part (a). What would be the total *Subway revenues* under this pricing plan?

**5. (Total 18 Points)** Assume that a cell-phone provider can identify and separate the low demand (e.g. students and senior citizens) and high demand (e.g. working households) consumers perfectly (i.e. by asking them to show student or senior citizen IDs). The marketing department presented you with the following demand graphs for both types of potential consumers:

(a) Low-demand consumer



(b) High-demand consumer



a) **(4 points)** What is the optimal two part tariff for low demand consumers (price per minute and fixed fee)?

b) **(4 points)** What is the optimal two part tariff for high demand consumers (price per minute and fixed fee)?

c) **(6 points)** Besides being able to identify the low and high demand consumers, what other conditions are necessary for successful price discrimination?

d) **(4 points)** Give 2 examples (besides cell phone pricing) of two part tariffs.

**6. (Total 12 Points) Bundling and Tying.**

a) **(8 points)** Explain how tying the purchase of printers and print cartridges, razors and blades, computer consoles and computer games, etc. is like second degree price discrimination.

b) **(4 points)** Consider pure bundling. Under what condition(s) do profits improve with bundling?





**EXTRA SHEET**