

14.01, Fall 2007
Problem Set 9
Due November 30, 2007

1. Please write your name, the name of your TA, and your section/recitation time (e.g. MWF 10am, or F 1 pm) on top of your solutions.
2. Problem sets are due IN SECTION/RECITATION. Late Problem sets will not be accepted under any circumstances.

Questions

1. Is the following true, false or uncertain? Explain why.
 - a. Price discrimination improves economic efficiency, therefore it should always be allowed by the government. (5 points)
2. Give examples from the real world of price discrimination of the different types (different from the examples already in the slides). For each of your examples, explain why they configure that type of price discrimination, in no more than 5 lines.
 - a. Second-degree price discrimination. (5 points)
 - b. Third-degree price discrimination. (5 points)
 - c. Peak-Load Pricing. (5 points)
 - d. Intertemporal price discrimination. (5 points)
 - e. Two-part tariffs. (5 points)
3. Pamela owns a miniature-golf course. Her weekly fixed costs of operation are \$1000, while her variable costs are 0. Pamela has two types of clients, serious players and occasional players. There are 100 customers of each type, and the individual weekly demand functions for miniature-golf games are:

$$\text{Demand serious player: } q^d = 10 - P$$

$$\text{Demand occasional player: } q^d = 5 - P/2$$

- a. Pamela believes that she will make the most possible profit by catering only to the serious players. She will price using a two-part tariff, where she will charge a weekly fee for access to her golf courses and a usage fee per game played of miniature-golf.

- i. What access fee and usage fee will Pamela charge? (5 points)
 - ii. What will be Pamela's profit? (2 points)
 - iii. Why would occasional players not want to go to Pamela's golf course, if she charges the fees you found above? (3 points)
 - b. Borat, a good friend of Pamela, advises her that she probably would increase her profits by having both types of players in her golf course. Pamela is still restricted to using the same two-part tariff for everyone – In this situation, the optimal two-part tariff will be one where Pamela charges the maximum possible access fee to the occasional players (but not so much they would prefer not to play in her golf courses) and a usage fee above marginal cost.
 - i. Find the consumer surplus of an occasional player as a function of the usage fee Pamela is charging. (4 points)
 - ii. Find Pamela's revenue from usage fees, as a function of the usage fee she is charging. (4 points)
 - iii. You should be able to calculate now Pamela's profit as a function of the usage fee she chooses. Present her profit function. (2 points)
 - iv. Maximize her profit function. What usage fee and access fee will she charge? (4 points)
 - v. Should Pamela follow Borat's advice? Why? (2 points)
 - c. Say that the population of serious players tripled. What of the above alternatives do you think Pamela would pick now? Explain. (If you want you can do the calculations to confirm your answer, but an intuitive answer will suffice) (4 points)
4. Allison is the only seller of flip-flops in Neverland. Allison has two types of costumers, the *chic* and the hillbillies. Their aggregate demands for flip-flops are given by:

$$\begin{aligned} \text{Chic costumers' Demand: } P &= 300 - 10Q^d \\ \text{Hillbillies' Demand: } P &= 100 - Q^d \end{aligned}$$

Allison's cost function is given by $C(Q) = Q^2/2$.

- a. Calculate Allison's marginal revenue. (Be careful, the marginal revenue will have two different segments) (2 points)
- b. What price will Allison charge? What will be her profit? What will be the consumer surplus of both types of consumers? (Hint: The marginal cost intersects marginal revenue in two quantities. Calculate both, and you should produce in the one that brings higher profit) (6 points)

Gabriel, Allison's business advisor, tells her that she with a clever advertisement campaign and some minor changes in the flip-flops produced (changes that would not increase the cost of production), it should be possible to "separate" the market for flip-flops, and sell at different prices to yuppies and hillbillies.

- c. How much would Allison sell to each group, and at what price? (6 points)
- d. How much would Allison be willing to pay for this advertisement campaign? (2 points)
- e. Are the *chic* better off with this change? What about the hillbillies? Intuitively explain your results. (4 points)

Allison decided to implement the advertisement campaign. Suddenly, due to an international craze for flip-flops, the demand of the *chic* goes up to $P = 500 - 2Q^d$.

- f. What price does Allison charge the *chic* now? (3 points)
- g. How much will Allison supply the hillbillies? (2 points)

5. There are only two competitors in the market of Tamagotchis in Tazmania, firm A and B. Both firms have no costs in producing Tamagotchis. Market demand for Tamagotchis is given by $P = 300 - Q$. Firms will compete a la Cournot, i.e., their variable of decision will be the quantity produced.

- a. Write firm A profit as a function of the quantity it produces and the quantity B produces. (2 points)
- b. Find the quantity that maximizes firm A's profit (you should treat firm B quantity as a constant in this maximization – firm A has no control over it). (4 points)

In b), you found firm A optimal choice of q , as a function of the production of company B – this is what we call reaction function.

- c. Solve the system with the reaction functions of both A and B – this will give the equilibrium quantities in this market. (3 points)
- d. What is the equilibrium price? What are the profits of both firms? (3 points)
- e. How much would firm A be willing to pay firm B not to produce? (3 points)