



# B.E. International Program

## Faculty of Economics

### Thammasat University



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**EE311 Microeconomics Theory, Semester 1/2019**

**Homework Assignment #6 | Due date: Wednesday 13 November 2019  
(in-class submission, before lecture begins!)**

**Instruction:**

- 1) Attempt all questions.
- 2) You may study and discuss in group but you have to write up your solutions independently and by handwriting only. Copying and/or Plagiarism is considered as a serious crime in academic arena and it will not be tolerated. If detected, all parties involved receive 'zero.'
- 3) If you have any questions, please feel free to email me at [pwrasai@econ.tu.ac.th](mailto:pwrasai@econ.tu.ac.th)

### **Price Discrimination (CH 12)**

11. Softco is a software company that sells a patented computer program to businesses. Each business it serves has the demand for Softco's product  $P = 70 - 0.5Q$ . The marginal cost for each program is \$10. Assume there is no fixed cost.

**(HINT: No fixed cost implies that  $MC = AVC = AC$ . Use this to find profit.)**

a) If Softco sells its program at a uniform price, what price would maximize profit? How many units would it sell to each business customer? How much profit would it earn from each business customer?

b) Softco would like to know if it is possible to improve its profit by implementing block pricing. Suppose that Softco were to sell the first block at the price you determined in (a), and that the quantity for that block is the quantity you determined in (a). Find the profit-maximizing quantity and price per unit for the second block. How much extra profit would Softco earn from each of its business customers?

c) Now, reconsider your answer to (b). Find the structure of prices and quantities in each of the two blocks that maximizes profit. In other words, you no longer assume

that the price and quantity that you determined in (a) is fixed. Instead, you must find the optimal price for both blocks.

12. Consider a market with 100 identical individuals, each with the demand schedule for electricity of  $P = 10 - Q$ . They are served by an electric utility that operates with a fixed cost 1,200 and a constant marginal cost of 2. A regulator would like to introduce a two-part tariff, where  $S$  is a fixed subscription charge and  $m$  is a usage charge per unit of electricity consumed. How should the regulator set  $S$  and  $m$  to maximize the sum of consumer and producer surplus while allowing the firm to earn exactly zero economic profit?

12.\*\* Consider a bar whose owner plans to set profit-maximizing two-part tariff (entry fee and per-drink price) on two types of customers. **The owner would like to welcome both types into his bar, meaning that he will not charge an entry fee that is too high.**

There are 20 people of the X-type whose individual demand is given by  $P = 10 - Q_x$ . There are 30 people of the Y-type whose individual demand is given by  $P = 10 - 2Q_y$ . The  $MC = AC = \$2$  per drink.

Find the optimal entry fee and per-drink price. Also, calculate the profit the bar can make from these 50 customers.

14. Suppose that Acme Pharmaceutical Company discovers a drug that cures the common cold. Acme has plants in both the United States and Europe and can manufacture the drug on either continent at a marginal cost of 10. Assume there are no fixed costs. In Europe, the demand for the drug is  $Q_E = 70 - P_E$ , where  $Q_E$  is the quantity demanded when the price in Europe is  $P_E$ . In the United States, the demand for the drug is  $Q_U = 110 - P_U$ , where  $Q_U$  is the quantity demanded when the price in the United States is  $P_U$ .

a) If the firm can engage in third-degree price discrimination, what price should it set on each continent to maximize its profit?

b) Assume now that it is illegal for the firm to price discriminate, so that it can charge only a single price  $P$  on both continents. What price will it charge, and what profits will it earn?

**(HINT: You should find the “total” demand for drugs by using the horizontal summation, i.e.  $Q = Q_U + Q_E$ .)**

20. A cruise line has space for 500 passengers on each voyage. There are two market segments: elderly passengers and younger passengers. The demand curve for the elderly market segment is  $Q_1 = 750 - 4P_1$ . The demand curve for the younger market segment is  $Q_2 = 850 - 2P_2$ . In each equation,  $Q$  denotes the number of passengers on a cruise of a given length and  $P$  denotes the price per day. The marginal cost of serving a passenger of either type is \$40 per person per day. Assuming the cruise line can price discriminate, what is the profit-maximizing number of passengers of each type? What is the profit-maximizing price for each type of passenger?

22. You are the only European firm selling vacation trips to the North Pole. You know only three customers are in the market. You offer two services, round trip airfare and a stay at the Polar Bear Hotel. It costs you 300 euros to host a traveler at the Polar Bear and 300 euros for the airfare. If you do not bundle the services, a customer might buy your airfare but not stay at the hotel. A customer could also travel to the North Pole in some other way (by private plane), but still stay at the Polar Bear. The customers have the following reservation prices for these services:

Reservation Prices (in euros)		
Customer	Airfare	Hotel
1	100	800
2	500	500
3	800	100

a) If you do not bundle the hotel and airfare, what are the optimal prices  $P_A$  and  $P_H$ , and what profits do you earn?

b) If you only sell the hotel and airfare in a bundle, what is the optimal price of the bundle  $P_B$ , and what profits do you earn?

c) If you follow a strategy of mixed bundling, what are the optimal prices of the separate hotel, the separate airfare, and the bundle ( $P_A$ ,  $P_H$ , and  $P_B$ , respectively) and what profits do you earn?