31E11100 - Microeconomics: Pricing

Exam, December 19, 2019

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Please answer the questions below. Answer shortly but justify your answers and explain accurately what you are doing. If you are confused about some question statement, please explain clearly what you assume when answering.

The maximum total points is 60. There is no need for a calculator or a dictionary.

1. (20 points) Answer the following questions. Give short answers and try to be as accurate as possible.

   (a) Show by example that selling an item using an auction is often better for the seller than using a posted price mechanism.

   (b) Discuss the problem of a monopolist that produces a durable good over time. What makes dynamic price discrimination difficult for the monopolist? What kind of a commitment problem is there, and how could the monopolist solve it?

   (c) What is the Revenue Equivalence Theorem? Give an example where it applies, and explain what it implies in your example.

   (d) Explain what is meant by time-inconsistent preferences. How can you model such preferences? Give some examples of behavior that can be explained by such preferences.

2. (20 Points) A firm can produce two versions of a product, standard and "damaged", where $q \in \{q^s, q^d\}$ denotes the fixed quality level of standard and damaged product, respectively. The production cost is assumed to be $c_s = 1$ for the standard version and $c_d = 2$ for the damaged version. There are two types of consumers, low type (L) and high type (H). The consumers have a unit demand (i.e. they buy at most one product), and their valuation for a product depends both on

the product version and consumer's type in the following way. The utility for the standard quality product is 10 for the low type and 30 for the high type, i.e. $\theta_s^L = 10$ and $\theta_s^H = 30$. The utility for the "damaged" product is 5 for the low type and 6 for the high type, i.e. $\theta_d^L = 5$ and $\theta_d^H = 6$. Let λ denote the fraction of high type consumers in the population.

(a) Assume first that only the standard version is available. What is the optimal price and proft of the seller.

(b) Suppose now that the firm can produce both versions. Let $\lambda = 1/2$. Find the optimal prices for the two different versions of the product, and compute the total profit of the firm.

(c) What are the welfare consequences of introducing the damaged good?

(d) How does the optimal solution to the problem change as you vary λ?

3. (20 points) A monopoly firm operates in a market with a sesonally varying demand. The inverse demand function in season $i \in \{s, w\}$ is given by:

$$p^i = \alpha^i - \beta^i q^i,$$

where $\alpha^s = 10$, $\alpha^w = 8$, $\beta^s = 1$, $\beta^w = 2$. There is a constant marginal cost of production so that producing q^i units in season i costs cq^i, where $c = 1$.

(a) Assume first that there is no capacity constraint for the firm. What is the optimal production level and correponding price for each season?

(b) Keep on assuming that there is no capacity constraint for the firm. If the firm must use the same price in both seasons, what is the total quantity sold over the two seasons for given price p? What is the optimal price p?

(c) Assume next that there is a fixed capacity level k. The capacity sets the maximum output that the firm can produce in either season: $q^i \leq k$ for $i \in \{s, w\}$. What is the optimal production level and correponding price for each season as a function of k?

(d) Assume now that the firm must choose its production capacity to serve the market, and it costs fk to build k units of capacity. The firm maximizes its total profits over the two seasons, and can choose different prices in the two seasons. For what values of f is the capacity constraint binding in the high season only? Solve the optimal capacity and supply levels for the two seasons both in the case where the capacity constraint binds only in one season and where it binds in both seasons.