31E11100 - Microeconomics: Pricing

Re-take exam, February 11, 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. (15 points) Answer the following questions. Give short answers and try to be as accurate as possible.

   (a) 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.

   (b) Discuss the different forms of price discrimination. What are their informational requirements? What kind of welfare effects do they have?

   (c) Explain what is meant by winner's curse. In what kind of auctions can it arise? How should bidders take it into account in their bidding behavior?

2. (15 points) A monopolist firm produces a homogenous good at cost $c(q) = q^2$, so that the production cost function is given by

$$c(q) = q^2, \ q \geq 0.$$

   The utility of a consumer of type θ, who consumes quantity q and pays tranfer t, is given by:

$$u(\theta, q, t) = \theta q - t.$$

   (a) Find the first-best level of q as a function of θ, where $\theta > 0$. (i.e. find the level of q that maximizes the total surplus)

(b) Suppose there are two types of buyers: $\theta^H = 5$, $\theta^L = 3$, and the fraction of high type buyers is λ. If the monopolist can perfectly identify each consumer's type, what would be the optimal quantity-price pair $\left(q^H, t^H\right)$ for consumer type θ^H, and correspondingly to θ^L?

(c) Suppose now that the seller cannot identify individual consumers' types. Suppose she offers a menu $\{(q^H, t^H), (q^L, t^L)\}$ consisting of the two quantity-price pairs that you derived in (b) and lets buyers select. What happens? What is the revenue for the seller? What is the rent to the buyers?

(d) Write down the IC and IR constraints for both types of buyers, and discuss verbally which of those should be binding when the monopolist chooses the menu $\{(q^H, t^H), (q^L, t^L)\}$ optimally.

(e) Explain how the optimal menu can be solved, and solve it explicitly if you can. Describe qualitatively the optimal solution and the resulting distortions.

3. (15 points) A monopolist produces two products, A and B, at zero cost. There is a unit mass of consumers. Each consumer is identified by type (θ_A, θ_B), where θ_A and θ_B are the consumer's respective valuations for goods A and B. Assume that consumer valuations for the two products are uniformly distributed over the unit square. This means that the valuations θ_A and θ_B for an individual consumer are independently and uniformly distributed over $[0, 1]$. Each consumer can buy either no product, one product, or both products.

(a) Suppose that the monopolist sells the two products separately, i.e. sets separate prices p_A and p_B for the two products. Describe the consumer types that buy product A only, product B only, or both products (you may find it useful to use a drawing on a unit square). Derive the demand for each product for the seller (i.e.

quantities of A and B sold at prices p_A and p_B). What are the optimal prices and what is the resulting total profit?

(b) Suppose that the monopolist bundles the two goods together, and sells them togehter at a single price p_{AB}. Describe the consumer types that buy the bundle. Derive the demand for the bundle and solve for the optimal bundle price and resulting profit. Compare to the result in a) and discuss.

(c) Suppose that the monopolist sells products A and B separately at prices p_A and p_B, respectively, and in addition offers a bundle consisting of both products at price p_{AB}. You can assume that the monopolist always wants to set $p_A = p_B \equiv p_S$. Derive the demand for products A and B sold separately and for the bundle consisting of both products (again, use drawing). Argue that by choosing p_S and p_{AB} optimally, the monopolist can get a higher profit than in a) or b). Solve the model as far as possibe and discuss the result.

4. (15 points) A seller has a single indivisible item to sell. There are two buyers who have a unit demand for the item and their valuations are independently drawn from the uniform distribution on $[0, 100]$. We consider here alternative mechanisms that the seller can use to sell the object.

(a) Suppose that the seller just posts a single price and buyers decide whether or not to buy at that price. What is the optimal posted price for the seller? (if both buyers want to buy, then the item is allocated randomly to one of the buyers at the posted price).

(b) Suppose the seller uses a standard second price auction. What do buyers bid in equilibrium? What is the resulting expected revenue for the seller?

(c) Change the auction format to the first price auction. What do

buyers bid in equilibrium? What is the resulting expected revenue for the seller?

(d) Can the seller increase profits by adding a reserve price in the auction? Discuss why this is the case. Does it make a difference whether the auction format is first price or second price?

(e) How does the optimal reserve price compare to the optimal posted price that you have derived in (a)?