
Problem Set #1

ECONOMICS 220A

This problem set is due at the beginning of class on September 21, 2005.
--

1. Consider a monopoly. The monopoly's cost of producing x units is $x^2/1000$. There are 10,000 potential customers for its product, each of whom has demand $5 - p/5$, where p is the per-unit price.
 - (a) Assume the monopoly is limited to linear pricing, what is the profit-maximizing price for it to charge? How many units does it sell at that price? What are its profits at that price?
 - (b) Maintaining the assumptions of part (a), what is the deadweight loss under the profit-maximizing price?
 - (c) Suppose, now, that the monopoly can utilize a two-part tariff. What is the profit-maximizing two-part tariff for it to use? What are its profits under this tariff? How many units does it sell?
 - (d) Suppose that, instead of utilizing a two-part tariff, the monopoly use packaging. What is the profit-maximizing package size and what does the monopoly charge for this package?
2. A monopolist sells to two populations, H and L. The consumers within each population are homogenous with regard to their preferences. A consumer in population H has demand $100 - p$. A consumer in population L has demand $50 - p/2$. The marginal cost of production is, conveniently, 0. There are 10,000 consumers in population L and N_H consumers in population H. As a function of N_H , what are the profit-maximizing package sizes for the monopolist to offer?
3. Consider a population with N individuals. Each individual has a taste parameter, θ , which is an independent draw from the distribution $F(\cdot)$ over the interval $[0, \Theta)$, where $\Theta \leq \infty$. A person with taste parameter θ has a demand for a given product equal to $\theta q - p$, where p is the price per-unit of the product in question and q is a quality parameter. The marginal cost of a unit is $c(q)$, where $c(\cdot)$ is an increasing and differentiable function.
 - (a) What level of q would a monopolist engaging in linear pricing set?
 - (b) What level of q would the social planner set?

- (c) If $F(\cdot)$ is the uniform distribution, is quality (q) greater under the monopolist or the social planner?
4. Consider the following scenario. There is a competitive market for a used product with an equal number of potential buyers and sellers. Let q be the quality of a particular product. Suppose $q \sim F : [q_0, q_1]$. Let $f(\cdot)$ be the associated density function. Buyers for the good in question are homogenous, risk neutral, and willing to pay up to βq for a product known to be of quality q , where $\beta > 1$ is a constant common to the buyers. Buyers do not know the quality of the product they purchase. Sellers do know the quality of the product they are selling. A seller with a quality q product is willing to sell for any price equal to or greater than q .
- (a) Prove that if $\beta q_0 \geq q_1$, no lemons problem exists regardless of $F(\cdot)$.
- (b) Suppose $\beta q_0 < q_1$. Derive a condition such that no lemons problem exists (*i.e.*, all sellers sell and all buyers buy).
- (c) Continue to suppose $\beta q_0 < q_1$. Derive a condition that a lemons problem exists (*i.e.*, some sellers, at least, don't sell and some buyers, at least, don't buy).
- (d) Prove that some trade must take place no matter what.