Prof. Marek Weretka's

Econ 301 Intermediate Microeconomics

Problem Set 10

Problem 1 (Equilibrium with N Firms)

The GMC company is considering building a new car factory in China. The total (fixed) cost of the investment is $F = 4$ (in billions of dollars). When built, the factory will allow to produce y cars at the (variable) cost given by

$$c(y) = 4y^2$$

Suppose the car industry in China is regulated (companies must have licences to sell on the Chinese market) and before GMC entry, there are already two firms operating in China. They are all identical to the GMC

a) Find individual supply of GMC, assuming that GMC has a licence and builds the third factory.

b) Find aggregate supply of the car industry in China, assuming that GMC has a licence and builds the third factory.

c) Suppose the aggregate demand for cars in China is $D(p) = 8 - (1/8)p$. Find the equilibrium price, individual and aggregate level of production and the level of individual profit.

d) How much (maximally) GMC is willing to pay for the licence to enter the market? (Hint: it will pay at most the value of the profit it makes after paying fixed cost.)

Problem 2 (Free Entry and Market Structure)

Suppose now Chinese government liberalizes the car industry, so that no license is required anymore (in such a case we have free entry.)

a) Given demand for cars equals to $D(p) = 8 - (1/8)p$, and costs are as in Problem 1 ($F = 4$ and $C(y) = 4y^2$), predict the number of firms producing cars, the level of production, the price of a car and the level of profit by each firm.

b) Find the number of firms given different levels of fixed cost F:

F	64	16	4	1/4	1/16
N					

(Hint: instead of calculating N for each value of F, it is much faster to find a function $N(F)$ where F is a parameter. Then only plug concrete values of F. Use the values for MES from point f) in Problem 1)

c) For which values of F should we observe monopoly, oligopoly or nearly perfectly competitive car industry?

Problem 3 (Why Monopolies Exist ?)

Give four examples of monopolistic industries. Explain what causes the monopoly in each case using the list from the second slide of Lecture 19).

Problem 4 (Monopoly)

Microsoft Corporation decides how many packets of the new operating system (Windows Vista) it is going to sell on the market. The research (fixed) costs associated with the development of the new system amounts to $F =\$1000$. The variable costs of the packet is negligible $C(y) = 0$. Microsoft's inverse demand for the new operating system is given by

$$p(y) = 100 - y$$

a) What are the total gains to trade in the market? What would consumer and producer surplus be if Microsoft was a price taker (a competitive firm)? Give exact numbers and show corresponding areas on the graph. (Hint: don't be surprised if one of the three variables is equals to zero).

b) Assume that Microsoft cannot discriminate among its customers. Find geometrically and analytically the level of sales that maximizes profit, the market price, and the maximal profit.

c) Is outcome in b) *pareto efficient*? If not, find the deadweight loss (DWL) geometrically and analytically.

d) Find consumer's and producer's surpluses (CS and PS) geometrically and analytically, with a monopolistic firm.

e) Find the elasticity of the demand at the optimal level of production. Is the monopolistic firm operating on elastic or inelastic part of the demand?

f) Should Competition Committee (the Governmental agency) regulate Microsoft to sell Vista at the competitive price $(p = MC)$? Explain why or why not, using graph (Hint: this is natural monopoly).