

Prof. Marek Weretka's
Econ 301 Intermediate Microeconomics
Problem set 10

Problem 1 (Reasons 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 20).

Problem 2 (Monopoly, Uniform Price)

Microsoft Corporation decides how many packets of the new operating system 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 (TS) in the market? What would the consumer and producer surplus be if Microsoft was a price taker (a competitive firm)? Give exact numbers and show on the graph corresponding areas. (Hint: don't be surprised if one of the three variables is equal 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 geometrically and analytically a deadweight loss (DWL).

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

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

f) Derive a formula for a markup in terms of demand elasticity. Given optimal choice, is markup greater than one?

Problem 3 (Monopoly and price discrimination)

Consider Microsoft Company from Problem 2. Microsoft's inverse demand for the new operating system is given by

$$p(y) = 100 - y \tag{1}$$

a) (1st-degree price discrimination) Suppose that Microsoft can perfectly discriminate. What is the profit of Microsoft if it does not discriminate? Is allocation Pareto efficient? What is consumer surplus?

Let's now assume more realistically that Microsoft can charge different prices on two segments of the market individual buyers and firms. The demands on two segments are

$$\begin{aligned} y^I(p^I) &= 50 - \frac{4}{5}p^I \\ y^F(p^F) &= 50 - \frac{1}{5}p^F \end{aligned}$$

b) Show that if Microsoft does not discriminate, the aggregate inverse demand is as in (1).

c) (3rd-degree price discrimination) Find the level of sales, prices, profits and elasticity of the demand each of the segments of the market.

d) Compare producer's and consumers surplus in the three cases: uniform price (Problem 2), perfect discrimination (Problem 3 point a) and 3rd-degree price discrimination (Problem 3 point c).

Problem 4 (Demand elasticity)

Suppose the demand facing the monopolistic firm is given by

$$y(p) = 1 - p$$

- a) Plot the inverse demand function, marking extreme points.
- b) Mark the value of the demand elasticity for $y = 0$, $y = 0.5$ and $y = 1$.
- c) Suppose the total cost is given by $TC(y) = cy$ where c is some positive number $c > 0$. Show formally that the monopoly will chose a point on the elastic part of the demand. (that is the one for which elasticity is $\varepsilon \in (-\infty, -1)$.)
- d) find the markup over a marginal cost c .