



Lab Problem Set 3

Market Power

This problem set is intended to support the presentation by your teacher in the class. You are not required to submit written solutions to this problem set. It is highly recommended that you work on these problems at home since you will be expected to know how to solve similar tasks in the controlled works.

Problem 1

Consider a market where there is only one seller. The cost of production is

$$C(q) = F + v \cdot q^2.$$

The demand function in this market is $p = A - b \cdot q$.

- Derive the equilibrium price and quantity as a function of F, v, A, b .
- Calculate the profit of the monopolist.
- Calculate the consumer surplus and the producer surplus for this market.
- Calculate the DWL for this market.

Problem 2

A monopolist produces output in two different locations 1 and 2. The cost in location 1 is given by $C_1(q_1) = q_1^2$ and in location 2 by $C_2(q_2) = 0.5 \cdot q_2^2 + 5q_2$. Demand in this market is given by $p = 120 - 0.5q$, where p is the price and q is the total quantity produced by the monopolist.

- Calculate the equilibrium quantities for each location and the price.
- Calculate the equilibrium profit for the monopolist.
- Draw the graph for this market and demonstrate how to find the equilibrium graphically.
- Derive a single marginal cost function for the monopolist assuming that for each output level he will distribute production between locations in the most efficient way.

Problem 3

Consider a monopolist who faces a demand curve $p = a - bq$. Average cost is constant and equal to c .

- Derive the profit function for this monopolist.
- Maximize the profit function with respect to quantity to derive the first order condition.
- Find the profit maximizing quantity, price and profit as a function of a, b and c .
- Find the DWL as a function of a, b and c .

Problem 4

Consider a monopolist who faces a demand curve $q = a - p$. Average cost is constant and equal to c . The government decides to impose a sales tax, t rubles on each unit of the product sold.

- Provide a neat graph showing the effect of the tax on the price of the product.
- Calculate algebraically the effect of the tax as a function of a and c .

Problem 5

Consider a market where the demand is given by $p = 10 - q$ and the supply is given by $p = 2 + q$. Assuming a PC environment, find the level of fixed cost for which the profit of the firm will become zero.

Problem 6

A monopolist has production function $Q = 2L + K$. A unit of labor costs $w = 10$ and a unit of capital costs $r = 6$. The monopolist faces demand

$$p(Q) = \frac{10}{\sqrt{Q}}$$

Calculate the value of deadweight loss.