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Chair VWL I

Competition Policy and Strategy

Assignment 1

The contents of this exercise sheet can be found in any introductory microeconomics textbook, for example Varian, H. R. (2014). Intermediate microeconomics: a modern approach: ninth international student edition, particularly chapters 16 and 24.

Exercise 1.1 (Perfect Competition)
Consider a market with perfect competition where n firms offer a homogeneous good. All firms have identical costs, characterized by following cost function:

$$C(q) = q^2 + 25 \text{ with } q > 0 \text{ and } C(0) = 0$$

The demand function is as follows:

$$D(p) = 240 - 10p,$$

where p denotes price and q quantity.

a) Find the short term market equilibrium for the case of $n = 20$ firms in the market. Calculate the profits of each firm, calculate consumer surplus and total welfare.

b) Calculate price and quantity of the long term equilibrium. How many firms will be in the market? Calculate total welfare for this situation. (Hint: In the long term market equilibrium the marginal cost function ($MC(q)$) intersects the average cost function ($AC(q)$.)

c) Illustrate the short term market equilibrium from task a) in a price-quantity-diagram and mark consumer as well as producer surplus. How does the short term supply function differ from the long term supply function? Explain why the total welfare is higher in the long term than in the sort term.

d) Name the assumptions that are implied by *perfect competition*. Explain what differences in market outcome you expect if these assumptions do not hold. Do you think that a model of perfect competition is appropriate to describe a variety of actual markets? Give reasons for your answer.

Exercise 1.2 (Monopoly 1)
A profit maximizing monopolist produces at constant marginal costs $c = 60$. Demand is defined as

$$q(p) = 120 - \frac{1}{3}.$$

a) Find the inverse demand function $p(q)$ and calculate the price, quantity and profit, as well as consumer surplus that result in the market equilibrium.

b) Find price, quantity and welfare that result under perfect competition. Calculate the gain in welfare in comparison to the monopolistic situation from task a).

c) Assume that marginal costs increase to $c_n > c$. Show that the monopolist passes on this cost increase under-proportionally to its consumers. (Hint: Analyze how the equilibrium price changes with increasing c).

Exercise 1.3 (Monopoly 2)
Assume a demand function of the form $q(p) = a - p$ for a homogeneous good. Let there be a monopolist in the market with constant marginal costs c.

a) Determine the monopoly price p_M as a function of parameters a and c.

b) Calculate monopoly price and quantity for $a = 10$ and $c = 4$. What is the own-price elasticity of demand at the point (q_M, p_M), where q_M is the monopoly quantity? (Note: Own-price elasticity of demand is defined as $\eta(p) = -\frac{\delta q/q}{\delta p/p}$.)

c) A profit-maximizing monopolist produces an output quantity q at which the price elasticity of demand takes a value of 0.8. Which of the following alternatives should the monopolist choose if they want to maximize their profit? Explain your answer.

   i) Increase output quantity

   ii) Decrease price

   iii) Decrease output quantity

   iv) Choose a output quantity such that price = marginal costs results

   v) Increase investments in advertisements

Exercise 1.4 (Profit definitions, optional)
Explain the difference between accounting profits and economic profits.