PARTIAL EQUILIBRIUM, CONSUMER AND PRODUCER SURPLUS

Problem 1

Mobile phones are one of the most important goods in a village. The table below presents the number of phones demanded by consumers and offered by suppliers in this village. When solving the tasks below, assume the linearity of the demand and supply functions.

Price (per unit in PLN)	Demand (in units)	Supply (in units)
120	0	3000
100	1000	2500
80	2000	200
60	3000	1500
40	4000	1000
20	5000	500
0	6000	0

a) Present the demand and supply functions graphically in the market for phones.

b) Find the equilibrium price and quantity in the market for phones (assume pure competition).

c) Find the (highest) reservation price for consumers.

d) Find the consumer and producer surplus (assume linear demand and supply functions).

e) What will the situation in the market look like when the village authorities introduce a law prohibiting prices higher than 40 PLN per phone? How will such a regulation change consumer and producer surplus?

f) What will the situation in the market look like when the village authorities introduce a law prohibiting prices lower than 100 PLN per phone? How will such a regulation change consumer and producer surplus? Consider two cases: (1) the authorities buy out the surplus of phones for the price of 100 PLN per phone; (2) the authorities do not buy out the surplus. For case (1), what is the cost of the regulation for the authorities?

Problem 2

Consider the initial situation in the market from Problem 1 (no regulations).

a) Find the market equilibrium price and quantity for the situation when consumers are willing to buy 150 phones more than previously for every price level because of an active advertisement campaign.

b) Find the market equilibrium price and quantity for the situation when producers are willing to supply twice more phones for every price level than previously due to changes in technology leading to a decrease in production costs.

c) Show on the graph (shade the area or show in some other clear way) changes in consumer and producer surplus upon a) and b).

Problem 3

The demand function for external hard drives (HD) in a country Y initially took the form of $Q(p) = 480 - 6p$, while the supply function was $Q(p) = 120 + 3p$, where p stands for the price per HD and Q for the number of HDs (in thousands). As a consequence of immigration to this country from the neighboring country X, the demand for HDs increased by 10% for each price level. As a result of employee strikes, the time required for producing a HD increased, leading to a decrease in supply by 20% for each price level.

a) Find the formula for the new demand function for HDs.

b) Find the formula for the new supply function for HDs.

c) Find the new equilibrium price and quantity of HDs in the country Y.

d) Find the elasticity of demand and supply for the new equilibrium price level.

Problem 4 (directly based on material from Micro 2)

In a purely competitive grain market, the cost functions of a typical farmer are given by the following formulas: LAC(q) = 25/q + q; SMC(q) = 4q – 10, where q is quantity. Demand for grain is given by the function Q(P) = 510 – P, where P is the price.

a) Describe the equilibrium conditions in the market (price, quantity, number of producers). *(hint: to find the solution: i) what is the condition for a firm to produce in the long run? That's how you'll find q*; ii) we're in the long run, so the are no profits (profit=0), that's how you'll find the number of firms and p*.*

b) Assume that in the next year, there is a drought, which results in decreasing the supply by 20%. How will this influence the price, the quantity produced, and the number of firms in a short-run equilibrium? *(hint: i) competitive market, so p=MC and that's how you get the initial supply function for a single firm (if you haven't found it yet in a); ii) if supply decreases by 20%, then the new supply function will be the fraction (what fraction?) of the old one; iii) then find a market supply, equate it with market demand to find q and p.)*

Problem 5

Demand for waste disposal in a given region is given by the formula P = a – bQ. The market for waste disposal is purely competitive. The marginal cost for all firms is constant and equal to c. Assume that as a consequence of the issuance of a directive concerning waste disposal, a license for this activity is granted only to one firm (because of a corrupt government).

a) How will this influence social welfare (consumer and producer surplus)? Consider the whole scenario- first the market is in perfect competition, then it is a monopoly.

b) Find the deadweight loss resulting from the monopoly when demand is given by the formula P = 150 – Q and the marginal cost for each firm is MC = 200q. Assume that initially, in the competitive market, there were 50 firms and that production possibilities of the monopolist are the same as those of the 50 firms taken together.

Problem 6

In some country, the utility function of a typical 40-year-old man for newspapers and coffee is given by the formula $U = n^{1/10} c^{9/10}$, where n stands for newspapers and c for coffee. His monthly income amounts to 2000 PLN. Find the change in his surplus when the price of a newspaper increases from 5 to 10 PLN. How will the surplus change if there are 1000 typical 40-year-old men in the country?

Problem 7

Consider the case of a monopoly with zero marginal cost meeting two consumers with linear, decreasing individual demand functions. From the viewpoint of total welfare (the sum of consumer surplus and producer surplus), is the price discrimination where each consumer faces a different price a good thing? (Hint: Does it depend on the two demand functions?)