MICROECONOMICS 3
PROBLEMS #1

PARTIAL EQUILIBRIUM, CONSUMER AND PRODUCER SURPLUS

Problem #1

Mobile phones are one of the most important goods in a certain village. The table below presents the number of phones demanded by consumers and offered by suppliers in this village.

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

a) Present the demand and supply functions in the market for phones graphically.
b) Find the equilibrium price and quantity in the market for phones (assume pure competition).
c) Find the reservation price for consumers.
d) Find the consumer and producer surplus (assuming linearity of the demand and supply functions).
e) What will the situation in the discussed market look like when the village authorities introduce a law prohibiting prices exceeding 40 *zloty* per phone? How will such regulation initially influence the consumer and producer surplus?
f) What will the situation in the discussed market look like when the village authorities introduce a law prohibiting prices lower than 100 *zloty* per phone? How will such regulation influence the consumer and producer surplus? (provide the answer for two cases: (1) the authorities buy out the surplus of phones for the price of 100 zloty per phone; (2) the authorities do not buy out the surplus)

Problem #2

Assume that the village authorities from Problem #1 withdraw the regulations proposed above.

a) Find the market equilibrium price and quantity for the situation when, because of an active advertisement campaign, for every price level consumers are willing to buy 150 phones more than previously.
b) Find the market equilibrium price and quantity for the situation when, thanks to a decrease in production costs, for every price level producers are willing to supply two times more phones than previously.
c) Calculate the changes in consumer and producer surplus.

Problem #3

The demand function for CDs in country YFactor 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 CD and Q – for the number of disks (in thousands). In consequence of immigration of new inhabitants to this country (from the neighboring XFactor) demand increased by 10% for each price level. As a result of employee strikes the time required for producing a CD increased resulting in a decrease in supply by 20% for each price level.

a) Find the formula for the new demand function for CDs.
b) Find the formula for the new supply function for CDs.
c) Find the new equilibrium price and quantity of CDs sold in the village.
d) Find the elasticity of demand and supply for the new equilibrium price level.

Problem #4

In a purely competitive grain market the cost functions of a typical farmer are given by the following formulae: 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).

b) Assume that next year there is a drought, which results in decreasing the supply by 20%. How will this influence the price, quantity produced and number of firms in a short-run equilibrium?

Problem #5

Demand for waste disposal in a Polish region is given by the formula $P = a - bQ$ (usual notation). 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.

a) How will this influence social welfare (consumer and producer surplus)?

b) Find the deadweight loss resulting from the monopoly for the case 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 the Intelligent Country the utility function of a typical 40-year-old 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 *zloty*. Find the change in his surplus when the price of a newspaper increases from 5 to 10 *zloty*. How will the surplus change if there are 1000 typical 40-year-olds?

Problem #7

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