Problem Set #9

Sonoma State University  Dr. Cuellar
Economics 201B-Introduction to Microeconomics

Given the following supply, demand and marginal revenue functions:

\[ Q^s = 5P - 25 \]
\[ Q^d = 100 - 5P \]
\[ MR = 20 - 2/5Q \]

(1) (a) Find the competitive equilibrium price and quantity.
(b) Calculate the amount of consumer surplus.
(c) Calculate the amount of producer surplus.
(d) Show the above answers graphically.

(2) Suppose now that the above market is taken over by a monopolist.
(a) Find the monopolistic equilibrium price and quantity for a single price monopolist.
Hint: Recall that supply curve of the competitive industry is the marginal cost curve, so to get the marginal cost function you need to solve the supply curve for price. This is the marginal cost function.
(b) Calculate the amount of consumer surplus. Compare the consumer surplus with that of the competitive equilibrium. Explain.
(c) Calculate the amount of producer surplus. Compare the producer surplus with that of the competitive equilibrium. Explain.
(d) Calculate the amount of the deadweight loss. Define deadweight loss. What causes the deadweight loss.
(e) Show the above answers graphically.

(3) Suppose now that the monopolist engages in perfect (first degree) price discrimination.
(a) What is the equilibrium price and quantity of the perfectly price discriminating monopolist.
(b) What is the amount of consumer surplus. Compare the consumer surplus with that of a single price monopolistic equilibrium and the competitive equilibrium. Explain.
(c) What is the amount of producer surplus. Compare the producer surplus with that of a single price monopolistic equilibrium and the competitive equilibrium. Explain.
(d) Show the above answers graphically.

(4) Suppose instead that the monopolist wants to engage in second degree price discrimination by employing a two part tariff.
(a) Find the price per unit and the amount of the tariff that will maximize the monopolists total profits. Assume there are 100 consumers with homogeneous preferences.
(b) Calculate the amount of consumer surplus. Compare the consumer surplus with that of a single price monopolistic equilibrium and the competitive equilibrium. Explain.
(c) Calculate the amount of producer surplus. Compare the producer surplus with that of a single price monopolistic equilibrium and the competitive equilibrium. Explain.
(d) Calculate the amount of the deadweight loss.
(e) Show the above answers graphically.
Suppose that the market consist of two main groups who differ based on their price elasticities of demand. The demand and marginal revenue functions of each group are as follows:

<table>
<thead>
<tr>
<th>Demand</th>
<th>Marginal Revenue</th>
</tr>
</thead>
<tbody>
<tr>
<td>Market One:</td>
<td>Q₁ = 50 - P₁</td>
</tr>
<tr>
<td>Market Two:</td>
<td>Q₂ = 50 - 4P₂</td>
</tr>
</tbody>
</table>

Assume also that output can be produced at a constant marginal cost of $10.

(a) What market conditions must exist in order to engage in third degree price discrimination?

(b) Calculate the profit maximizing price, output and profits in market one.

(c) Calculate the profit maximizing price, output and profits in market two.