First Mid Term
ECON 615
Industrial Organization I
February 17, 2005

Time: 1 hour 15 minutes.

Instructions. To obtain credit, you must give arguments to support your answer. The numbers in brackets at the start of each question are the numbers of points the questions are worth.

[35] Exercise 1: Assume that a monopoly supplier of a good makes sales to consumers located in different regions of the country. The demand functions for the good in each region are

\[ q_1 = 1 - p_1 \]

and

\[ q_2 = \frac{1}{2} - p_2. \]

Assume in what follows that production and transport costs are zero.

1. Assuming that the monopolist must charge a uniform (linear) price to the two regions, calculate the profit-maximizing uniform price.

2. Assume that the monopolist can engage in third-degree price discrimination. Calculate the profit-maximizing price for each region.

3. Does third-degree price discrimination increase or decrease welfare, as measured by the sum of consumers’ plus producers’ surplus, in this case? Is this general result when one compares uniform monopoly prices with third-degree price discrimination?

[30] Exercise 2: A monopolist produces a product whose demand price and production costs vary with quality \( s \) and quantity \( q \) according to

\[
\begin{align*}
P(s, q) &= s(1 - q) \\
C(s, q) &= s^2 q
\end{align*}
\]

1. Calculate the price and quality levels that a monopolist would choose, and the corresponding quantity sold.

2. Derive the consumers’ surplus \( CS(s, q) \) for any combination \( \{s, q\} \).

3. The social planner does care for both consumers and monopolist.

   (a) Write down the objective function of the social planner.
Substitute the monopolist’s profit-maximizing quantity from question 1. and then derive the optimal quality for that quantity choice (the level of quality that maximizes consumer surplus plus profit).

(c) Show that the monopolist’s actual quality choice is lower than optimal quality, given the quantity chosen.

Exercise 3: Consider a linear city of length 1. $N$ consumers are distributed uniformly along the city. Two shops located at the two ends of the city, both sells the same physical good. The location of shop 1 is $x = 0$, and that of shop 2 is $x = 1$. Consumers have quadratic transportation costs $t^2$ per unit of length. They have unit demands, they consume either 0 or 1 unit of good. Let $p_1$ and $p_2$ the prices charged by the two shops. $\bar{s}$ denotes the surplus enjoyed by each consumer when he is consuming the good.

1. Determine the generalized prices of going to shop 1 and to shop 2.

2. Determine the utility of a consumer located at $x$ if he buys from shop 1 and if he buys from shop 2.

3. Determine the demand functions (hint: you have to separate 3 different cases). Use graphs to support your argumentation.