



Homework 3

Due October 2 – turn in AFTER the end of the lecture in piles by group number

Homework must be submitted in the lecture on the due day. Submissions in any other way or time will be ignored with no exceptions. Your name and your group number must be clearly visible on the top right corner of your paper. Submit your assignment in a professional way: in A4 sheets, neatly written and clean. Multiple sheets must be stapled together. Do not use plastic folders. Failure to meet any of the above requirements will be penalized with a 50% reduction in your score. Show your work in a sufficient manner.

Publication of the answers of this homework is illegal according to the Russian legislation (tampering with public records and state evaluation). HSE has notified the *Federal Police* for the previous leak of homework solutions, one of the leakers has already been identified and the university is in the process of seeking criminal and civil responsibility against this individual.

1. A monopolistic firm sells its product to two geographically separated markets: East and West. Inverse demand functions for the two markets are $P_E = E - q_E$ and $P_W = W - kq_W$ respectively. The monopolist's costs are zero.
 - (a) Suppose that the monopolist can use third-degree price discrimination. Calculate the price, output, profit and deadweight loss in each market. [10p]
 - (b) Suppose now that the law prohibits charging different prices in the two regions. Given that $W > E$, calculate the price and the output sold when the firm serves both regions and when it serves only one region. [10p]
 - (c) Compare your results in (a) and (b) and explain what happens to the deadweight loss. [5p]
 - (d) Suppose that the firm's costs are not zero any longer. Instead, the cost function is $0.5\beta Q^2$. If the monopoly can use third-degree price discrimination, how much output will it supply to each region? If $W > E$, show the combinations of (E, W) such that the monopoly serves both markets. (Hint: *ignore the sign of the realized profit.*) [15p]

2. A monopolist produces a good with zero marginal costs. There is only one group of consumers whose demand for the good is $Q(P) = 1 - P$.
 - (a) If the monopolist cannot price discriminate, what price will it set? [5p]
 - (b) If the monopolist can set a two-part tariff, what entry fee and what price per unit will it set? [5p]
 - (c) Compare profit, CS and DWL for (a) and (b). [5p]
 - (d) Now assume that there are two groups of consumers: one with demand $Q(P) = 1 - P$ and another with demand $Q(P) = 2 - P$. What is the maximum profit under each of the following scenarios?
 - i. The two groups are served at separate prices. [5p]
 - ii. Only one group is served at a single price. [5p]
 - iii. Both groups are served at a common price. [10p]
 - iv. Both groups are served at a common two-part tariff. [10p]
 - v. The two groups are served at separate two-part tariffs and the monopolist can identify each group. [5p]
 - (e) Can the monopolist serve both groups at separate two-part tariffs if she cannot identify each group? [10p]