

IO UV - Fall 2026

Homework #2 (27/10/2026)

1 Question #1

Two firms have different technologies for producing identical erasers. Assume that all erasers are sold in boxes containing 100 of them. Firm Faber can produce each box at a unit cost of $c_F = \$6$ whereas firm Milan (less efficient) at a unit cost of $c_M = \$8$.

- a. Suppose that the aggregate market demand for boxes of erasers is $p = 12 - \frac{Q}{2}$, where p is the price per box and Q is the number of boxes sold. Solve for the Nash-Bertrand equilibrium prices p_F^B and p_M^B , and the equilibrium profits π_F^B and π_M^B .

2 Question #2

The demand function for concert tickets played by the Valencia symphony orchestra varies between nonstudents (N) and students (S). Formally, the two inverse demand functions for these groups are given by

$$p_N = 12 - q_N \text{ and } p_S = 6 - q_S.$$

Thus, at any given consumption level nonstudents are willing to pay a higher price than students. Assume that the orchestra's total cost function is $C(Q) = 10 + 2Q$ where $Q = q_N + q_S$ is the total number of tickets sold. Solve the following questions:

- a. Suppose the orchestra is able to price discriminate between the two consumer groups by asking students to present their student ID cards to be eligible for a student discount. Compute the profit-maximizing prices p_N and p_S , the number of tickets sold to each group of consumers, and total monopoly profit.
- b. Suppose now the local mafia has distributed a large number of fake student ID cards, so basically every resident has a student ID card regardless of whether the resident is a student or not. Compute the profit-maximizing price, the number of tickets sold to each group of consumers, and total profit assuming that the monopoly orchestra is unable to price discriminate.
- c. By how much the orchestra enhances its profit from the introduction of student discounted tickets compared with the profit generated from selling a single uniform ticket price to both consumer groups.

3 Question #3

In Valencia there are two suppliers of distilled water, labeled as firm Aqua (A) and firm Blue (B). Distilled water is considered a homogenous good. Let p denote the price per gallon, q_A quantity sold by firm Aqua, and q_B the quantity sold by firm Blue. Both firms are located close to a spring so the only production cost is the cost of bottling. Formally, each firm bears a production cost of $c_A = c_B = \$3$ per one gallon of water. Valencia's aggregate inverse demand function for distilled water is given by $p = 12 - Q$, where $Q = q_A + q_B$ denotes the aggregate industry supply of distilled water in Valencia. Solve the following problems:

- a. Solve for firm A 's best-response function, $q_A = R_A(q_B)$. Also solve for firm B 's best-response function, $q_B = R_B(q_A)$. Show your derivations.
- b. Solve for the Cournot equilibrium output levels q_A^c and q_B^c . State which firm sells more water (if any) and why.
- c. Solve for the aggregate industry supply and the equilibrium price of distilled water in Valencia.
- d. Solve for the profit level made by each firm, and for the aggregate industry profit. Which firm earns a higher profit and why?