

Day 9 problems

1. A monopolist serves two markets. Demand in the first market is given by $P=a-bq_1$. Demand in the second market is given by $P=\alpha-\beta q_2$. The output has a constant per unit cost of c and there are no fixed costs.
 - a. If the monopolist faces no restrictions, find the maximum profit of the firm.
 - b. Suppose that the government believes it is unfair to charge different buyers different prices and thus mandates that this firm must charge a single price. Find the firm's optimal profit.
 - c. Suppose that instead of the government regulation, an advance in technology allows customers to transfer goods from one market to the other for a cost of t so that the firm cannot charge prices that differ by more than t . Find the firm's optimal profit.

2. Two firms compete according to the Cournot model in which they both pick their own output. Market demand is given by $P=100-Q$, where Q is the total produced in the market. A firm's cost is equal to q_i^2 , where q_i is firm i 's output.
 - a. Find the optimal quantity for each firm.
 - b. Suppose that firm two had a capacity constraint so that $q_2 \leq C$. Find the optimal quantity for each firm.

3. Minimize $-x^2-y^2+xy$ subject to $x \leq 5$, $y \leq 20$ and $0 \leq x+y \leq 30$

4. Maximize $u(x,y)=(x^r+y^r)^{1/r}$ subject to $x \geq 0$, $y \geq 4$, and $2x+y \leq 20$ assuming $r > 0$.

5. Maximize $2x+y+z^{1/2}$ st. $x \geq 0$, $y \geq 0$, $z \geq 0$ and $Ax+y+2z \leq 20$.