

Problem Set 9

1. A single-price profit maximizing monopolist faces the following demand and cost functions:

$$P(Q) = 10,000 - 0.5Q$$

$$C(Q) = 4,000Q$$

- Draw the marginal cost curve and the marginal revenue curve on the same diagram. Calculate the profit-maximizing price and quantity.
- The government decides to put a price ceiling so that the monopolist will behave like a price-taking firm in a perfectly competitive industry. Repeat (a) under this price ceiling.
- Suppose that another firm with the same technology enters the market. Calculate the Cournot equilibrium and compare it to the monopoly solution obtained above.
- Compare the three cases: monopoly, duopoly, and perfect competition in terms of consumers surplus and total surplus.

2. A monopolist can produce at a constant average (and marginal) cost of $AC = MC = 5$. The firm faces a market demand curve given by $Q = 53 - P$.

- Calculate the profit-maximizing price, quantity and profits for the monopolist.
- Suppose a second firm enters the market. Let Q_1 be the output of the first firm and Q_2 be the output of the second. Market demand is now given by

$$Q_1 + Q_2 = 53 - P.$$

Assuming that this second firm has the same costs as the first, write the profits of each firm as functions of Q_1 and Q_2 :

- Suppose the two firms are Cournot duopolists. Find each firm's best reply function, the Cournot equilibrium, and the resulting price and outputs.
- How much would the first firm be willing to pay to the second firm not to enter the market?
- How much would the consumers collectively be willing to pay to the second firm to encourage it to enter the market?