Homework Policy:

Study You can study the homework on your own or with a group of fellow students. You should feel free to consult notes, text books and so forth.

The quiz will be available Wednesday at 5pm. Following the Honor code, you should find 20 minutes and do the quiz, by yourself and without using any notes. Paper and pen should be all you need. Then turn it in by Thursday 5pm. (drop off in box in front of Baxter 133). It will include one question from each section.

The answers to the whole homework will be available Friday at 2pm.
**Definitions**

Please explain each term in three lines or less!

- Market imperfection
- Externality
- Pigouvian tax
- Monopoly power
- Natural monopoly
- Price discrimination
- Public good
- Free rider problem

**Word problems**

Indicate which of the following statements (referred to the figure below) is true:

1) In the absence of government intervention, the quantity of “pollution” produced will be
   a) 45 tons
   b) 40 tons
   c) 20 tons
   d) 30 tons.

2) If the government established and environmental regulation that did not allow the quantity of pollution to exceed 30 tons, there would be:
   a) Too little pollution, because the marginal social benefit of pollution would exceed its marginal social cost
   b) Too much pollution: pollution is an “economic bad”, and any quantity is thus socially inefficient from an economic perspective
   c) A socially optimal quantity.
   d) Too much pollution, because its marginal social cost would exceed its marginal social benefit.
The figure below shows the marginal cost and benefit of pollution. If the current level of pollution is at $Q_1$, indicate which of the statements below is true:

a) The optimal amount of pollution is being produced.

b) Not enough pollution is being produced.

c) Too much pollution is being emitted.
• Indicate whether each of these goods is a public good, and explain why/why not.
  a) University education
  b) Pay-per view TV show.
  c) City streets.

• Suppose that a firm dumps wastes into a river, decimating the fish population and reducing the profits of the fishermen living along the river by $100,000 a year. The cost of eliminating the wastes for the firm is $60,000 a year.
  a) Using the notion of Coase bargaining, explain how costless bargaining between the firm and the fishermen will lead to a socially efficient outcome, regardless of whether the firm or the fishermen have property rights on the river.
  b) How would the answer to a) change if the waste reduced the fishermen’s profits by $40,000 a year, but the firm could only eliminate the waste at a cost of $60,000 per year.

• Indicate whether each of these sentences is true or false, briefly justifying your answer.
  a) A monopolist operating in two markets and facing the same production costs to serve both of them must charge a higher price in the market with higher price-elasticity.
  b) A monopolist operating in two markets and facing the same production costs to serve both of them must charge a higher price in the market with a higher demand.
  c) A monopolist operating in two markets and facing different marginal costs to serve each of the markets will always charge a higher price in the market associated with higher marginal costs.

**Technical problems**

• Assume that a monopolist with total cost function \( c(q) = q^2 + 100q \) faces a market demand curve given by: \( q^d = 700 - p \).
  a) Obtain the optimal production level, price, and profit level for the monopolist.
  b) Suppose that the government establishes a fixed tax of 10,000 dollars. How does this tax scheme affect the production and profit levels of the monopolist?
  c) Suppose now that, instead of a fixed tax, the government now establishes a 20 dollar tax per unit sold of the good. How would this tax affect the production and profit levels of the monopolist?
  d) How would the monopolist’s production level, price and profits change if instead the government established a 10% tax over the firm’s revenues.
e) Which of the three previous tax schemes would consumers prefer?

- Assume a monopolist sells the same good in two different markets. The aggregate demand in market 1 is \( q_1^d = 200 - p_1 \), while for market 2, the aggregate demand is \( q_2^d = 50 - \frac{1}{2} p_2 \). The marginal cost of production for the monopolist is constant and equal to 40.

  a) What would be the equilibrium prices and quantities in each market if the monopolist behaved as a price-taker in both of them?

  b) Now assume that the firm behaves as a price-discriminating monopolist. What would be the prevailing prices and quantities transacted in each market?

  c) Draw the demand (D), marginal revenue (MR) and marginal cost (MC) function for each market resulting from part b).

  d) Now suppose that the government precludes the monopolist from charging different prices in the two markets. What price would the firm - acting as a monopolist - then charge in the “unified” market?