Problem Set 1: due Thursday, February 15, 2001, in class

(Late assignments will not be graded.)

Part A: Numerical Problems

1. We have a market where the market (inverse) demand function is given by P = 170 - 2Q, where P is the price in dollars and Q is the total quantity demanded. The marginal cost of production (MPC) is given by MPC = 20 + Q and the marginal external cost (MEC) is given by MEC = 20 + 3Q.

   a) Determine the socially optimal level of output (Q*). Calculate the total external cost (TEC*), consumer surplus (CS*), producer surplus (PS*) and social welfare (W*) at this level of output.

   b) Determine the price a monopolist is likely to charge (P_m) and the resulting quantity demanded (Q_m). Calculate the consumer surplus (CS_m), producer surplus (PS_m), and total external cost (TEC_m) under monopoly. What is the deadweight loss (DWL_m) in this case?

   c) The government wants to fix the externality problem using a price mechanism. What is the optimal level of the tax/subsidy? (Which one is it?) Explain and draw a graph to illustrate your answer.

   d) Assume the government imposes the tax or subsidy you found in part (c). How do the government's finances change? What are the changes in consumer surplus, producer surplus and total external cost? What has happened to the DWL found in part (b)? Explain.

   e) Now suppose the monopoly is constrained to charge a price no higher than the competitive market price (P_c). Find P_c and determine Q_c. Calculate consumer surplus, producer surplus, total external cost, social welfare and deadweight loss in this case.

   f) If, in addition to the price regulation, the government taxes the monopolist in order to fix the externality problem, should the tax be set at the same level as if the market were competitive? Explain why or why nor using a graph or numerical calculations.

2. Once upon a time, there was a quiet little town called Pacific Creek. The townsfolk appreciated the peace and tranquillity of their rural situation. They enjoyed romping through the wildflowers in the wide open space just beyond their doors, and could often be seen hiking and berry-picking in the surrounding deserted hills. The local high school's biology students conducted field studies in the nearby forest several times a year. Life was good in Pacific Creek. Then the city-folk decided they did not want (or could not afford) to live in the city anymore. Each new family required a new house. Suppose the marginal benefits from additional housing are MB = 15 - 0.03X, where X is the number of housing units. As the number of new housing developments increased, however, the amount of space available for recreational, educational and aesthetic purposes diminished. The lost marginal benefits to the residents resulting from the additional housing development are MEC = 0.02X. (Disregard for now the difficulty we would encounter in actually obtaining these numbers.) Marginal benefits and marginal costs are in $millions.

   a) What is the optimal number of new housing units from the city-folks' point-of-view? From the original residents' point-of-view? What should the optimal level housing development be according to the principles we have seen in this class? What do **you** think? Explain.

   b) What is the dead-weight loss in each case?

   c) If property rights were defined in such a way as to give the new residents the right to do as they please, what are the maximum possible gains from trade by moving to the optimal level of housing X*?

   d) If property rights were defined in such a way as to give the incumbent home-owners' group the right to "undisturbed" land, what are the maximum possible gains from trade by moving to X*?

   e) What would prevent the two groups from moving up to X* in the real world? Explain.

Part B: Essay question

Write a brief (less than one page) essay on the topic described below. Remember that your answer must be in the form of an essay. (Don't just answer the questions. Discuss the issue!)

1. On January 1, 1998, the State of California introduced a ban on smoking in public bars because of health risks to employees and non-smoking patrons. Examine this issue using the economic tools and concepts (surplus, deadweight loss, tax revenue, …) you have seen to date. Your discussion should address the following matters:

   a) What is the primary market failure leading to government intervention? In your experience, is the ban uniformly enforced?

   b) Do you feel that there exists a market resolution to this issue?

   c) Can smokers be said to be rational agents? What are they maximizing?

   d) What group's ownership of property rights is consistent with the smoking ban?

   e) What are some (current or proposed) alternative policies? What are the pros and cons of the different options?