

Homework 2

ECON 5332 Government, Taxes, and Business Strategy
Spring 2008

Due Tuesday, January 29, 7:00 pm

1. Warrenia has two regions. In Oliviland, the marginal benefit associated with pollution cleanup is $MB = 300 - 10Q$, while in Linneland, the marginal benefit associated with pollution cleanup is $MB = 200 - 4Q$. Suppose the marginal cost of cleanup is constant at \$12 per unit. What is the optimal level of pollution cleanup in each of the two regions?
2. The marginal private benefit associated with a product's consumption is $MPB = 360 - 4Q$ and the marginal private cost associated with its production is $MPC = 6Q$. Furthermore, the marginal external damage associated with this good's production is $MEC = 2Q$. To correct the externality, the government decides to impose a tax of T per unit sold. What tax T should it set to achieve the social optimum?
3. Suppose the demand for a product is $Q = 1200 - 4P$ and supply is $Q = -200 + 2P$. Furthermore, suppose that the marginal external damages of this product is \$8 per unit. How many more units of this product will the market produce relative to the social optimum? Calculate the deadweight loss associated with this externality.
4. Two firms are ordered by the federal government to reduce their pollution levels. Firm A's marginal cost of pollution reduction is given by $MC^A = 20 + 4Q^A$. Firm B's marginal cost of pollution reduction is given by $MC^B = 10 + 8Q^B$. The marginal benefit of total pollution reduction is $MB = 400 - 4Q^T$, where $Q^T = Q^A + Q^B$.
 - (a) What is the socially optimal level of pollution reduction in total? How much pollution reduction does each firm contribute?
 - (b) Compare the total surplus generated by each of three possible public policies designed to generate the socially optimal quantity of pollution reduction: (1) require both firms to reduce pollution by the same amount, (2) charge a common tax per unit of pollution, or (3) require both firms to reduce pollution above levels for which they do not have a permit, and issue an equal number of tradeable pollution permits to each firm.