

Econ 211 > Problem Set 4

1. Explain the nonrivalry and nonexcludability features of a pure public good. Why are both necessary for the good to be a pure public good?
2. Parsons Apartments has 100 resident who are all concerned about security. The table below gives the total cost per day of hiring a 24-hour security guard service and the marginal benefit per day to each of the residents.

Number of Guards	Total Cost of Guards	Marginal Benefit per Resident	Marginal Benefit to all Residents
1	\$300	\$10	
2	\$600	\$4	
3	\$900	\$2	
4	\$1200	\$1	

- a) Why is a security guard a public good for the residents of Parsons Apartments?
 - b) Why will no guards be hired if each of the residents must act individually?
 - c) Complete the last column of the table by computing the marginal benefit of security guards to all the residents combined.
3. Now suppose that the residents of Parsons form an Apartment Council that acts as a governing body to address security issues.
 - a) What is the efficient number of guards? What is the net benefit of this amount?
 - b) Show that the net benefit is less for either one less guard or for one more guard than the net benefit for the efficient number of guards.
 - c) How might the Apartment Council pay for the guards it will hire?
 4. Art, Bob, and Charlie own a lake in Michigan that they use for recreational purposes. A mosquito abatement program will benefit all. Art place a value of \$1, Bob places a value of \$19, and Charlie places a value of \$100 on a mosquito-free environment. A firm will spray the lake and charge each owner \$35.
 - a) What decision would be reached under majority rule? Would the result be efficient?
 - b) What decision would be reached if Art, Bob, and Charlie could engage in costless negotiations? Could unanimity be achieved?
 5. An environmentalist argues that all pollution must be eliminated. How would you try to convince her that her position is both unreasonable and impractical?
 6. What are the advantages of marketable permits compared to regulation of pollution where all firms are required to reduce pollution by a certain percent?
 7. Factory A produces 1000 tons of sulfuric acid at a cost of \$10,000. For the people in the community, the production of 1000 tons of sulfuric acid causes an increase of \$5000 in medical payments, a loss of \$4000 in wages by being sick, and an increase of \$1000 in dry-cleaning bills. What are the private and social costs of the 1000 tons of sulfuric acid? Show your work.
 8. Airport noise is certainly a negative externality. Why would people choose to live near airports?
 9. A factory's production process creates sludge that pours into a river. This sludge makes it difficult to fish in the river, increasing the costs of the local fishermen by \$5000. The factory can install a water filter system for \$4100, and the fishermen can utilize a weighted fishing net system (to get under the sludge) for \$3250. Both systems would remedy the sludge damage to the fishermen.
 - a) Suppose transactions costs are zero. If the factory is not liable and can continue to produce sludge, what outcome do you predict and why?
 - b) Suppose transactions costs are zero. If the factory is assigned liability for sludge damage, what outcome do you predict and why?
 - c) Now suppose transactions costs preclude the possibility of private bargaining between the factory and fishermen. If a pollution tax is levied on the factory with the proceeds given to the fishermen, then what outcome do you predict and why?
 - d) Discuss the results of parts (a), (b), and (c) in terms of the Coase Theorem.