ECON 200. Introduction to Microeconomics **Homework 4**

Name:_____

[Multiple Choice]

1. Which of the following is an example of a positive externality? (c)
   a. Bob mows Hillary's lawn and is paid $100 for performing the service.
   b. While mowing the lawn, Bob's lawnmower spews out smoke that Hillary's neighbor Kristen has to breathe.
   c. Hillary's newly cut lawn makes her neighborhood more attractive.
   d. Hillary's neighbors pay her if she promises to get her lawn cut on a regular basis.

2. When the government levies a tax on a good equal to the external cost associated with the good's production, it _____ the price paid by consumers and makes the market outcome _____ efficient. (a)
   a. increases, more
   b. increases, less
   c. decreases, more
   d. decreases, less.

3. The Coase theorem does NOT apply if (c)
   a. there is a significant externality between two parties.
   b. the court system vigorously enforces all contracts.
   c. transaction costs make negotiating difficult.
   d. both parties understand the externality fully

4. Which categories of goods are excludable? (a)
   a. private goods and club goods
   b. private goods and common resources
   c. public goods and club goods
   d. public goods and common resources

5. Which categories of goods are rival in consumption? (b)
   a. private goods and club goods
   b. private goods and common resources
   c. public goods and club goods
   d. public goods and common resources

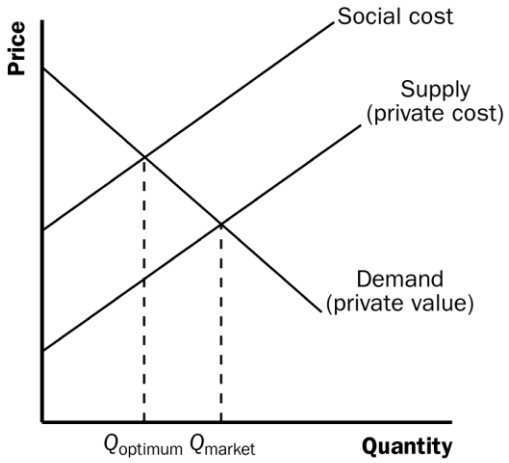
6. Which of the following is an example of a public good? (b)
   a. residential housing
   b. national defense
   c. restaurant meals
   d. fish in the ocean

7. Which of the following is an example of a common resource? (d)
   a. residential housing
   b. national defense
   c. restaurant meals
   d. fish in the ocean

[Short Answer]

1. Draw a supply-and-demand diagram to explain the effect of a negative externality that occurs as a result of a firm's production process.

The figure illustrates the effect of a negative externality. The equilibrium quantity provided by the market is Q_{market}. Because of the externality, the social cost of production is greater than the private cost of production, so the social-cost curve is above the supply curve. The optimal quantity for society is $Q_{optimum}$. The private market produces too much of the good because Q_{market} is greater than $Q_{optimum}$.



2. What are corrective taxes? Why do economists prefer them to regulations as a way to protect the environment from pollution?

Corrective taxes are taxes enacted to correct the effects of a negative externality. Economists prefer corrective taxes over regulations as a way to protect the environment from pollution because they can reduce pollution at a lower cost to society. A tax can be set to reduce pollution to the same level as a regulation. The tax has the advantage of letting the market determine the least expensive way to reduce pollution. The tax gives firms incentives to develop cleaner technologies to reduce the taxes they have to pay.

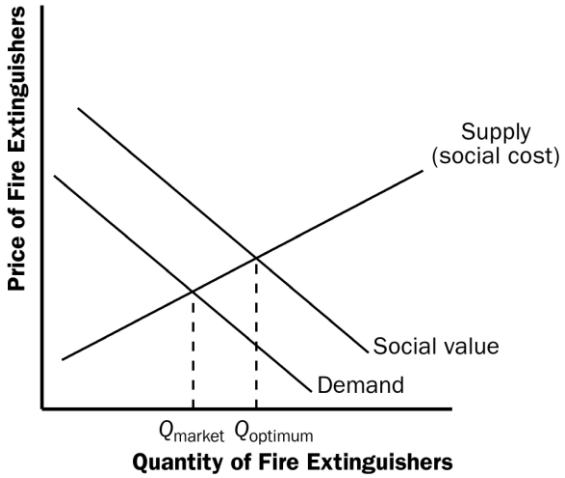
3. Consider the market for fire extinguishers.

a. Why might fire extinguishers exhibit positive externalities?

Fire extinguishers exhibit positive externalities because even though people buy them for their own use, they may prevent fire from damaging the property of others

b. Draw a graph of the market for fire extinguishers, labeling the demand curve, the social-value curve, the supply curve, and the social-cost curve.

The figure illustrates the positive externality from fire extinguishers. Notice that the social-value curve is above the demand curve and the social-cost curve is the same as the supply curve



c. Indicate the market equilibrium level of output and the efficient level of output. Give an intuitive explanation for why these quantities differ.

The market equilibrium level of output is denoted Q_{market} and the efficient level of output is denoted $Q_{optimum}$. The quantities differ because in deciding to buy fire extinguishers, people don't account for the benefits they provide to others

d. If the external benefit is $10 per extinguisher, describe a government policy that would yield the efficient outcome.

A government policy that would result in the efficient outcome would be to subsidize people $10 for every fire extinguisher they buy. This would shift the demand curve up to the social-value curve, and the market quantity would increase to the optimum quantity

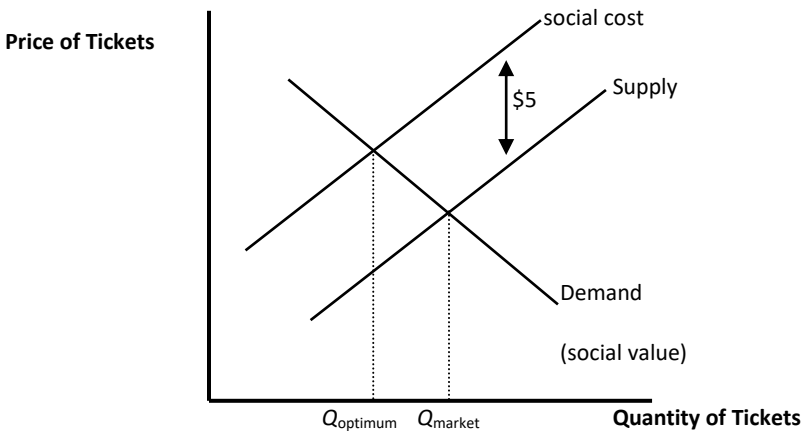
4. A local drama company proposes a new neighborhood theater in San Francisco. Before approving the building permit, the city planner completes a study of the theater's impact on the surrounding community.

a. One finding of the study is that theaters attract traffic, which adversely affects the community. The city planner estimates that the cost to the community from the extra traffic is $5 per ticket. What kind of an externality is this? Why?

The extra traffic is a negative externality because the social cost is greater than the private cost

b. Graph the market for theater tickets, labeling the demand curve, the social-value curve, the supply curve, the social-cost curve, the market equilibrium level of output, and the efficient level of output. Also show the per-unit amount of the externality.

The figure shows the market for theater tickets. Because there is no external benefit, the social-value curve is the same as the demand curve in this case. However, the social-cost curve lies $5 above the supply curve at each quantity. The efficient level of output occurs where the social-value curve (which is demand in this case) and the social-cost curve intersect

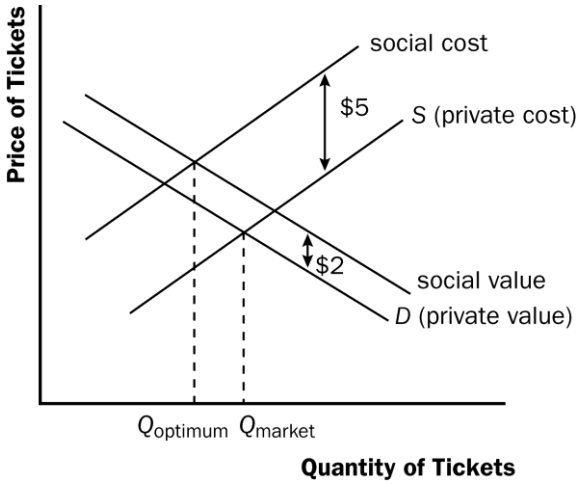


c. Upon further review, the city planner uncovers a second externality. Rehearsals for the plays tend to run until late at night, with actors, stagehands, and other theater members coming and going at various hours. The planner has found that the increased foot traffic improves the safety of the surrounding streets, an estimated benefit to the community of $2 per ticket. What kind of externality is this? Why?

This is a positive externality because the social value of theater tickets is greater than the private value in this case

d. On a new graph, illustrate the market for theater tickets in the case of these two externalities. Again, label the demand curve, the social-value curve, the supply curve, the social-cost curve, the market equilibrium level of output, the efficient level of output, and the per-unit amount of both externalities.

The figure shows both the positive and the negative externalities



e. Describe a government policy that would result in an efficient outcome.

A tax of $3 per ticket will lead to the efficient outcome. The market equilibrium quantity will be equal to the social optimum

5. Many observers believe that the levels of pollution in our society are too high.

a. If society wishes to reduce overall pollution by a certain amount, why is it efficient to have different amounts of reduction at different firms?

It is efficient to have different amounts of pollution reduction at different firms because the costs of reducing pollution differ across firms. If all firms were made to reduce pollution by the same amount, the costs would be low at some firms and prohibitively high at others, imposing a greater burden overall

b. Command-and-control approaches often rely on uniform reductions among firms. Why are these approaches generally unable to target the firms that should undertake bigger reductions?

Command-and-control approaches that rely on uniform pollution reduction among firms give the firms no incentive to reduce pollution beyond the mandated amount. Instead, every firm will reduce pollution by just the amount required and no more.

c. Economists argue that appropriate corrective taxes or tradable pollution rights will result in efficient pollution reduction. How do these approaches target the firms that should undertake bigger reductions?

Corrective taxes or tradable pollution rights give firms greater incentives to reduce pollution. Firms are rewarded by paying lower taxes or spending less on permits if they find methods to reduce pollution, so they have the incentive to engage in research on pollution control. The government does not have to figure out which firms can reduce pollution the most—it lets the market give firms the incentive to reduce pollution on their own

6. Ringo loves playing rock 'n' roll music at high volume. Luciano loves opera and hates rock 'n' roll. Unfortunately, they are next-door neighbors in an apartment building with paper-thin walls.

a. What is the externality here?

The externality is noise pollution. Ringo's consumption of rock and roll music affects Luciano, but Ringo does not consider that in deciding how loudly he plays his music

b. What command-and-control policy might the landlord impose? Could such a policy lead to an inefficient outcome?

The landlord could impose a rule that music could not be played above a certain decibel level. This could be inefficient because there would be no harm done by Ringo playing his music loud if Luciano is not home

c. Suppose the landlord lets the tenants do whatever they want. According to the Coase theorem, how might Ringo and Luciano reach an efficient outcome on their own? What might prevent them from reaching an efficient outcome?

Ringo and Luciano could negotiate an agreement that might, for example, allow Ringo to play his music loudly at certain times of the day. They might not be able to reach an agreement if the transaction costs are high or if bargaining fails because each holds out for a better deal

7. There are three industrial firms in Happy Valley.

Firm	Initial Pollution level	Cost of Reducing Pollution by 1 unit
A	70 units	$20
B	80 units	$25
C	50 units	$10

The government wants to reduce pollution to 120 units, so it gives each firm 40 tradable pollution permits.

a. Who sells permits and how many do they sell? Who buys permits and how many do they buy? Briefly explain why the sellers and buyers are each willing to do so. What is the total cost of pollution reduction in this situation?

The firms with the highest cost of reducing pollution will buy permits rather than reduce their pollution. Firms that can sell their permits for more than it costs them to reduce their pollution will sell.

Because firm B faces the highest costs of reducing pollution, $25 per unit, it will keep its own 40 permits and buy 40 permits from the other firms, so that it can still pollute 80 units. Thus, firm B does not reduce its pollution at all.

Of the two remaining firms, firm A has the higher cost of reducing pollution so it will keep its own 40 permits and reduce its pollution by 30 units at a cost of $20 x 30 units = $600.

Firm C sells all 40 of its permits to firm B and reduces its pollution by 50 units at a cost of $10 × 50 = $500. The total cost of pollution reduction is $1,100

b. How much higher would the costs of pollution reduction be if the permits could not be traded?

If the permits could not be traded, then firm A would have to reduce its pollution by 30 units at a cost of $20 × 30 = $600, firm B would have to reduce its pollution by 40 units at a cost of $25 × 40 = $1,000, and firm C would have to reduce its pollution by 10 units at a cost of $10 × 10 = $100. The total cost of pollution reduction would be $1,700, $600 higher than in the case in which the permits could be traded

8. Both public goods and common resources involve externalities.

a. Are the externalities associated with public goods generally positive or negative? Use examples in your answer. Is the free-market quantity of public goods generally greater or less than the efficient quantity?

The externalities associated with public goods are positive. Because the benefits from the public good received by one person do not reduce the benefits received by anyone else, the social value of public goods is substantially greater than the private value. Examples include national defense, knowledge, uncongested nontoll roads, and uncongested parks. Because public goods are not excludable, the free-market quantity is zero, so it is less than the efficient quantity

b. Are the externalities associated with common resources generally positive or negative? Use examples in your answer. Is the free-market use of common resources generally greater or less than the efficient use?

The externalities associated with common resources are generally negative. Because common resources are rival in consumption but not excludable, the use of the common resources by one person reduces the amount available for others. Because common resources are not priced, people tend to overuse them — their private cost of using the resources is less than the social cost. Examples include fish in the ocean, the environment, congested nontoll roads, the Town Commons, and congested parks

9. Wireless, high-speed Internet is provided for free in the airport of the city of Communityville.

a. At first, only a few people use the service. What type of a good is this and why?

If only a few people use the free wireless internet, it would not be excludable and not rival in consumption. Thus, it would be a public good

b. Eventually, as more people find out about the service and start using it, the speed of the connection begins to fall. Now what type of a good is the wireless Internet service?

Once a large number of people begin using the free internet service, it is a common resource. It is still not excludable, but it is now rival in consumption

c. What problem might result and why? What is one possible way to correct this problem?

Overuse is likely to occur. One possible way to correct for this would be to make the good excludable by charging a fee for its use

10. Four roommates are planning to spend the weekend in their dorm room watching old movies, and they are debating how many to watch. Here is their willingness to pay for each film:

	Judd	**Joel**	**Gus**	**Tim**
First film	$7	$5	$3	$2
Second film	6	4	2	1
Third film	5	3	1	0
Fourth film	4	2	0	0
Fifth film	3	1	0	0

a. Within the dorm room, is the showing of a movie a public good? Why or why not?

Within the dorm room, the showing of a movie is a public good. None of the roommates can be excluded from viewing the movie. Because one roommate's viewing does not affect the ability of another roommate to view the movie, the good is also not rival in consumption

b. If it costs $8 to rent a movie, how many movies should the roommates rent to maximize total surplus?

The roommates should rent three movies because the value of the fourth film ($6) would be less than the cost ($8).

c. If they choose the optimal number from part (b) and then split the cost of renting the movies equally, how much surplus does each person obtain from watching the movies?

The total cost would be $8 \times 3 = $24. If the cost were divided evenly among the roommates, each would pay $6. Judd values three movies at $18 so his surplus would be $12. Joel values three movies at $12 so his surplus would be $6. Gus values three movies at $6, so his surplus would be $0. Tim values three movies at $3 so his surplus is -$3. Total surplus among the three roommates would be $15

d. Is there any way to split the cost to ensure that everyone benefits? What practical problems does this solution raise?

The costs could be divided up by the roommates based on the benefits they receive. Because Judd values the movies the most, he would pay the greatest share. The problem is that this gives each roommate an incentive to understate the value of the movies to him

e. Suppose they agree in advance to choose the efficient number and to split the cost of the movies equally. When Judd is asked his willingness to pay, will he have an incentive to tell the truth? If so, why? If not, what will he be tempted to say?

Because they are going to pay equal shares, Judd has an incentive to tell the truth about the value he places on movies to ensure that the group rents three movies. He values each of the movies more than his cost per movie ($2).

f. What does this example teach you about the optimal provision of public goods?

The optimal provision of public goods will occur if individuals do not have an incentive to hide their valuation of a good. This means that each individual's cost cannot be related to his valuation