EC 11

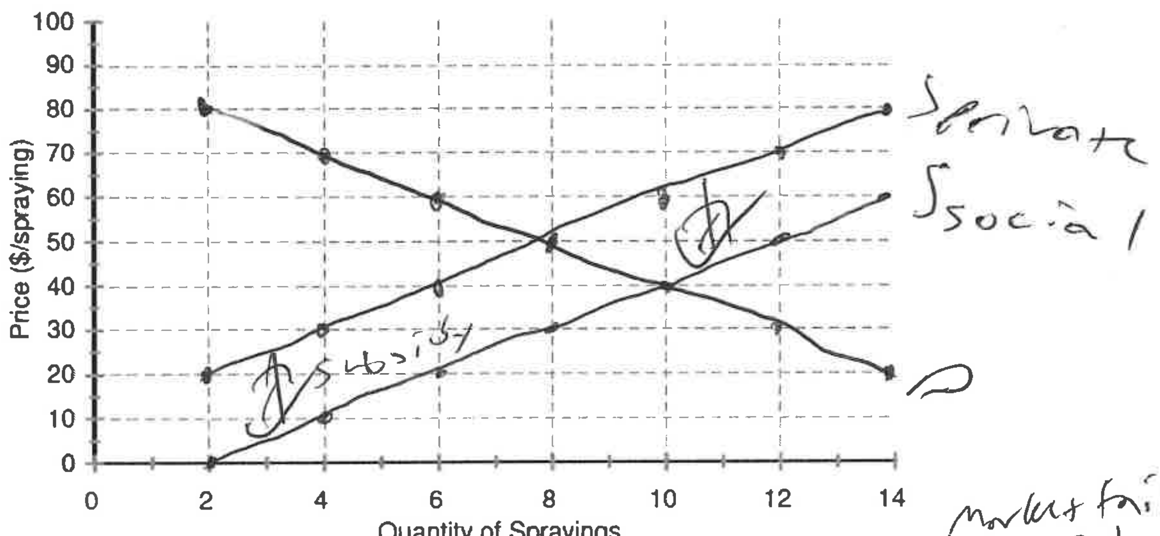
Problem Set 5 – Due 4/18

1.)

The town of Edisto Beach, South Carolina, has a horrible mosquito problem from May through October each year. The table below shows the community's demand and supply schedules for spraying for mosquitoes.

Price ($/spraying)	Quantity Demanded	Quantity Supplied
80	2	14
70	4	12
60	6	10
50	8	8
40	10	6
30	12	4
20	14	2

Suppose the town derives a positive externality of $20 for every spraying for mosquitoes. What is the extent of market failure in this situation? What price and quantity does the market generate? What price and quantity are consistent with an efficient level of spraying? How can the efficient level of spraying be realized? Illustrate your answer using the axes provided below.



market failure = 2
= 10-8

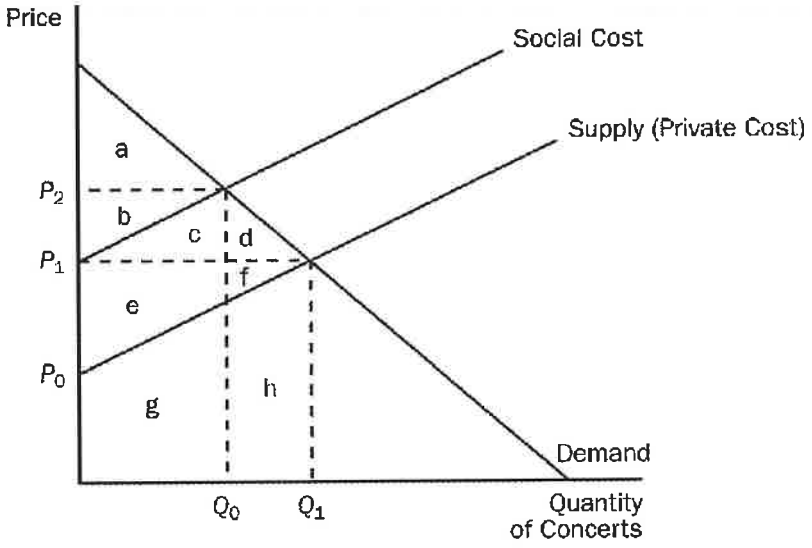
Market P = $50
Q = 8

Socially Efficient
P = 40
Q = 10

– Efficient level can be realized with a $20 subsidy.

2.) This figure reflects the market for outdoor concerts in a public park surrounded by residential neighborhoods.

Figure 10-3



a.) Why is the social cost curve above the supply curve?

The concerts may create loud noises that bother the neighbors. This would be an externality equal to $P_1 - P_0$.

b.) The difference between the social cost curve and the supply curve reflects what?

The externality of the concerts.

c.) At the private market outcome, the equilibrium price will be what?

P_1.

d.) What price and quantity combination best represents the optimum price and number of concerts that should be organized?

P_2, Q_0.

3.) Many species of animals are common resources, and many must be protected by law to keep them from extinction. Why is the cow not one of these endangered species even though there is such a high demand for beef?

Cows can be individually raised and people excluded from killing them. This means production can be efficient in the private market.

4.) Consider a small town with only three families, the Johnson family, the Marshall family, and the Walker family. The town does not currently have any streetlights so it is very dark at night. The three families are considering putting in streetlights on Main Street and are trying to determine how many lights to install. The table below shows each family's willingness to pay for each streetlight.

Number of Streetlights	The Johnson Family	The Marshall Family	The Walker Family	Total WTP
1	$170	$240	$210	
2	130	190	200	
3	80	130	170	1810
4	20	65	120	1725
5	0	25	50	1800
6	0	0	10	1810

a. Suppose the cost to install each streetlight is $450. How many streetlights should the town install to maximize total surplus from the streetlights?

2 – total cost is $900, WTP – $1440.
CS = $240

b. Suppose the cost to install each streetlight is $180. How many streetlights should the town install to maximize total surplus from the streetlights?

4 – total cost – 720
total WTP – 1725
Total surplus – $1005

c. Suppose the cost to install each streetlight is $450 and the families have agreed to split the cost of the streetlights equally. If the families vote to determine the number of streetlights to install, basing their decision solely on their own willingness to pay (and trying to maximize their own

surplus), what is the greatest number of streetlights for which the majority of families would vote "yes?"

2 - after 2 the Marshall and Johnson family vote "no."

d. Suppose the cost to install each streetlight is $180 and the families have agreed to split the cost of installing the streetlights equally. To maximize their own surplus, how many streetlights would the Johnson's like the town to install?

3

5.) a.) Frank's Tire Company produced and sold 500 tires. The average cost of production per tire was $50. Each tire sold for a price of $65. Frank's Tire Company's total costs are what?

Total cost = $50 \cdot 500 = 25,000$

$ATC \cdot Q$

b.) Frank's Tire Company produced and sold 500 tires. The average cost of production per tire was $50. Each tire sold for a price of $65. Frank's Tire Company's total profits are what?

$Profit = Q(P - ATC)$

$= 500(65 - 50)$

$= \$7,500$