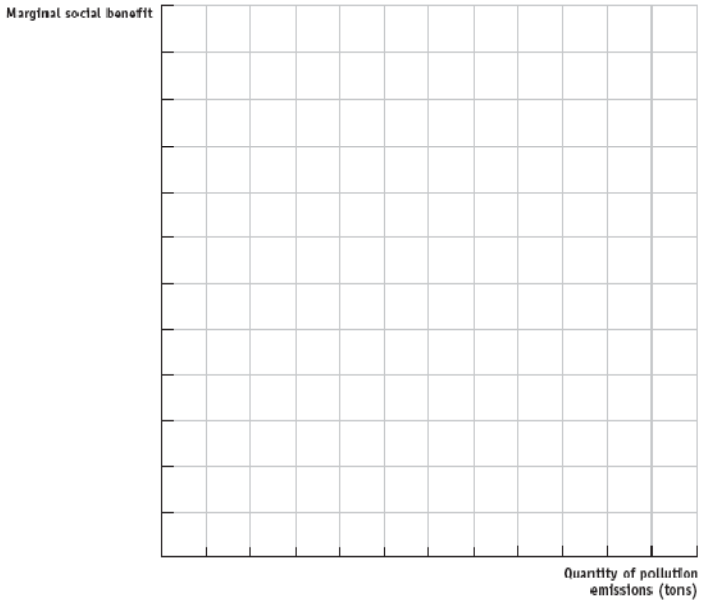
RECITATION #13 – Week 04/26/09 to 05/02/09

EXTERNALITIES AND PUBLIC GOODS

CHAPTER 17 - EXTERNALITIES

1. Suppose there are just two firms in Smalltown and both of these firms emit pollution as part of their productive process. Firm A's marginal social benefit from pollution is given by the equation $MSB = 100 - Q$, while firm B's marginal social benefit from pollution is given by the equation $MSB = 50 - 0.5Q$, where Q is the quantity of pollution emissions measured in tons.

a. Draw a graph representing the marginal social benefit of pollution emissions for firm A and firm B.



b. Suppose the government in Smalltown decides to impose an emissions standard of 55 tons for every firm producing in Smalltown. How much of a reduction in pollution emissions will occur because of the imposition of this standard? Assume that prior to the emissions standard, firms produced the level of pollution emissions at which their marginal social benefit equaled $0.

c. What is the marginal social benefit to firm A of the last ton of pollution it emits? What is the marginal social benefit to firm B of the last ton of pollution it emits?

d. Is this an efficient method for reducing pollution emissions by this amount? Explain your answer.

2. Use the information given in the previous exercise to answer this set of questions. Suppose that the government, instead of an emissions standard, imposes a tax on emissions of $30 per ton.

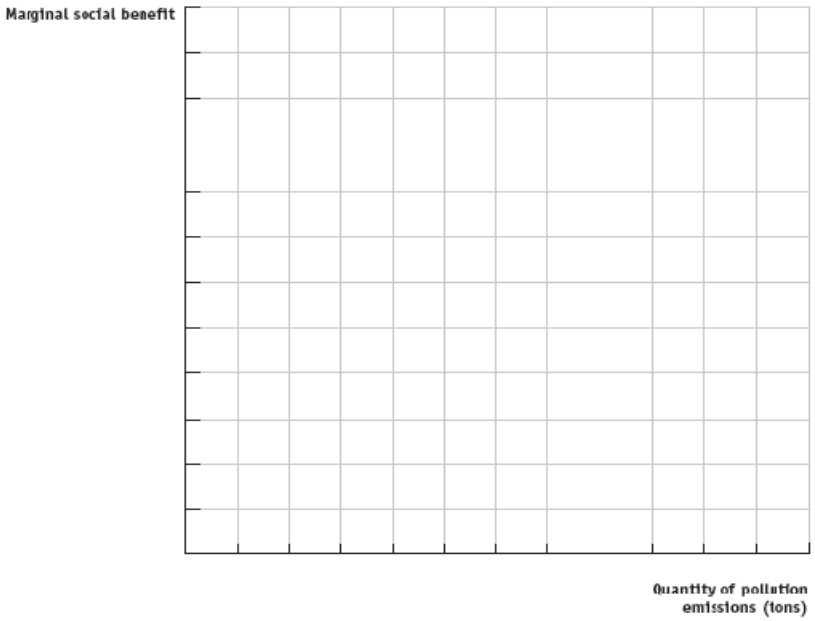
a. What will be the reduction in pollution emissions by firm A with the imposition of this tax?

b. What will be the reduction in pollution emissions by firm B with the imposition of this tax?

c. What will be the total reduction in pollution emissions with this tax?

d. Is this an efficient method for reducing pollution emissions by this amount? Explain your answer.

e. Draw a graph illustrating this tax. Identify firm A's and firm B's marginal social benefit from pollution emissions. [SEE NEXT PAGE]



3. Suppose the demand for computer software engineers in Micronesia can be expressed as

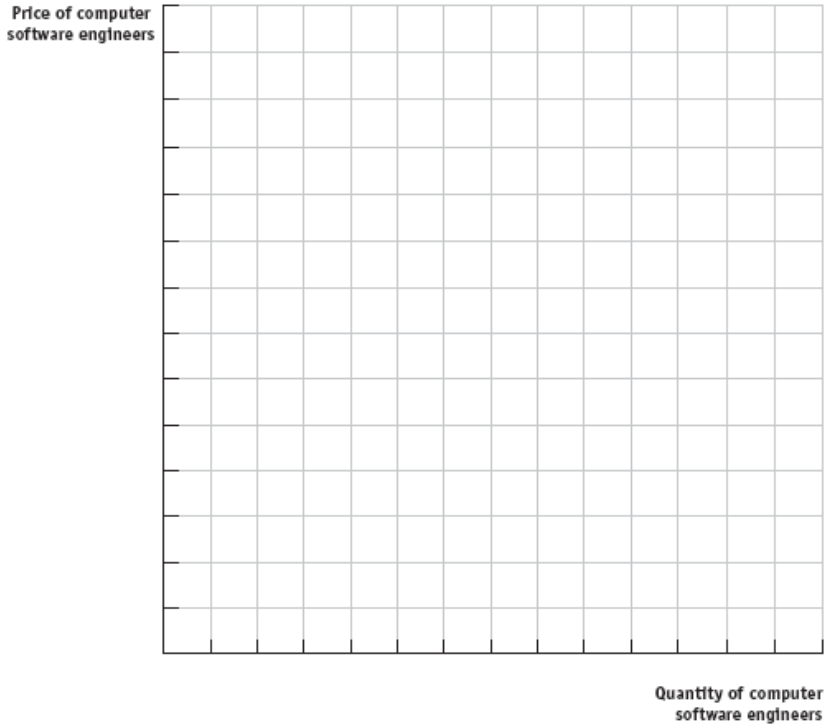
$$Q = 100 - 0.001P,$$

where Q is the number of computer software engineers demanded and P is the annual salary per computer software engineer. Suppose that the supply of computer software engineers in Micronesia can be expressed as $P = 4{,}000Q$. Furthermore, suppose that in the market for computer software engineers there are substantial technology spillovers equal to $20,000 per computer software engineer. Currently, the market for computer software engineers does not take into account these technological spillovers.

a. What is the equilibrium quantity of computer software engineers in Micronesia, and what is the annual salary per computer software engineer?

b. Is the quantity of computer software engineers you found in part (a) the socially optimal quantity of computer software engineers for Micronesia? Explain your answer.

c. Draw a graph of the market for computer software engineers. In your graph draw a curve that represents the marginal private benefits (demand), a curve that represents the marginal social benefit (*MSB*), and a curve that represents supply. Identify the market quantity and market price as well as the socially optimal quantity and price.

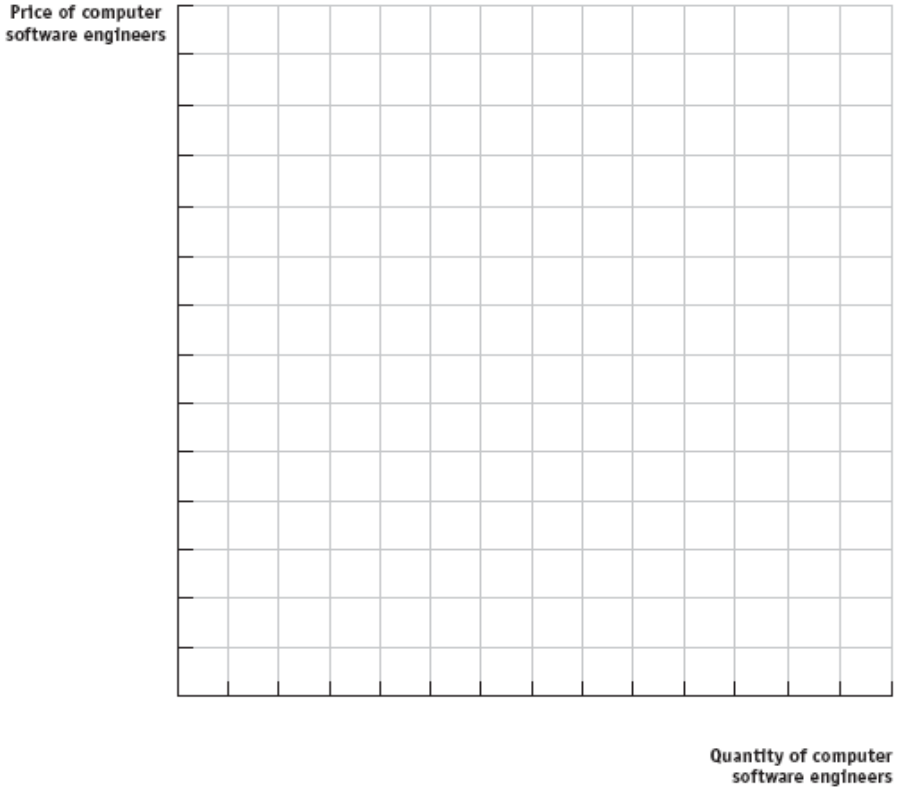


d. What is the optimal quantity of computer software engineers for Micronesia? Explain why you have chosen this quantity as the optimal quantity.

e. What policy could the government enact to enable Micronesia to produce this optimal

quantity?

f. Graph the policy you described in part (e) on the graph below, and label this graph carefully and completely.



CHAPTER 18 - PUBLIC GOODS

1. For each of the following situations, determine whether the good in the situation is

(1) excludable or nonexcludable, and

(2) nonrival in consumption or rival in consumption.

a. A community erects a lighthouse to guide ships navigating near its rocky shoreline.

b. A country builds a national defense system of missiles.

c. A community builds a toll road that has low levels of usage.

d. A community builds a toll road that has high levels of usage.

e. A radio station broadcasts the baseball game.

f. A community builds a non-toll road that has high levels of usage.

g. Police protection is hired for a community.

h. The environment of a community is improved.

2. Jimmy and Beth are the only residents of Smalltown. They both think the community would benefit from more parks, but neither Jimmy or Beth are willing to contribute money to buy land to turn into parks since they both realize that once a park is provided they can enjoy the park even though they have not paid for the park.

a. Describe Jimmy and Beth's behavior and why it represents a problem when trying to provide parks in their community.

b. Suppose Jimmy reveals that his marginal benefit from one park is equal to $50 per park, his marginal benefit from two parks is equal to $25 per park, and his marginal benefit from three parks is equal to $0 per park. Beth reveals that her marginal benefit from one park is equal to $60 per park, her marginal benefit from two parks is equal to $40 per park, and her marginal benefit from three parks is equal to $20 per park. What is the marginal social benefit of two parks equal to in their community? Explain how you found this answer.

c. Suppose the information in part (b) is still true. Jimmy and Beth analyze the cost of providing parks in their community and they find that the marginal social cost of providing parks is constant and equal to $55. What is the socially optimal amount of parks for this community? Explain how you got this answer.

d. If Jimmy and Beth are both willing to reveal their preferences with regard to parks (that is, they will tell the truth about the marginal private benefit they receive from the parks), will they both contribute to getting the socially optimal amount of parks for their community?

3. In which of the following situations is the free-rider problem likely to arise? Explain for each situation that has a free-rider problem why this occurs and what the nature of the free-rider problem is.

a. The parent-teacher association at your child's elementary school is looking for parent volunteers to direct a fundraiser to raise money to replace the playground equipment.

b. Local community organizers are seeking people to serve on a committee to improve the beauty of the community through gardening and landscaping efforts.

c. The local hamburger joint is testing a new sandwich on its menu.

d. A local group is organizing a Saturday morning spring cleanup of the lakeshore in their community.