Assignment 3

(Due April 16)

1. Guards patrolling the mall provide a service without rivalry: all the stores in the mall are simultaneously protected. The demand for the electronics store, which suffer a big loss if thieves strike, is $Q_1 = 9 – 0.5P$, where Q_1 is demand of guards per hour, and P is the price of guard service. The ice-cream parlor, which loses less from a theft, demands fewer guards at any given price. Its demand is $Q_2 = 7 - P$.
A competitive market supplies as many guards as the stores want at $10.

(a) If stores act independently, what is the competitive market equilibrium? How many guards each store will hire? Show the results mathematically and graphically.

(b) What is the marginal benefit to society of guard service, given that a guard patrolling the mall protects both stores at once? Show and discuss your results with a graph.

(c) Is the competitive market equilibrium optimal to the society? If yes, explain why. If no, find the optimal level of guard service and explain why.

2. The Pristine River has two polluting firms on its banks. Acme Industrial and Creative Chemicals each dump 100 tons of glop into the river each year. The cost of reducing glop emissions per ton equals $10 for Acme and $100 for Creative. The local government wants to reduce overall pollution from 200 tons to 50 tons.

(a) If the government knew the cost of reduction for each firm, what reductions would it impose to reach its overall goal? What would be the cost to each firm and the total cost to the firms together?

(b) In a more typical situation, the government would not know the cost of pollution reduction at each firm. If the government decided to reach its overall goal by imposing uniform reductions on the firms, calculate the reduction made by each firm, the cost to each firm, and the total cost to the firms together.

(c) Compare the total cost of pollution reduction in parts (a) and (b). If the government does not know the cost of reduction for each firm, is there still some way for it to reduce pollution to 50 tons at the total cost you calculated in part (a)? Explain.

3. Two companies require identical skills and training from their workers. Both employ 10,000 people. On average, Safety First has one worker fatality per year, while Safety Second has two worker fatalities per year. Jobs at Safety First pay $50,000/year, while jobs at Safety Second pay $50,500/year.

(a) Why do these jobs with identical requirements pay different salaries, based on the information presented here?

(b) What is the risk for a worker of a fatal accident at each company? What is the pay premium associated with the higher risk?

(c) The value of a statistical life is the difference in wage divided by the difference in

risk. What is the value of a statistical life for workers with these skills and training?
(d) Do you expect this value of a statistical life to be appropriate for the population as a whole? Why or why not?

4. Estimate the value of the “Harbor View” (Victoria Harbor) for HK’s hotels each year.

State clearly how you sample the hotels, what assumptions you make, what data you collect, what method(s) you use, and what is your rough estimate of the value of the “harbor view”.
(Note: you cannot possibly collect data for all hotels, so you need to make assumptions when necessary)