

## Chapter 15 Problems

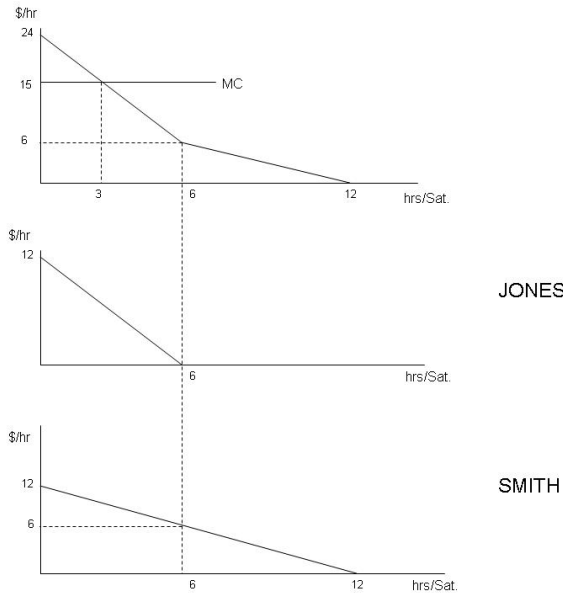
1. Jack and Jill are the only two residents in a neighborhood, and they would like to hire a security guard. The value of a security guard is \$50 per month to Jack and \$150 per month to Jill. Irrespective of who pays the guard, the guard will protect the entire neighborhood.
  - a. What is the most a guard can charge per month and still be assured of being hired by at least one of them? *The most the guard can charge is \$150, to be hired by Jill.*
  - b. Suppose the competitive wage for a security guard is \$120 per month. The local government proposes a plan whereby Jack and Jill each pay 50 percent of this monthly fee, and asks them to vote on this plan. Will the plan be voted in? Would economic surplus be higher if the neighborhood had a guard? *The plan will not be approved because Jack will not vote for it. He would have to pay a \$60 tax for a service worth only \$50 to him.*
3. The following table shows all the marginal benefits for each voter in a small town whose town council is considering a new swimming pool with capacity for at least three citizens. The cost of the pool would be \$18 per week and would not depend on the number of people who actually used it.

| Voter | Marginal benefit (\$/week) |
|-------|----------------------------|
| A     | 12                         |
| B     | 5                          |
| C     | 2                          |

- a. If the pool must be financed by a weekly head tax levied on all voters, will the pool be approved by majority vote? Is this outcome socially efficient? Explain. *No and no. The pool will not be built because with the necessary lump-sum tax of \$6 per voter per week, voters B and C will vote against it. This outcome is not socially efficient because the total benefits per week (\$19) will exceed the total weekly cost (\$18).*
- b. The town council instead decides to auction a franchise off to a private monopoly to build and maintain the pool. If it cannot find such a firm willing to operate the pool, then the pool project will be scrapped. If

all such monopolies are constrained by law to charge a single price to users, will the franchise be sold, and if so, how much will it sell for? Is this outcome socially efficient? *Since the marginal cost is zero, a monopolist's profit-maximizing price is the price that maximizes total weekly revenue: \$12. At a lower price of \$5, A and B would pay, but total revenue in this case would only be \$10. At the lowest possible price of \$2, all three customers would pay, but total revenue would only be \$6. So, the firm charges the price equal to the highest marginal benefit customer, which in this case is \$12, for a total weekly revenue of \$12. The result at this profit-maximizing price is still a loss of \$6 per week, so no firm is willing to operate the pool. The socially efficient outcome is not achieved.*

5. Two consumers, Smith and Jones, have the following demand curves for Podunk Public Radio broadcasts of recorded opera on Saturdays. Smith:  $P_S = 12 - Q$  and Jones:  $P_J = 12 - 2Q$ , where  $P_S$  and  $P_J$  represent marginal willingness to pay values for Smith, and Jones.  $Q$  represents the number of hours of opera broadcast each Saturday.
- a. If Smith and Jones are the only public radio listeners in Podunk, construct the demand curve for opera broadcasts. *To construct the demand curve for this public good, we add the two demand curves vertically:*



- b. If the marginal cost of opera broadcasts is \$15 per hour, what is the socially optimal number of hours of broadcast opera? *The socially optimal quantity of broadcast opera on Saturdays occurs where the marginal cost curve intersects the combined demand curve (top panel). The socially optimal amount is 3 hours per Saturday.*
6. Suppose the demand curves for hour-long episodes of the Jerry Springer Show and Masterpiece Theater are as shown in the book. A television network is considering whether to add one or both programs to its upcoming fall lineup. The only two time slots remaining are sponsored by Colgate, which is under contract to pay the network 10 cents for each viewer who watches the program, out of which the network would have to cover its production costs of \$400,000 per episode. Any time slot the network does not fill with Springer or Masterpiece Theater will be filled by infomercials for a weight-loss program, for which the network incurs no production costs and for which it receives a fee of \$500,000. Viewers will receive \$5 million in economic surplus from watching each installment of the infomercial.
- a. How will the network fill the two remaining slots in its fall lineup? *An episode of Springer would attract an audience of 12 million viewers, while one of Masterpiece Theater would attract only 8 million (the network does not charge customers, so viewership corresponds to the horizontal intercept on the demand curves). Those audience sizes would generate payments of \$1.2 million and \$800,000, respectively, from Colgate. Net of production costs, the network would earn a profit of \$800,000 per Springer episode, and \$400,000 per Masterpiece Theater episode. The network would maximize profit by filling one time slot with Springer and the other with the weight-loss infomercial.*
- b. Is this outcome socially efficient? *No. The economic surpluses from showing episodes of Springer and Masterpiece Theater are the areas under their demand curves - \$48 million for Springer, and \$64 million for Masterpiece Theater. Since both figures are larger than the \$5 million surplus generated by the infomercial, the socially efficient result would be for the network to choose Springer and Masterpiece Theater.*