Chapter 33

NAME_____

Law

Introduction. These problems are based on the survey of law and economics found in your text. We hope that you will be pleased to see that the techniques you learned in earlier chapters can provide useful insights into issues that arise in law.

33.1 (2) Madame Norrell makes her living in Florida by stealing gold buttons from designer jackets in expensive boutiques. She can sell each button to a fence for $10. The maximum number of buttons she can steal in a day is 50. Florida has a law against button theft. There is a fine of F dollars if someone is caught stealing any number of buttons. The police catch about 10 percent of all button thieves, and these must pay the fine and forfeit any buttons they have stolen.

(a) Suppose that the only thing that Madame Norrell cares about is her expected profits. What is the smallest fine that will discourage Madame Norrell from stealing buttons? 4,500.

(b) Due to an oversupply of buttons, Madame Norrell's fence announces that he will no longer pay her a flat price for buttons. If Madame Norrell delivers x buttons, she will be paid $5 \ln x$. (Assume that Madame Norrell will take at least 1 button if she takes any at all.) Initially Madame Norrell has $100, and the fine if she is caught stealing x buttons is $3 per button. However, she only has to pay the fine if she is caught, in which case all her buttons are confiscated and she collects zero from the fence. How many buttons will Madame Norrell try to take, assuming she maximizes her expected profit? 15.

(c) What does the fine per button have to be to induce Madame Norrell to limit herself to taking 10 buttons? 4.50.

(d) Now assume that Madame Norrell is an expected utility maximizer. With probability .10, she is caught with x buttons and pays a fine of $3x$. With probability .90, she gets away with x buttons, which she can sell for $10 each. She cares about the expected utility of her wealth, with von Neumann-Morgenstern utility function $\ln x$. Initially her wealth is $100. How many buttons will she take? 29.

33.2 (2) Jim Levson rides his bike through the forest with reckless abandon, while Dick Stout likes to hike in the woods. Let s be the speed in miles per hour that James rides and w the speed with which Dick walks.

Jim's utility depends on how fast he rides and how many dollars he has, while Dick's utility depends on how fast he walks and how much money he has.

$$U_{Jim} = 6\sqrt{s} - s + m$$
$$U_{Dick} = 4\sqrt{w} - w + m.$$

(a) How fast will Dick walk? 4 miles per hour. How fast will Jim ride? 9 miles per hour.

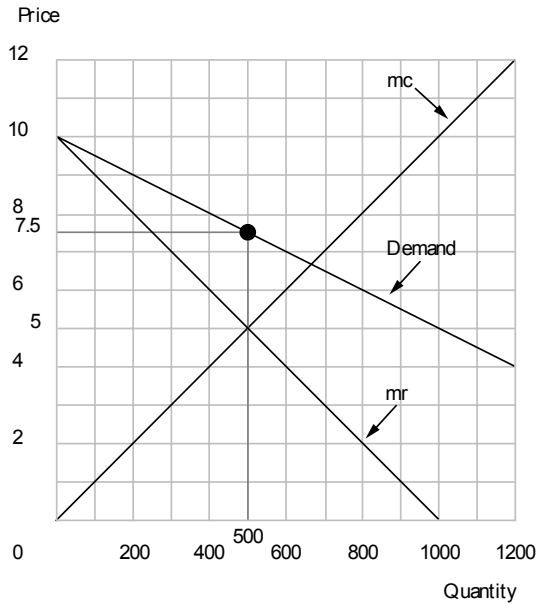
(b) Alas, since Jim and Dick are both moving in the same forest, there is some chance that Jim will run into Dick. Suppose that the expected cost to Dick of such an accident depends on the speed that each moves: $c(s, w) = \frac{s^2}{16} + \frac{w^2}{2}$. (Assume that Jim is fitter than Dick and will incur negligable costs in an accident.) If Dick has to pay the entire cost of an accident, how fast will he walk? 1 mile per hour. How fast will Jim ride? 9 miles per hour.

(c) Suppose that Jim now has full liability and must pay any costs that he imposes on Dick. How fast will Dick walk? 4 miles per hour. How fast will Jim ride? 4 miles per hour.

(d) What are the socially optimal speeds for Jim and Dick to move? Dick should walk 1 mile per hour and Jim should ride 4 miles per hour.

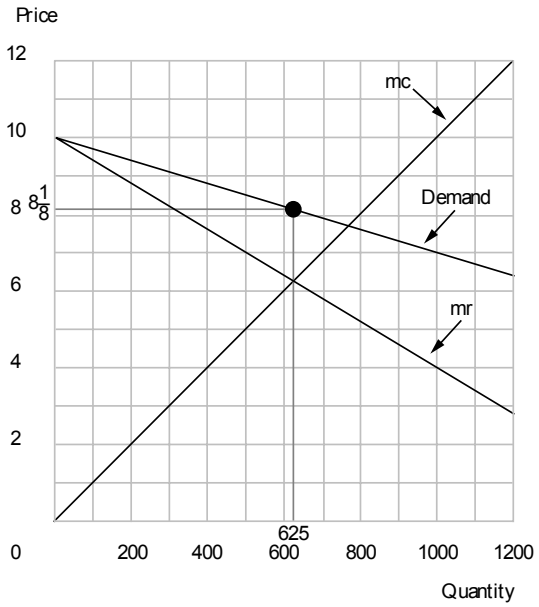
33.3 (2) Derri Bottled Water of Christchurch, New Zealand, sells bottled water from "the bottom of the world." Due to a number of fortuitous circumstances, Derri has a monopoly on bottled water in the South Island. The demand for bottled water in the South Island is $p(x) = 10 - x/200$, and the cost of producing x bottles of water is $c(x) = x^2/200$. Here the price is measured in New Zealand dollars and the quantity is measured in $1,000$ cases per month.

(a) Draw the demand curve, the marginal revenue curve, and the marginal cost curve in the graph below. The profit-maximizing quantity is 500 cases of water, and the profit maximizing price is 7.5 dollars per case.



(b) The New Zealand antitrust authorities now bring action against Derri waters for monopolizing the bottled water industry. They announce that during the coming year they will confiscate 50 percent of Derri's profits. Part of these confiscated profits will be used to distribute rebates to the consumers of bottled water. In particular, each purchaser of bottled water will receive \$2 per case from the government. How does this rebate influence the demand for bottled water? Shifts it up by \$2 What is the equation for the new inverse demand curve? $p(x) = 12 - x/200$.

(c) Solve for the new levels of output and price. Draw the marginal revenue curve, marginal cost curve, and inverse demand curve in the following graph.


Price
12
10
8 1/8
6
4
2
0
200
400
600
625
800
1000
1200
Quantity
mc
Demand
mr