Econ 73-250A-F
Spring 2001
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## Practice Exam #3

*As indicated on the course syllabus, this practice exam will be discussed during your recitation section on Friday, May 4. The exam will be on May 10. You won't be allowed to use any books or notes during the exam. The final exam is comprehensive.*

### Part III

**Exercise #1. [10 pts.]** A monopolist has an inverse demand curve given by $p(y) = 12 - y$ and a cost curve given by $c(y) = y^2$. Describe how to determine its profit-maximizing level of output, and compute it. Show your work: to receive full credit you should show how you compute the optimal quantity of output.

**Exercise #2. [15 pts.]** You are the manager of a new amusement park that has monopoly power over the service it offers: roller coaster rides. You have figured that the park will attract 1,000 people per day, and each person will take $x = 50 - 50p$ rides, where $p$ is the price of a ride. The marginal cost of a ride is essentially zero.

(a) If admission to the park were free and you had to choose the profit maximizing price of a ride $p^*$, which value would you set?

(b) Suppose now that you can use a two-part tariff, i.e., you can set a price for admission to the park, and another one for each roller coaster ride. Which admission fee and price of a ride would you choose? Show your work: to receive full credit you should show how you compute the optimal prices.

**Exercise #3. [20 pts.]** Your company has monopoly over product H. It sells it in the UK and in the US. The cost function for your firm is

$$c(q) = 10q.$$

Your marketing department has identified the UK and the US demand curves for H to be

$$
\begin{aligned}
q_{US} &= 50{,}000 - 2{,}000 p_{US} \\
q_{UK} &= 10{,}000 - 500 p_{UK},
\end{aligned}
$$

where $q_{US}$ and $q_{UK}$ represent the quantities demanded by US and UK consumers respectively, and $p_{US}$ and $p_{UK}$ the (US dollar) prices charged for the product in the US and in the UK, respectively.

(a) If you were to charge the same price in both countries, how many units of H should you sell, and what price should you charge in order to maximize your company's profits?

(b) If you could charge different prices in the US and the UK what prices would you choose and how many units would you sell in the US and how many in the UK?

**Exercise #4. [20 pts.]** A company sells product A in a competitive market. Its long-run cost function is given by

$$c(y) = y^2 + 10 \text{ for } y > 0$$
$$c(y) = 0 \text{ for } y = 0,$$

where $y$ represents the quantity of good A.

(a) What is the lowest price at which this company will supply a positive amount of product A in the long-run?

(b) Suppose that the market price for A is $p = 2\sqrt{10}$, and that 100 firms are operating in this market in the long-run. What is the equilibrium market demand for the product?

**Part II**

**Exercise #5. [17 pts.]** The rental price of machinery $K$ (measured in machine-hours) is $10 per hour, while the hourly wage rate for labor, $L$ (measured in labor-hours), is $6. Find the cost function associated with the following technology:

$$y = 10K + L,$$

where $K$ represents machinery (measured in machine-hours) and $L$ labor (measured in labor-hours).

**Part I**

**Exercise #6. [18 pts.]** John likes books and restaurant meals. His utility function is

$$u(x_b, x_m) = (x_b)^{0.2} (x_m)^{0.4},$$

where $x_b$ represents the quantity of books that John "consumes" in a month, and $x_m$ the amount of restaurant meals that he consumes. Suppose that both books and restaurant meals are perfectly divisible goods. The relative price of books in terms of restaurant meals is 0.4, i.e., buying a book costs 40% of the price of a restaurant meal. The nominal price of a restaurant meal is $40. John's income is $1,000 per month. Compute the quantity of books and restaurant meals that John consumes in a month.