Econ 403: Final Examination — April 28, 2009

file=h2p-w09-final.tex

Last Name (Please PRINT): ....

First Name (PRINT): ....

Your UM I.D. Number: ....

INSTRUCTIONS (please read!)

1. Please make sure that you have 8 pages, including this page. Complaints about missing pages will not be accepted.
2. Please answer all the questions. You are not allowed to use any course material. Calculators are permitted.
3. Maximum Time Allowed: 2 hours (1:30–3:30).
4. Your grade depends on the arguments you develop for supporting your answers. Each answer must be justified by using a logical argument consisting of a model/graph. An answer with no justification will not be given any credit.
5. You must provide all the derivations leading you to a numerical solution.
6. When you draw a graph, make sure that you label the axes with the appropriate notation.
7. Maximum Score: 100 Points
8. Budget your time. If you cannot answer a certain question, skip to the next one.
9. Please always bear in mind that "somebody" has to read and understand your handwriting. Please make sure that your ink is "visible" and that your sentences are properly organized and fit into the designated blank space. If you think that your handwriting is poor, please print each word!
10. Good Luck !

Instructor's use only

Problem #	1	2	3 & 4	5	6	Total
Maximum	20	20	20	20	20	100
Points						

(1) ChewMe is a monopoly in the market for sugarless chewing gum. There are only two potential consumers, labeled as consumer 1 and consumer 2. Consumers' inverse demand functions are given by

$$p_1 = 8 - 2q_1 \quad \text{and} \quad p_2 = 4 - \frac{q_2}{2},$$

where q_i denotes the number of sticks consumed, and p_i the price (denominated in, say, ¢). Each stick of chewing gum costs $\mu = 2$¢ to produce. There are no fixed costs, $\phi = 0$.

(1a) [10 points] Suppose now that ChewMe has decided to bundle more than one stick in a single package and sell the entire package for a price p^b. Compute the profit maximizing price of a bundle containing $q^b = 3$ sticks and the resulting profit. Compute the same for bundle containing $q^b = 4$ sticks. Conclude which of the two bundles maximizes ChewMe's profit.

(1b) [5 points] Compute CHEWME's profit when it simultaneously offers for sale two different packs of chewing gum. One pack contains $q^b_A = 2$ sticks which sells for $p^b_A = 10¢$. The second pack has $q^b_B = 5$ sticks and sells for $p^b_B = 13¢$.

(1c) [5 points] Suppose ChewMe sells individual sticks (no bundling) at a uniform price of p per stick. ChewMe cannot price discriminate between the two consumer groups. Compute the profit maximizing price, p, total quantity sold Q, and total profit.

(2) Consider a price discriminating monopoly selling in two markets. The market demand curves are given by $p_1 = 120 - 0.25q_1$ and $p_2 = 240 - 0.5q_2$. The firm bears a marginal cost of $\mu = \$10$, and market-specific and general fixed costs given by $\phi_1 = \phi_2 = \phi = \$10,000$.

(2a) [10 points] Compute the profit-maximizing prices assuming that capacity is unlimited. Indicate which markets should be served.

(2b) [10 points] Now suppose that the firm has a limited production capacity in the sense that it cannot produce more than $K = 240$ units. Compute the profit-maximizing prices and indicate which markets are profitable to serve.

(3) You company sells $q_1 = 70$ GPS units at a price $p_1 = \$120$. Each additional unit costs $\mu = \$40$ to produce. The fixed cost is $\phi = \$3500$.

(3a) [5 points] Your CEO suggests to reduce the price by $\$10$, so the new price would be $p_2 = \$110$. Compute how many additional units should the firm sell in order for the company to (at least) break even with the profit before the price cut took place?

(3b) [5 points] At the new price, $p_2 = \$110$, how many GPS units should your company sell in order to (at least) break even?

(4) [10 points] Suppose you are the manager of an amusement park. The inverse demand function of each of $N_1 = 2$ potential visitors is given by $p_1 = 8 - 2q_1$; whereas the demand of each of $N_2 = 5$ visitors is $p_2 = 4 - q_2/2$. You charge all visitors a single two-part tariff $f + 2q$, where q is the number of rides the visitor chooses to pay for. That is, each visitor pays a fixed admission fee of $\$f$, and in addition $\$2$ for each ride. Suppose it costs you $\mu = \$2$ to operate each ride and that there are no fixed costs ($\phi = 0$). Compute the fixed fee f which maximizes profit of this amusement park.

(5) [20 points] Congratulations! You have been appointed the CEO of AIR ARBOR Airlines. The passengers' inverse demand functions facing AIR ARBOR during summer and winter are $p_S = 12 - q_S/2$ and $p_W = 24 - 2q_W$, respectively. There are no fixed costs, so $\phi = 0$. The marginal capacity cost is $\mu_k = \$8$, and the marginal operating cost is $\mu_o = \$4$. Compute the profit-maximizing number of passengers flown in each season, the seasonal prices, and the resulting total profit.

(6) GIBBERISH, a leading manufacturer of inkjet printers, can produce printers of three quality levels: fast (F), medium speed (M), and slow (S). Buyers' willingness to pay for the different qualities and the corresponding unit production costs are summarized in the table below. There are no fixed costs, $\phi = 0$.

i (Quality)	$\ell = 1$	$\ell = 2$	μ_i (Unit Cost)
F (Fast)	$V_1^F = \$70$	$V_2^F = \$50$	$\mu_F = \$50$
M (Medium)	$V_1^M = \$65$	$V_2^M = \$40$	$\mu_M = \$30$
S (Slow)	$V_1^S = \$40$	$V_2^S = \$30$	$\mu_S = \$10$
N_ℓ (# consumers)	$N_1 = 50$	$N_2 = 40$	

(6a) [10 points] Compute the profit GIBBERISH earns when it sells quality F only, quality M only, and quality S only. Conclude which quality GIBBERISH should introduce into the market, assuming that only one quality can be sold in this market.

(6b) [10 points] Can GIBBERISH enhance its profit by introducing more than one model into the market. If your answer is positive, indicate which printer models should be introduced and their profit-maximizing prices. Prove that these prices indeed segment the market in the sense that each model introduced into the market will be demanded by at least one type of consumers.

THE END