

## Ec844 Final Exam, Fall 1999 GMU

Will you be taking this class via the “exam only” (no paper) option?: Yes / No

For each of the first four problems, you will get 1/2 credit for each problem for translating the word problem into a math problem, and 1/2 credit for solving this math problem. A sample translation might be

“ $\pi(p, r) = 3ap/(r + p)^2 - 10$ . Find  $d\pi(p, r)/dp$ , set it equal to zero, and solve for  $p$  in terms of  $r, a$ . Call that  $p^*$ . Now set  $\pi(p^*, r) = 0$  and solve for  $r$  in terms of  $a$ . Call this  $\hat{r}(a)$ . Let  $a = 1$ . If  $\hat{r}(1) > 2$ , the answer is yes.”

1. *What Price for Directory?* The Latvian Folk Music Directory (LFMD) is the only web site which lists Latvian folk music for sale on the web. If you like that kind of music, you can either pay LFMD a price  $p$  for access, or you can go searching for it elsewhere on the web. Such do-it-yourself search costs  $sx$ , where  $s$  is a generic cost of search, and  $x$  is an individual difficulty of search which varies uniformly between 0 and 1. If the marginal cost of allowing access to LFMD is negligible, what price  $p$  would a profit-maximizing LFMD charge?
2. *Unbundle cable channels?* Up until now, the local cable TV monopoly has offered all of its channels as a whole package; take it or leave it. Now a consumer group is proposing a “reform:” the cable company should be forced to only sell consumers individual channels. The marginal cost of supplying a channel to a consumer is negligible, even given this reform. Assume there are three cable TV channels: Sports, Movies, and News. Assume also that there are  $N$  viewers of each of these three types: sports fans, movie fans, and news fans. If the monetary value each viewer type places on each channel follows this table,

<i>Channel Value</i>	Sports	Movies	News
Sports fans	5	1	2
Movie fans	3	3	1
News fans	1	2	3

- (a) What is cable TV’s current price? What would channel prices be given reform?
- (b) What is the cable company’s current profit? What would it be given reform?
- (c) What is each viewer type’s current consumer surplus? What would it be given reform?
- (d) Would you favor this “reform”? Why or why not?

3. *How Many Compete for New Product?* Currently the marginal cost of producing a certain product is 1, while the demand for it is  $Q = 1 - P$ . Two competing firms are capable of researching a way to make this product for free (with no fixed or marginal cost). If a firm spends 0.1 on research, it will have a 1/3 chance of discovering this new method (which it could then keep secret from the other firm). If both firms do research, their chance of success is independent. And if both firms succeed, they will compete in prices.
- How many of these two firms will do research?
  - How many of these two firms should do research (by the usual welfare measure)?
4. *How much better is HDTV?* HDTV is a standard for higher quality TV images than the familiar TV standard. The value each viewer places on watching TV of a given image quality is the product of three terms: a personal taste for TV  $x$ , an image quality  $a$ , and a number  $n$  of TV shows available at that quality. Viewer taste  $x$  is distributed uniformly between 0 and a maximum value of  $m$ . Familiar TV is free, with a quality  $a = 1$ . And the number  $n$  of TV shows available at a quality is proportional to the number of viewers who watch that quality.
- What is HDTV's revenue as a function of its quality  $b$  and its price  $p$ ?
  - What quality  $b$  would an HDTV monopolist choose, given zero marginal costs? (Warning: this is not easy.)
5. *Video Games for Fun and Profit* Use your understanding of industrial organization to advise a new video game company, who is hoping to compete with companies like Nintendo, Sony, and Sega. Such a company typically sells a machine, like *Nintendo 64*, and compatible games, like *Super Mario 64*. Issues you might consider:
- Sell games individually or in bundles?
  - Where higher margins: game machines or individual games?
  - How different be from existing video and other games?
  - Sell or rent games and machines?
  - Sell via web, catalog, discount stores, or specialty stores?
  - How price discriminate in other ways?
  - Deter or encourage others selling compatible games or machines?
  - How high a quality should it be?
  - How much time/money spend on research of machine, games?
  - How/when convince consumers of product quality?
  - How convince consumers of future prices, available games?
  - How many people should play each game together?
  - How long should each game take to play?
6. *For those taking "exam only" option* Describe the U.S. market for beer, as told by Scherer in our text *Industry, Structure, Strategy, and Public Policy*.