
Chapter 13: Answers to Questions and Problems

1.
 - a. 16 units.
 - b. Note that $P = \$200$, $AC = \$180$, and $Q = 16$, so profits are $(\$200 - \$180)(16) = \$320$.
 - c. Yes; if it can credibly commit to a higher output it will earn even greater profits.

2.
 - a. $\Pi^{MD} = \pi^M + \frac{\pi^D}{i} = \$40 + \frac{\$10}{.2} = \90 million.
 - b. $\Pi^L = \pi^L + \frac{1}{1+i}\pi^L + \left(\frac{1}{1+i}\right)^2\pi^L + \dots = \left(\frac{1+i}{i}\right)\pi^L = \left(\frac{1+.2}{.2}\right)(\$8) = \$48$ million.
Since this is less than the profits obtained if entry occurs, the firm should not engage in limit pricing.

3.
 - a. The simultaneous-move equilibrium is (Yes, Yes), and Player 1 earns \$200 in this equilibrium. By going first player 1's best strategy is to commit to "No." Player 2's best response would be "No", and thus Player 1 would earn \$350 by going first. The maximum amount Player 1 should pay for going first is this \$150 (or perhaps \$149.99). Importantly, this assumes Player 1's move is observed by Player 2 before Player 2 makes her decision.
 - b. Player 2 gets \$200 when Player 1 goes first, compared to \$225 when they move at the same time. Thus, player 2 would be willing to pay up to \$25 to keep player 1 from moving first.

4.
 - a. A network with 10 users provides $10(10 - 1) = 90$ potential connection services.
 - b. No. Revenues will be \$1,000 which is well short of the \$6,000 in costs.
 - c. Yes. With 90 connection services, each consumer will pay \$900 to join the network. Since there are 10 consumers, total revenues are \$9,000. This exceeds the \$6,000 required to build the network.
 - d. The number of potential connection services increases by 20 to 110.

5.
 - a. Two examples include tactics that raise distribution costs or increase the price of inputs.
 - b. No. The benefits stem from the fact that by raising rivals' costs, your rivals reduce their own output. This tends to increase the market price, thus permitting you to expand your own output (and market share) to enjoy higher profits.

6.
 - a. Firm 2 will enter so Firm 1 earns profits of \$300 thousand.
 - b. By eliminating the fee, Firm 2 still has an incentive to enter. Firm 1 earns profits of \$340 thousand.
 - c. The \$300 thousand increase in the medallion fee eliminates Firm 2's incentive to enter (since its profits are -\$100 thousand upon entry). Since Firm 2 does not enter, Firm 1 earns profits of \$400 thousand.
 - d. The optimal change is an increase of \$200 thousand (or perhaps \$200 thousand plus one cent). This makes it unprofitable for Firm 2 to enter. Firm 1 earns profits of \$500 thousand.
 - e. Yes; the city gets a higher fee which is probably good politically.

7.
 - a. Since last year's market price was \$8, it follows that Firm 1 produced 1 million units last year (since $P = 10 - 2Q = 8$ implies $Q = 1$ million). For this to be the profit-maximizing price ($MR = MC$), it follows that $10 - 4Q = MC$. Since $Q = 1$, Firm 1's marginal cost was \$6 last year – the same as Firm 2's marginal cost this year. Thus, it would appear that Firm 1's marginal cost has declined over time due perhaps to learning curve effects.
 - b. At the current market price of \$8, total market output is 1 million. Thus, each firm sells 0.5 million units. Each firm's fixed costs are \$1 million. Firm 1's profits are thus $(\$8 - \$2)(.5) - \$1 = \2 million and Firm 2's profits are $(\$8 - \$6)(.5) - \$1 = \0 million.
 - c. Firm 1's profits would increase to $(\$6 - \$2)(2) - \$1 = \7 million and Firm 2's profits would fall to -\$1 million.
 - d. No; \$6 is the monopoly price.
 - e. No; it is not pricing below its own marginal cost.

8. Your best strategy is to preempt them by committing to target households before they have a chance to commit to target professionals. If you can credibly and publicly commit to your strategy before they commit to their strategy, their best response will be to target households. You will earn \$100 million and ultimately drive them out of the market.

9. Penetration pricing (see the text for details).

10. This pattern of pricing is consistent with predatory pricing, which is illegal under the *Sherman Antitrust Act*. However, it is not illegal to lower prices to meet competition, so the observed pricing is also consistent with competitive behavior. It is often difficult to establish that a firm priced below marginal cost. For the case of an airline, this is even more problematic. At one extreme, one might argue that the marginal cost of putting one more passenger on an existing flight is zero. At the other extreme, one might argue that it is the marginal cost of adding another flight rather than another passenger that is relevant.

11. No. Profits are negative from limit pricing, but strictly positive otherwise. Regardless of the interest rate and the timing of profit flows (at the start or the end of each period), Palm would earn less by limit pricing than by permitting entry.
12. Not necessarily. Due to network effects, penetration pricing was probably optimal for many companies. To the extent that there is consumer lock-in, the number of hits could be a good proxy for the long-run profitability of a site once a firm begins to increase prices above the penetration pricing level. Ultimately, however, hits must translate into profits in order for such companies to survive.
13. As shown in the text, strategies that raise the cost of potential entrants – even when doing so raises the costs of incumbents – can lead to less entry and higher profits for incumbents. To the extent that such practices raise costs, they may be motivated out of self-interest (to limit entry) rather than a concern about social welfare.
14. First, note that the monopoly price is $P = \$210$, the monopoly output is $Q = 1,666,666.67$, and monopoly profits are $\$16,666,667$. (To see this, note that $MR = 220 - .000012Q$ and $MC = \$200$, so setting $MR = MC$ and solving yields these results). Second, notice that with the subsidy the firm's average cost curve is constant at $\$200$ per unit. Thus, to prevent entry via limit pricing, Barnacle would have to price its product at $\$200$. Doing so would yield zero profits. A better strategy for Barnacle is to lobby to eliminate the $\$9$ million in subsidies while committing to produce its current (monopoly) level of output. This would reduce Barnacle's profits to $\$7.67$ million per year, but would make it unprofitable for an entrant to enter the market.
15. Such a premium might be justified when there are significant network externalities. In this case, adding one more customer to a network of n customers increases the number of potential network connections by $2n$. To the extent that a brokerage company is a two-way network that benefits from having a network of customers that can be matched as buyers and sellers, there is a potential business rationale. Whether this justifies a premium of $\$100$ per customer is an entirely different matter and subject to some debate.
16. Notice that Argyle earns profits from both the sale of wool and sweaters. To the extent that overall profits are enhanced by selling both, it is rational to do so. However, if selling wool to other downstream suppliers reduces its overall profits, it may be able to increase its profits by raising rivals' costs, a vertical price squeeze, or vertical foreclosure.
17. Unfortunately, your best option is to accept the offer. If you don't, your rival will purchase the machine. If you purchase the machine, your profits are $\$15 - \$24 = -\$9$ million. This is better than the $-\$10$ million you will earn if your rival has an opportunity to buy the machine.

18. Each bank can be viewed as a star network: the bank is the hub and ATMs are consumer access points. An agreement that expands the number of ATMs (access points to a hub) creates value to each consumer and value to each bank.
19. Economic experts for the government would argue that Microsoft attempted to foreclose the browser market to Netscape by engaging in agreements with OEMs, ISPs, and ICPs that made it difficult for Netscape to distribute its product. Furthermore, the experts would argue that Microsoft was engaging in predatory pricing by distributing its Internet Explorer free of charge with its Windows 95 operating system.