

Answers to the Problems – Chapter 13

1.
 - a. Lite and Kool produces 100 pairs a week.
To maximize profit, Lite and Kool produces the quantity at which marginal revenue equals marginal cost.
 - b. Lite and Kool charges \$80 a pair.
To maximize profit, Lite and Kool charges the highest price for the 100 pairs of shoes, as read from the demand curve.
 - c. Lite and Kool makes a profit of \$2,000 a week.
Economic profit equals total revenue minus total cost. The price is \$80 a pair and the quantity sold is 100 pairs, so total revenue is \$8,000. Average total cost is \$60 a pair, so total cost equals \$6,000. Economic profit equals \$8,000 minus \$6,000, which is \$2,000 a week.
2.
 - a. The price of a pair of running shoes falls in the long run.
Lite and Kool is earning an economic profit. This profit attracts entry into the market. As new firms enter, the demand for Lite and Kool's shoes decreases. The decrease in demand leads to the price of running shoes falling.
 - b. The quantity of running shoes produced by Lite and Kool decreases in the long run.
Lite and Kool is earning an economic profit. This profit attracts entry into the market. As new firms enter, the demand for Lite and Kool's shoes decreases. The decrease in demand leads to the quantity of running shoes produced by Lite and Kool decreasing.
 - c. The quantity of running shoes in the market as a whole increases in the long run.
Lite and Kool is earning an economic profit. This profit attracts entry into the market. As new firms enter, each initial firm decreases its output a bit. But the new firms produce more shoes and, on net, the quantity of shoes in the entire market increases.
 - d. Lite and Kool does not produce at the minimum of the average total cost in the long run.
Lite and Kool is a monopolistically competitive firm. In the long run, monopolistically competitive firms produce less output than the amount which minimizes the average total cost.
3.
 - a. The average total cost of a jacket is \$200.
The average total cost equals the total cost divided by the quantity. The fixed cost is \$2,000. Because the marginal cost is \$100 per jacket, the total variable cost is \$2,000. So the total cost is the \$2,000 fixed cost plus the \$2,000 variable cost, or \$4,000. So the average total cost is $\$4,000/20$, which is \$200.
 - b. The average total cost of a jacket is \$180.
The average total cost equals the total cost divided by the quantity. The fixed cost is \$4,000. Because the marginal cost is \$100 per jacket, the total variable cost is \$5,000. So the total cost is the \$4,000 fixed cost plus the \$5,000 variable cost, or \$9,000. The average total cost is $\$9,000/50$, which is \$180.
 - c. If the advertising has increased the demand and made it more elastic, which is likely the case if all firms advertise, then the price will fall. However, if the advertising has increased the demand and made the price less elastic, then the price will rise.
 - d. If the price falls, then the markup falls; if the price rises, then the markup rises.
 - e. It is not possible to determine the effect on the profit in the short run. In the long run, however, the economic profit will equal zero as it does for all monopolistically competitive firms in the long run.
4. The market for CPUs is natural oligopoly, most likely a natural duopoly. There are only two firms in the market, Intel and AMD, and there are no legal barriers to entry which limit the

number of firms to two. Because other firms *could* enter the market but do not do so supports the idea that this industry is a natural duopoly. The cost curves and demand curve for this market would be similar to Figure 13.9, which shows the situation for a market in which two firms can satisfy the market demand.

5.
 - a. The situation being described is that of a firm facing a kinked demand curve. The figure will be similar to Figure 13.11 in which the demand curve has a kink at the current price of flat panel TVs.
 - b. Walmart's marginal cost of a flat panel TV has fallen, so Walmart's marginal cost curve has shifted downward. Figure 13.11 shows the issue: As long as the marginal curve "intersects" the marginal revenue curve in the break, Walmart will not change the price or the quantity of flat panel TVs it buys and sells. If the fall in the marginal cost is large enough so that the marginal cost curve intersects the marginal revenue below the vertical break portion, Walmart will lower the price (and increase the number) of the flat panel TVs it sells.
6.
 - a. The price rises, output increases, and economic profit increases. The dominant firm, Big Joe's Trucking, produces the quantity and sets the price such that it maximizes its profit. When demand increases, marginal revenue increases, so the firm produces a larger output. The highest price at which the dominant firm can sell its output increases. Economic profit increases.
 - b. The price rises, output increases, and economic profit increases. The small firms are price takers, so the price they charge rises. Because these firms are price takers, the price is also marginal revenue. Because marginal revenue increases, the small firms move up along their marginal cost curves (supply curves) and increase the quantity they produce. Because price exceeds marginal cost, economic profit increases.
7.
 - a. The game has 2 players (*A* and *B*), and each player has 2 strategies: to answer honestly or to lie. There are 4 payoffs: Both answer honestly; both lie; *A* lies, and *B* answers honestly; and *B* lies, and *A* answers honestly.
 - b. The payoff matrix has the following cells: Both answer honestly: *A* gets \$100, and *B* gets \$100; both lie: *A* gets \$50, and *B* gets \$50; *A* lies and *B* answers honestly: *A* gets \$500, and *B* gets \$0; *B* lies and *A* answers honestly: *A* gets \$0, and *B* gets \$500.
 - c. The equilibrium is that each player lies and gets \$50. If *B* answers honestly, the best strategy for *A* is to lie because he would get \$500 rather than \$100. If *B* lies, the best strategy for *A* is to lie because he would get \$50 rather than \$0. So *A*'s best strategy is to lie, no matter what *B* does. Repeat the exercise for *B*. *B*'s best strategy is to lie, no matter what *A* does.
 - d. The game is the same as a prisoners' dilemma. In this game, as in the prisoners' dilemma game, both players get the jointly worse equilibrium outcome because they cannot trust the other player to cooperate. If the players could cooperate, they would achieve a better result.
8.
 - a. Each firm has two strategies: to abide with the agreement or to cheat on the agreement.
 - b. The payoff matrix has the following cells: Both abide by the agreement: Soapy makes \$1 million profit, and Suddies makes \$1 million profit; both cheat: Soapy makes \$0 profit, and Suddies makes \$0 profit; Soapy cheats and Suddies abides by the agreement: Soapy makes \$1.5 million profit, and Suddies incurs a \$0.5 million loss; Suddies cheats and Soapy abides by the agreement: Suddies makes \$1.5 million profit, and Soapy incurs \$0.5 million loss.
 - c. The equilibrium is that both firms cheat and each makes normal profit.
 - d. The equilibrium is a dominant strategy because for each firm, regardless of the opponent's choice, the best strategy for the firm is to cheat. If Suddies abides by the agreement, the best strategy for Soapy is to cheat because it would make a profit of \$1.5 million rather than \$1 million. If Suddies cheats, the best strategy for Soapy is to cheat because it would make a

profit of \$0 (the competitive outcome) rather than incur a loss of \$0.5 million. So Soapy's best strategy is to cheat, no matter what Suddies does. Repeating the exercise for Suddies shows that Suddies's best strategy also is to cheat, no matter what Soapy does.

9. a. Each firm can adopt a tit-for-tat strategy or a trigger strategy, strategies that were not possible in a one-time game.
- b. The game has a cooperative equilibrium. If the firms employ a trigger strategy or a tit-for-tat strategy, they can reach the cooperative abide/abide outcome. Take the case of the tit-for-tat strategy. If both firms comply for, say, three periods, both firms make \$3 million profit. If a firm cheats in the first period while its opponent complies, the cheater makes a \$1.5 million profit. In the second period, the opponent cheats, so if the first firm complies, it loses \$0.5 million. In the third period the opponent will comply so the first firm can again cheat and make \$1.5 million. However, in these three periods the total profit is only \$2.5 million, so the cooperative equilibrium is possible.
- c. The game has a cooperative equilibrium. If the firms employ a trigger strategy or a tit-for-tat strategy, they can reach the cooperative abide/abide outcome. In these cases, the profit from complying with the agreement exceeds that from cheating and so the cooperative equilibrium is likely.

Critical Thinking

1. a. Dell's strategies in 2000 and 2006 were the same: Dell could either cut prices or it could hold its prices higher. HP's strategies differed in the years. In 2000, HP had the same two strategies as did Dell: Cut prices or hold them higher. But in 2006 HP's strategies were either improve its marketing and design or hold its price higher.
- b. According to the news article, Dell was having a harder time in 2006 because its competitor was "no longer the bloated and slow-moving company it was six years ago." In other words, HP responded more rapidly and more effectively to Dell's strategies in 2006, so Dell's profit in 2006 was much lower than in 2000.
- c. If HP improved its marketing and design, HP would boost its costs. If HP cuts its price, HP runs the risk of decreasing its revenue, which would happen if the demand for HP computers is inelastic. So if HP simultaneously improves its marketing and cuts its price, HP might simultaneously increase its costs and decrease its revenues, which would significantly decrease HP's profit.
- d. Your students' answers will vary.
- e. The global market for computers is probably monopolistic competitive but with two large, dominating firms. The fact there are so many firms makes it difficult for the large firms to collude, which is similar to the situation in monopolistic competition.

2. The more people use a particular browser, the more advertisers are willing to pay. And charging for a browser also generates profit. If the browser is given away and the competitor charges, likely the one given away gains market share and that company makes a large economic profit. The other company incurs an economic loss. If both browsers are given away, both companies probably earn a comparable economic profit. And if both browsers are sold, both companies probably earn the largest economic profit because they collect from both advertisers and consumers.

A payoff matrix is to the right that reflects this analysis. The joint profit is the largest when the browser is given away and is the smallest when the browser is sold. The numbers in the matrix are the economic profit in millions of dollars. If your students develop a payoff matrix, their profit figures will be different. With the profits in the payoff matrix, the Nash equilibrium is to give the browsers away for free. Your students' answers might differ according to the profits they have in their payoff matrices.

		Microsoft's strategies	
		Free	Charge
Netscape's strategies	Free	100 / 100	-100 / 600
	Charge	600 / -100	500 / 500

3. Coca-Cola and PepsiCo are engaged in an advertising game. In an advertising game, two firms can advertise or not advertise. Advertising is costly but if one firm advertises and the other does not, the one not advertising loses market share and profit while the one advertising gains market share and profit. Both firms would be better if neither advertised but the Nash equilibrium is that both firms advertise. Consumers benefit if the advertising gives them new information, say information about a new drink. They also benefit if the advertising allows the firms to increase their production and enjoy economies of scale that allow lower prices. At one time in history, it is likely that consumers benefited from lower prices due to the increased economies of scale as Coca-Cola and PepsiCo drove smaller firms from the market. Today, however, most of the advertising does not convey new information and there are probably not many economies of scale left to exploit, it is likely that consumers are generally harmed by the advertising because the price of the product is higher.
4. a. These firms compete on price, quality, innovation, and, temporarily, on availability. Nintendo is definitely competing on price because its console has the lowest price. Nintendo also competes in innovation because its console uses unique controllers that respond to motion. Sony is definitely competing on quality and innovation because its console has the most advanced technology. Microsoft initially competed on availability because its console was available a year before those of its competitors. Once Sony's and Nintendo's consoles were released, Microsoft competing on offering relatively advanced technology at a more moderate price than the most advanced technology.
- b. The strategies are whether to offer highly advanced, moderately advanced, or less advanced technology and whether to set a high price, moderate price, or low price.
- c. Your students' answers will differ according to how the market evolves. Immediately after the Sony and Nintendo consoles were introduced, the initial equilibrium favored Nintendo

because it was selling more consoles than expected. But the market equilibrium might change over time.

- d. The consoles are so different because the firms are competing, in large part, in innovation and technology. In particular, each manufacturer is innovating in a way that it expects will most appeal to consumers. Sony's innovations had the largest cost and Sony's highest price reflects this fact. Nintendo's console had the least advanced technology and Nintendo was positioning the console as the less expensive, "fun" alternative to its competitors.

Web Activities

1.
 - a. The vitamin market has a few large producers, including Roche, BASF, and Rhone-Poulenc, which together account for more than 60 percent of the vitamin market. The market is an oligopoly.
 - b. During the 1990s the large vitamin producers formed a cartel that raised the price of vitamins and increased their profits. The cartel was illegal and was successfully prosecuted so that Roche had to pay a fine of \$500 million and BASF had to pay a fine of \$250 million.
 - c. BASF and Roche faced a classic oligopoly game. If they agreed to boost their prices and both firms adhered to the agreement, both firms would make a significantly larger profit. If one firm cheated and lowered its price, the cheating firm would have a still larger profit but the complying firm would have a much lower profit. And if both firms cheated on the agreement, their profits would be lower than if they both complied but larger than if they complied and their opponent cheated.
 - d. The game was a repeated game. It stayed in place for almost the entire decade practice of the 1990s.
2.
 - a. In the 1990s, the fine art and antique auction market was dominated by two auction houses, Sotheby's Holdings and Christie's International. The two firms fixed the commission rates they charged consigners and buyers, thereby boosting their profit. However such price fixing is illegal.
 - b. Sotheby's and Christie's faced a classic oligopoly game. If they agreed to boost their commission rates (which are their prices) and both firms adhered to the agreement, both firms would make a significantly larger profit. If one firm cheated and lowered its commission rates, the cheating firm would have a still larger profit but the complying firm would have a much lower profit. And if both firms cheated on the agreement, their profits would be lower than if they both complied but larger than if they complied and their opponent cheated.