

pumping costs and water allotment rights. The weather, of course, also has a major influence on agricultural supply. If the weather is unusually wet, farmers may not be able to plant the desired acreage of their most profitable crop and may be forced to plant an alternative crop with a shorter growing season.

## Key Terms

diseconomies of scale, p. 178

economies of scale, p. 178

equilibrium point for the perfectly competitive firm, p. 176

industry concentration, p. 179

marginal revenue for the perfectly competitive firm, p. 172

perfect competition, p. 169

price-cost margin (PCM), p. 181

price-taker, p. 170

profit maximization, p. 171

profit-maximizing rule, p. 171

shutdown point for the perfectly competitive firm, p. 174

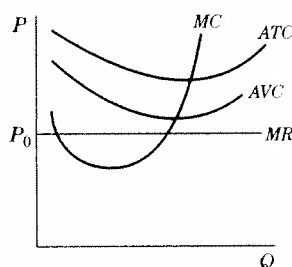
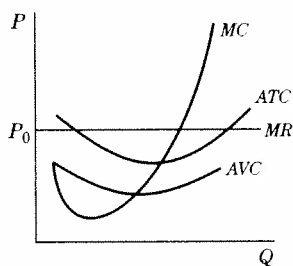
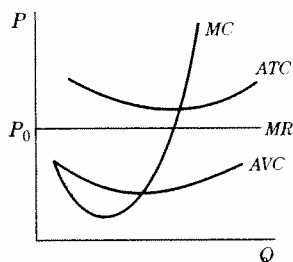
supply curve for the perfectly competitive firm, p. 175

supply curve for the perfectly competitive industry, p. 175

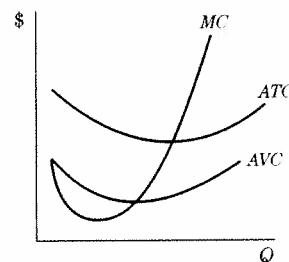
## Exercises

### Technical Questions

- For each of the following graphs, identify the firm's profit-maximizing (or loss-minimizing) output. Is each firm making a profit? If not, should the firm continue to produce in the short run?



- Consider a firm in a perfectly competitive industry. The firm has just built a plant that cost \$15,000. Each unit of output requires \$5 worth of materials. Each worker costs \$3 per hour.
  - Based on the information above, fill in the table on the following page.
  - If the market price is \$12.50, how many units of output will the firm produce?
  - At that price, what is the firm's profit or loss? Will the firm continue to produce in the short run? Carefully explain your answer.
  - Graph your results.
- The following graph shows the cost curves for a perfectly competitive firm. Identify the shutdown point, the breakeven point, and the firm's short-run supply curve.

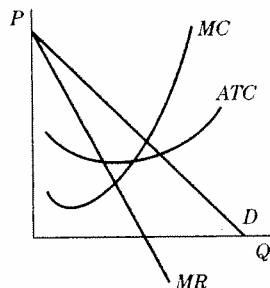


- Consider the following graph, which shows a demand curve and two supply curves. Suppose that there is an increase in demand. Compare the equilibrium price and quantity change in both cases, and use those results to explain what you can infer about the elasticity of supply.

## Exercises

### Technical Questions

- Given the demand curve in the following graph, find (and label) the monopolist's profit-maximizing output and price.

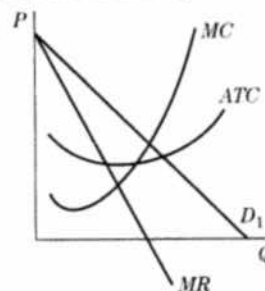


- Show graphically an example of a monopolist that is producing the profit-maximizing output, but is *not* making a profit.
- Suppose the demand curve for a monopolist is  $Q_D = 500 - P$ , and the marginal revenue function is  $MR = 500 - 2Q$ . The monopolist has a constant marginal and average total cost of \$50 per unit.
  - Find the monopolist's profit-maximizing output and price.
  - Calculate the monopolist's profit.
  - What is the Lerner Index for this industry?
- Demonstrate graphically why persuasive advertising, which makes consumers more loyal to the advertised brand, is likely to increase a firm's market power (its ability to raise price above marginal cost). Will it necessarily increase profit as well?
- The top four firms in Industry A have market shares of 30, 25, 10, and 5 percent, respectively. The top four firms in Industry B have market shares of 15, 12, 8, and 4 percent, respectively. Calculate the

four-firm concentration ratios for the two industries. Which industry is more concentrated?

- In both Industry C and Industry D, there are only four firms. Each of the four firms in Industry C has a 25 percent market share. The four firms in Industry B have market shares of 80, 10, 5, and 5 percent, respectively.
  - Calculate the three- and four-firm concentration ratios for each industry.
  - Calculate the Herfindahl-Hirschman Index for each industry.
  - Are these industries equally concentrated? Explain your answer.

- The following graph shows a firm in a monopolistically competitive industry.



- Show the firm's short-run profit-maximizing quantity and price. Is the firm making a profit?
  - Carefully explain what will happen in the industry over time, and draw a graph of a monopolistically competitive firm in long-run equilibrium.
- Because products are typically differentiated in some way, there tends to be significant advertising in monopolistically competitive industries. How will advertising affect a typical firm in a monopolistically competitive industry? Explain, using a graph to support your answer.

## Application Questions

- Drawing on current business publications, discuss ongoing changes in market power among the firms in the personal computer industry. What new strategies have Dell and its competitors developed to protect, maintain, or increase market power?
- The following discussion describes a takeover attempt in the beer industry in 2008.<sup>62</sup>

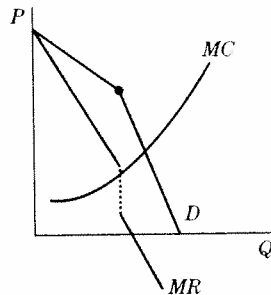
In June 2008, InBev NV, a Belgian-Brazilian giant, launched an unsolicited bid to acquire Anheuser-Busch Cos. for \$46.4 billion, a move that would create the world's largest brewer with annual sales of approximately \$36 billion. InBev, the maker of Stella Artois and Labatt Blue, has long considered acquiring Anheuser-Busch, which controls nearly half the U.S. beer market. The two companies market about 300 brands on six continents and are the second- and third-largest brewers in the world in terms of volume.

<sup>62</sup> David Kesmodel and Matthew Karnitschnig, "InBev Uncorks Anheuser Takeover Bid," *Wall Street Journal*, June 12, 2008.

## Exercises

### Technical Questions

1. The following graph shows a firm with a kinked demand curve.



- What assumption lies behind the shape of this demand curve?
  - Identify the firm's profit-maximizing output and price.
  - Use the graph to explain why the firm's price is likely to remain the same, even if marginal costs change.
2. The following matrix shows strategies and payoffs for two firms that must decide how to price.

		Firm 2	
		PRICE HIGH	PRICE LOW
FIRM 1	PRICE HIGH	400, 400	-50, 700
	PRICE LOW	700, -50	100, 100

- Does either firm have a dominant strategy, and if so, what is it?
  - What is the Nash equilibrium of this game?
  - Why would this be called a prisoner's dilemma game?
3. Some games of strategy are cooperative. One example is deciding which side of the road to drive on. It doesn't matter which side it is, as long as everyone chooses the same side. Otherwise, everyone may get hurt.

		Driver 2	
		LEFT	RIGHT
DRIVER 1	LEFT	0, 0	-1000, -1000
	RIGHT	-1000, -1000	0, 0

- Does either player have a dominant strategy?
- Is there a Nash equilibrium in this game? Explain.
- Why is this called a cooperative game?

4. A game that everyone knows is coin flipping. Suppose that Player 1 flips the coin (and is so skilled that he is able to flip it whichever way he wants) and Player 2 calls heads or tails. The winner gets \$10 from the loser.

		Player 2 (call)	
		HEADS	TAILS
PLAYER 1 (FLIP)	HEADS	-10, 10	10, -10
	TAILS	10, -10	-10, 10

- Does either player have a dominant strategy?
- Is there a Nash equilibrium in this game? Explain.
- Games like this are called *zero-sum games*. Can you explain why?

5. A monopolist has a constant marginal and average cost of \$10 and faces a demand curve of  $Q_D = 1000 - 10P$ . Marginal revenue is given by  $MR = 100 - 1/5Q$ .

- Calculate the monopolist's profit-maximizing quantity, price, and profit.
- Now suppose that the monopolist fears entry, but thinks that other firms could produce the product at a cost of \$15 per unit (constant marginal and average cost) and that many firms could potentially enter. How could the monopolist attempt to deter entry, and what would the monopolist's quantity and profit be now?
- Should the monopolist try to deter entry by setting a limit price?

6. Consider a market with a monopolist and a firm that is considering entry. The new firm knows that if the monopolist "fights" (that is, sets a low price after the entrant comes in), the new firm will lose money. If the monopolist accommodates (continues to charge a high price), the new firm will make a profit.

		Entrant	
		ENTER	DON'T ENTER
MONOPOLIST	PRICE HIGH	20, 10	50, 0
	PRICE LOW	5, -10	10, 0

- Is the monopolist's threat to charge a low price credible? That is, if the entrant has come, would it make sense for the monopolist to charge a low price? Explain.
- What is the Nash equilibrium of this game?
- How could the monopolist make the threat to fight credible?