

- a. At what level of the control variable are net benefits maximized?
- b. What is the relation between marginal benefit and marginal cost at this level of the control variable?
7. It is estimated that over 90,000 students will apply to the top 30 M.B.A. programs in the United States this year.
- a. Using the concept of net present value and opportunity cost, explain when it is rational for an individual to pursue an M.B.A. degree.
- b. What would you expect to happen to the number of applicants if the starting salaries of managers with M.B.A. degrees remained constant but salaries of managers without such degrees increased by 15 percent? Why?
8. Jaynet spends \$20,000 per year on painting supplies and storage space. She recently received two job offers from a famous marketing firm—one offer was for \$100,000 per year, and the other was for \$90,000. However, she turned both jobs down to continue a painting career. If Jaynet sells 20 paintings per year at a price of \$10,000 each:
- a. What are her accounting profits?
- b. What are her economic profits?
9. Suppose the total benefit derived from a given decision, Q , is $B(Q) = 25Q - Q^2$ and the corresponding total cost is $C(Q) = 5 + Q^2$, so that $MB(Q) = 25 - 2Q$ and $MC(Q) = 2Q$.
- a. What is total benefit when $Q = 2$? $Q = 10$?
- b. What is marginal benefit when $Q = 2$? $Q = 10$?
- c. What level of Q maximizes total benefit?
- d. What is total cost when $Q = 2$? $Q = 10$?
- e. What is marginal cost when $Q = 2$? $Q = 10$?
- f. What level of Q minimizes total cost?
- g. What level of Q maximizes net benefits?
10. An owner can lease her building for \$100,000 per year for three years. The explicit cost of maintaining the building is \$35,000, and the implicit cost is \$50,000. All revenues are received, and costs are borne, at the end of each year. If the interest rate is 4 percent, determine the present value of the stream of:
- a. Accounting profits.
- b. Economic profits.

PROBLEMS AND APPLICATIONS

11. You've recently learned that the company where you work is being sold for \$275,000. The company's income statement indicates current profits of \$10,000, which have yet to be paid out as dividends. Assuming the company will remain a "going concern" indefinitely and that the interest rate will remain constant at 10 percent, at what constant rate does the owner believe that profits will grow? Does this seem reasonable?
12. You are in the market for a new refrigerator for your company's lounge, and you have narrowed the search down to two models. The energy efficient

- model sells for \$500 and will save you \$25 at the end of each of the next five years in electricity costs. The standard model has features similar to the energy efficient model but provides no future saving in electricity costs. It is priced at only \$400. Assuming your opportunity cost of funds is 5 percent, which refrigerator should you purchase?
13. You are the human resources manager for a famous retailer, and you are trying to convince the president of the company to change the structure of employee compensation. Currently, the company's retail sales staff is paid a flat hourly wage of \$18 per hour for each eight-hour shift worked. You propose a new pay structure whereby each salesperson in a store would be compensated \$8 per hour, plus five-tenths of 1 percent of that store's daily profits. Assume that, when run efficiently, each store's maximum daily profits are \$40,000. Outline the arguments that support your proposed plan.
14. Tara is considering leaving her current job, which pays \$56,000 per year, to start a new company that manufactures a line of special pens for personal digital assistants. Based on market research, she can sell about 160,000 units during the first year at a price of \$20 per unit. With annual overhead costs and operating expenses amounting to \$3,160,000, Tara expects a profit margin of 25 percent. This margin is 6 percent larger than that of her largest competitor, Pens, Inc.
- a. If Tara decides to embark on her new venture, what will her accounting costs be during the first year of operation? Her implicit costs? Her opportunity costs?
- b. Suppose that Tara's estimated selling price is lower than originally projected during the first year. How much revenue would she need in order to earn positive accounting profits? Positive economic profits?
15. Approximately 14 million Americans are addicted to drugs and alcohol. The federal government estimates that these addicts cost the U.S. economy \$300 billion in medical expenses and lost productivity. Despite the enormous potential market, many biotech companies have shied away from funding research and development (R&D) initiatives to find a cure for drug and alcohol addiction. Your firm—DrugAbuse Sciences (DAS)—is a notable exception. It has spent \$170 million to date working on a cure, but is now at a crossroads. It can either abandon its program or invest another \$30 million today. Unfortunately, the firm's opportunity cost of funds is 7 percent and it will take another five years before final approval from the Federal Drug Administration is achieved and the product is actually sold. Expected (year-end) profits from selling the drug are presented in the accompanying table. Should DAS continue with its plan to bring the drug to market, or should it abandon the project? Explain.

Year-End Profit Projections

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9
\$0	\$0	\$0	\$0	\$15,000,000	\$16,500,000	\$18,150,000	\$19,965,000	\$21,961,500

Managerial Economics and Business Strategy

16. As a marketing manager for one of the world's largest automakers, you are responsible for the advertising campaign for a new energy-efficient sports utility vehicle. Your support team has prepared the following table, which summarizes the (year-end) profitability, estimated number of vehicles sold, and average estimated selling price for alternative levels of advertising. The accounting department projects that the best alternative use for the funds used in the advertising campaign is an investment returning 10 percent. In light of the staggering cost of advertising (which accounts for the lower projected profits in years 1 and 2 for the high and moderate advertising intensities), the team leader recommends a low advertising intensity in order to maximize the value of the firm. Do you agree? Explain.

Advertising Intensity	Profits (in millions)			Units Sold (in thousands)			Average Selling Price		
	Year 1	Year 2	Year 3	Year 1	Year 2	Year 3	Year 1	Year 2	Year 3
	\$15	\$90	\$270	10	60	120	\$24,000	\$25,500	\$26,000
High	30	75	150	5	12.5	25	24,500	24,750	25,000
Moderate	70	105	126	4	6	7.2	24,800	24,850	24,900
Low									

17. The head of the accounting department at a major software manufacturer has asked you to put together a pro forma statement of the company's value under several possible growth scenarios and the assumption that the company's many divisions will remain a single entity forever. The manager is concerned that, despite the fact that the firm's competitors are comparatively small, collectively their annual revenue growth has exceeded 50 percent over each of the last five years. She has requested that the value projections be based on the firm's current profits of \$2.5 billion (which have yet to be paid out to stockholders) and the average interest rate over the past 20 years (8 percent) in each of the following profit growth scenarios:

- Profits grow at an annual rate of 10 percent. (This one is tricky.)
- Profits grow at an annual rate of 3 percent.
- Profits grow at an annual rate of 0 percent.
- Profits decline at an annual rate of 3 percent.

18. Suppose one of your clients is four years away from retirement and has only \$1,500 in pretax income to devote to either a Roth or a traditional IRA. The traditional IRA permits investors to contribute the full \$1,500 since contributions to these accounts are tax-deductible, but they must pay taxes on all future distributions. In contrast, contributions to a Roth IRA are not tax-deductible, meaning that at a tax rate of 25 percent, an investor is able to contribute only \$1,125 after taxes; however, the earnings of a Roth IRA grow tax-free. Your company has decided to waive the one-time set-up fee of \$25 to

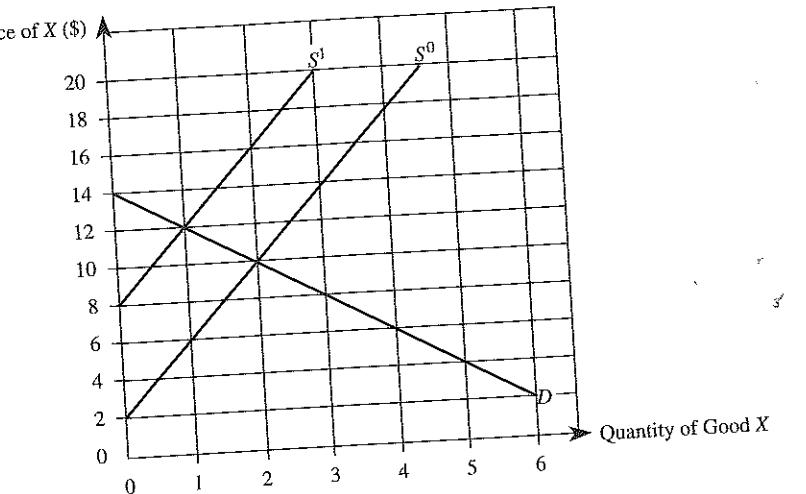
open a Roth IRA; however, investors opening a traditional IRA must pay the \$25 set-up fee. Assuming that your client anticipates that her tax rate will remain at 17 percent in retirement and will earn a stable 8 percent return on her investments, will she prefer a traditional or a Roth IRA?

19. You are the manager in charge of global operations at BankGlobal—a large commercial bank that operates in a number of countries around the world. You must decide whether or not to launch a new advertising campaign in the U.S. market. Your accounting department has provided the accompanying statement, which summarizes the financial impact of the advertising campaign on U.S. operations. In addition, you recently received a call from a colleague in charge of foreign operations, and she indicated that her unit would lose \$6 million if the U.S. advertising campaign were launched. Your goal is to maximize BankGlobal's value. Should you launch the new campaign? Explain.

Financial Impact on U.S. Operations

	Pre-Advertising Campaign	Post-Advertising Campaign
Total Revenues	\$20,540,100	\$30,347,800
Variable Cost		
TV airtime	6,100,000	9,045,700
Ad development labor	2,357,100	3,536,200
Total variable costs	8,457,100	12,581,900
Direct Fixed Cost		
Depreciation—computer equipment	1,500,000	1,500,000
Total direct fixed cost	1,500,000	1,500,000
Indirect Fixed Cost		
Managerial salaries	8,458,100	8,458,100
Office supplies	2,003,500	2,003,500
Total indirect fixed cost	\$10,461,600	\$10,461,600

20. According to *The Wall Street Journal*, merger and acquisition activity in the first quarter rose to \$5.3 billion. Approximately three-fourths of the 78 first-quarter deals occurred between information technology (IT) companies. The largest IT transaction of the quarter was EMC's \$625 million acquisition of VMWare. The VMWare acquisition broadened EMC's core data storage device business to include software technology enabling multiple operating systems—such as Microsoft's Windows, Linux, and Novell Inc.'s netware—to simultaneously and independently run on the same Intel-based server or workstation. Suppose that at the time of the acquisition the weak economy led many analysts to project that VMWare's profits would grow at a constant rate of 1 percent for the foreseeable future, and that the company's annual net income



- b. Suppose demand is D and supply is S^0 . If a price floor of \$12 is imposed, what is the resulting surplus? What is the cost to the government of purchasing any and all unsold units?
- c. Suppose demand is D and supply is S^1 so that the equilibrium price is \$10. If an excise tax of \$6 is imposed on this product, what happens to the equilibrium price paid by consumers? The price received by producers? The number of units sold?
- d. Calculate the level of consumer and producer surplus when demand and supply are given by D and S^0 respectively.
- e. Suppose demand is D and supply is S^0 . Would a price ceiling of \$2 benefit any consumers? Explain.
9. The supply curve for product X is given by $Q_x^s = -340 + 10P_x$.
- Find the inverse supply curve.
 - How much surplus do producers receive when $Q_x = 350$? When $Q_x = 1,000$?
10. Consider a market where supply and demand are given by $Q_x^s = -10 + P_x$, and $Q_x^d = 56 - 2P_x$. Suppose the government imposes a price floor of \$25, and agrees to purchase any and all units consumers do not buy at the floor price of \$25 per unit.
- Determine the cost to the government of buying firms' unsold units.
 - Compute the lost social welfare (deadweight loss) that stems from the \$25 price floor.

PROBLEMS AND APPLICATIONS

11. You are the manager of a midsized company that assembles personal computers. You purchase most components—such as random access memory (RAM)—in a competitive market. Based on your marketing research, consumers earning

over \$75,000 purchase 1.3 times more RAM than consumers with lower incomes. One morning, you pick up a copy of *The Wall Street Journal* and read an article indicating that a new technological breakthrough will permit manufacturers to produce RAM at a lower unit cost. Based on this information, what can you expect to happen to the price you pay for random access memory? Would your answer change if, in addition to this technological breakthrough, the article indicated that consumer incomes are expected to grow over the next two years as the economy pulls out of recession? Explain.

12. You are the manager of a firm that produces and markets a generic type of soft drink in a competitive market. In addition to the large number of generic products in your market, you also compete against major brands such as Coca-Cola and Pepsi. Suppose that, due to the successful lobbying efforts of sugar producers in the United States, Congress is going to levy a \$0.50 per pound tariff on all imported raw sugar—the primary input for your product. In addition, Coke and Pepsi plan to launch an aggressive advertising campaign designed to persuade consumers that their branded products are superior to generic soft drinks. How will these events impact the equilibrium price and quantity of generic soft drinks?
13. Some have argued that higher cigarette prices do not deter smoking. While there are many arguments both for and against this view, some find the following argument to be the most persuasive of all: "The laws of supply and demand indicate that higher prices are ineffective in reducing smoking. In particular, higher cigarette prices will reduce the demand for cigarettes. This reduction in demand will push the equilibrium price back down to its original level. Since the equilibrium price will remain unchanged, smokers will consume the same number of cigarettes." Do you agree or disagree with this view? Explain.
14. You are the manager of an organization in America that distributes blood to hospitals in all 50 states and the District of Columbia. A recent report indicates that nearly 50 Americans contract HIV each year through blood transfusions. Although every pint of blood donated in the United States undergoes a battery of nine different tests, existing screening methods can detect only the antibodies produced by the body's immune system—not foreign agents in the blood. Since it takes weeks or even months for these antibodies to build up in the blood, newly infected HIV donors can pass along the virus through blood that has passed existing screening tests. Happily, researchers have developed a series of new tests aimed at detecting and removing infections from donated blood before it is used in transfusions. The obvious benefit of these tests is the reduced incidence of infection through blood transfusions. The report indicates that the current price of decontaminated blood is \$80 per pint. However, if the new screening methods are adopted, the demand and supply for decontaminated blood will change to $Q^d = 175 - P$ and $Q^s = 2P - 200$. What price do you expect to prevail if the new screening methods are adopted? How many units of blood will be used in the United States? What is the level of consumer and producer surplus? Illustrate your findings in a graph.
15. As a result of increased tensions in the Middle East, oil production is down by 1.21 million barrels per day—a 5 percent reduction in the world's supply of

- crude oil. Explain the likely impact of this event on the market for gasoline and the market for small cars.
16. You are an assistant to a senator who chairs an ad hoc committee on reforming taxes on telecommunication services. Based on your research, AT&T has spent over \$15 million on related paperwork and compliance costs. Moreover, depending on the locale, telecom taxes can amount to as much as 25 percent of a consumer's phone bill. These high tax rates on telecom services have become quite controversial, due to the fact that the deregulation of the telecom industry has led to a highly competitive market. Your best estimates indicate that, based on current tax rates, the monthly market demand for telecommunication services is given by $Q^d = 250 - 5P$ and the market supply (including taxes) is $Q^s = 4P - 110$ (both in millions), where P is the monthly price of telecommunication services. The senator is considering tax reform that would dramatically cut tax rates, leading to a supply function under the new tax policy of $Q^s = 4.171P - 110$. How much money would a typical consumer save each month as a result of the proposed legislation?
17. G.R. Dry Foods Distributors specializes in the wholesale distribution of dry goods, such as rice and dry beans. The firm's manager is concerned about an article he read in this morning's *The Wall Street Journal* indicating that the incomes of individuals in the lowest income bracket are expected to increase by 10 percent over the next year. While the manager is pleased to see this group of individuals doing well, he is concerned about the impact this will have on G.R. Dry Foods. What do you think is likely to happen to the price of the products G.R. Dry Foods sells? Why?
18. From California to New York, legislative bodies across the United States are considering eliminating or reducing the surcharges that banks impose on non-customers who make \$10 million in withdrawals from other banks' ATM machines. On average, noncustomers earn a wage of \$20 per hour and pay ATM fees of \$2.75 per transaction. It is estimated that banks would be willing to maintain services for 4 million transactions at \$0.75 per transaction, while noncustomers would attempt to conduct 16 million transactions at that price. Estimates suggest that, for every 1 million gap between the desired and available transactions, a typical consumer will have to spend an extra minute traveling to another machine to withdraw cash. Based on this information, use a graph to carefully illustrate the impact of legislation that would place a \$0.75 cap on the fees banks can charge for noncustomer transactions.
19. Rapel Valley in Chile is renowned for its ability to produce high-quality wine at a fraction of the cost of many other vineyards around the world. Rapel Valley produces over 20 million bottles of wine annually, of which 5 million are exported to the United States. Each bottle entering the United States is subjected to a \$0.50 per bottle excise tax, which generates about \$2.5 million in tax revenues. Strong La Niña weather patterns have caused unusually cold temperatures, devastating many of the wine producers in that region of Chile. How will La Niña affect the price of Chilean wine? Assuming La Niña does

- not impact the California wine-producing region, how will La Niña impact the market for Californian wines?
20. Viking InterWorks is one of many manufacturers that supplies memory products to original equipment manufacturers (OEMs) of desktop systems. The CEO recently read an article in a trade publication that reported the projected demand for desktop systems to be $Q^d_{\text{desktop}} = 1000 - 2P_{\text{desktop}} + .6M$ (in millions of units), where P_{desktop} is the price of a desktop system and M is consumer income. The same article reported that the incomes of the desktop systems' primary consumer demographic would increase 4.2 percent this year to \$52,500 and that the selling price of a desktop would decrease to \$940, both of which the CEO viewed favorably for Viking. In a related article, the CEO read that the upcoming year's projected demand for 512 MB desktop memory modules is $Q^d_{\text{memory}} = 10,000 - 80P_{\text{memory}} - P_{\text{desktop}}$ (in thousands of units), where P_{memory} is the market price for a 512 MB memory module and P_{desktop} is the selling price of a desktop system. The report also indicated that five new, small start-ups entered the 512 MB memory module market bringing the total number of competitors to 100 firms. Furthermore, suppose that Viking's CEO commissioned an industrywide study to examine the industry capacity for 512 MB memory modules. The results indicate that when the industry is operating at maximum efficiency, this competitive industry supplies modules according to the following function: $Q^s_{\text{memory}} = 1000 + 20P_{\text{memory}} + N$ (in thousands), where P_{memory} is the price of a 512 MB memory module and N is the number of memory module manufacturers in the market. Viking's CEO provides you, the production manager, with the above information and requests a report containing the market price for memory modules and the number of units to manufacture in the upcoming year based on the assumption that all firms producing 512 MB modules supply an equal share to the market. How would your report change if the price of desktops were \$1,040? What does this indicate about the relationship between memory modules and desktop systems?
21. Seventy-two percent of the members of the United Food and Commercial Workers Local 655 voted to strike against Stop 'n Shop in the St. Louis area. In fear of similar union responses, two of Stop 'n Shop's larger rivals in the St. Louis market—Dierberg's and Schnuck's—decided to lock out its union employees. The actions of these supermarkets, not surprisingly, caused Local 655 union members to picket and boycott each of the supermarkets' locations. While the manager of Mid Towne IGA—one of many smaller competing grocers—viewed the strike as unfortunate for both sides, he was quick to point out that the strike provided an opportunity for his store to increase market share. To take advantage of the strike, the manager of Mid Towne IGA increased newspaper advertising by pointing out that Mid Towne employed Local 655 union members and that it operated under a different contract than "other" grocers in the area. Use a graph to describe the expected impact of advertising on Mid Towne IGA (how the equilibrium price and quantity change). Identify the type of advertising in which Mid Towne IGA engaged. Do you believe the impact of advertising will be permanent? Explain.

	A	B	C	D	E	F	G
1	SUMMARY OUTPUT						
2							
3	Regression Statistics						
4	Multiple R	0.62					
5	R-Square	'1'					
6	Adjusted R-Square	'2'					
7	Standard Error	190.90					
8	Observations	100.00					
9							
10	Analysis of Variance						
11		Degrees of Freedom	Sum of Squares	Mean Square	F	Significance F	
12	Regression	2.00	'3'	1,111,508.88	30.50	0.00	
13	Residual	97.00	3,535,019.49	36,443.50			
14	Total	'4'	5,758,037.26				
15							
16		Coefficients	Standard Error	t-Statistic	P-Value	Lower 95%	Upper 95%
17	Intercept	187.15	'5'	0.35	0.73	-880.56	1,254.86
18	Price of X	-4.32	0.69	'6'	0.00	-5.69	2.96
19	Income	'7'	0.02	4.47	0.00	0.05	0.14

10. The demand function good X is $\ln Q_x^d = a + b \ln P_x + c \ln M + e$, where P_x is the price of good X and M is income. Least squares regression reveals that $\hat{a} = 5.25$, $\hat{b} = -1.36$, and $\hat{c} = -0.14$.
- If $M = 45,000$ and $P_x = 5.69$, compute the own price elasticity of demand based on these estimates. Determine whether demand is elastic or inelastic.
 - If $M = 45,000$ and $P_x = 5.69$, compute the income elasticity of demand based on these estimates. Determine whether X is a normal or inferior good.

PROBLEMS AND APPLICATIONS

11. Revenue at a major cellular telephone manufacturer was \$1.4 billion for the nine months ending March 2, up 97 percent over revenues for the same period last year. Management attributes the increase in revenues to a 137 percent increase in shipments, despite a 17 percent drop in the average blended selling price of its line of phones. Given this information, is it surprising that the company's revenue increased when it decreased the average selling price of its phones? Explain.
12. You are the manager of a firm that sells a leading brand of alkaline batteries. A file named Q12.xls with data on the demand for your product is available online at www.mhhe.com/baye7e. Specifically, the file contains data on the natural logarithm of your quantity sold, price, and the average income of consumers in various regions around the world. Use this information to perform a

- log-linear regression, and then determine the likely impact of a 3 percent decline in global income on the overall demand for your product.
- For the first time in two years, Big G (the cereal division of General Mills) raised cereal prices by 2 percent. If, as a result of this price increase, the volume of all cereal sold by Big G dropped by 3 percent, what can you infer about the own price elasticity of demand for Big G cereal? Can you predict whether revenues on sales of its Lucky Charms brand increased or decreased? Explain.
 - If Starbucks's marketing department estimates the income elasticity of demand for its coffee to be 1.75, how will looming fears of a recession (expected to decrease consumers' incomes by 4 percent over the next year) impact the quantity of coffee Starbucks expects to sell?
 - You are a division manager at Toyota. If your marketing department estimates that the semiannual demand for the Highlander is $Q = 100,000 - 1.25P$, what price should you charge in order to maximize revenues from sales of the Highlander?
 - You are a manager in charge of monitoring cash flow at a company that makes photography equipment. Traditional photography equipment comprises 80 percent of your revenues, which grow about 2 percent annually. You recently received a preliminary report that suggests consumers take three times more digital photographs than photos with traditional film, and that the cross-price elasticity of demand between digital and disposable cameras is -0.2 . In 2009, your company earned about \$400 million from sales of digital cameras and about \$600 million from sales of disposable cameras. If the own price elasticity of demand for disposable cameras is -2.5 , how will a 1 percent decrease in the price of disposable cameras affect your overall revenues from both disposable and digital camera sales?
 - As newly appointed "Energy Czar," your goal is to reduce the total demand for residential heating fuel in your state. You must choose one of three legislative proposals designed to accomplish this goal: (a) a tax that would effectively increase the price of residential heating fuel by \$2; (b) a subsidy that would effectively reduce the price of natural gas by \$1; or (c) a tax that would effectively increase the price of electricity (produced by hydroelectric facilities) by \$5. To assist you in your decision, an economist in your office has estimated the demand for residential heating fuel using a linear demand specification. The regression results are presented on the next page (page 114). Based on this information, which proposal would you favor? Explain.
 - As the owner of Barney's Broilers—a fast-food chain—you see an increase in the demand for broiled chicken as consumers become more health conscious and reduce their consumption of beef and fried foods. As a result, you believe it is necessary to purchase another oven to meet the increased demand. To finance the oven you go to the bank seeking a loan. The loan officer tells you that your revenues of \$750,000 are insufficient to support additional debt. To qualify for the loan, Barney's Broilers's revenue would need to be \$50,000 higher. In developing a strategy to generate the additional revenue, you collect data on the price (in cents) per pound you charge customers and the related quantity of chicken consumed per year in pounds. This information is contained

view these products as perfect substitutes, meaning that consumers are always willing to substitute a constant proportion of the store brand for the producer brand. Consider a consumer who is always willing to substitute three pounds of a generic store-brand sugar for two pounds of a brand-name sugar. Do these preferences exhibit a diminishing marginal rate of substitution between store-brand and producer-brand sugar? Assume that this consumer has \$10 of income to spend on sugar, and the price of store-brand sugar is \$1 per pound and the price of producer-brand sugar is \$2 per pound. How much of each type of sugar will be purchased? How would your answer change if the price of store-brand sugar was \$2 per pound and the price of producer-brand sugar was \$1 per pound?

12. The U.S. government spends over \$15.8 billion on its Food Stamp Program to provide millions of Americans with the means to purchase food. These stamps are redeemable for food at over 160,000 store locations throughout the nation, and they cannot be sold for cash or used to purchase nonfood items. The average food stamp benefit is about \$170 per month. Suppose that, in the absence of food stamps, the average consumer must divide \$500 in monthly income between food and "all other goods" such that the following budget constraint holds: $\$500 = \$10A + \$5F$, where A is the quantity of "all other goods" and F is the quantity of food purchased. Using the vertical axis for "all other goods," draw the consumer's budget line in the absence of the Food Stamp Program. What is the market rate of substitution between food and "all other goods"? On the same graph, show how the Food Stamp Program alters the average consumer's budget line. Would this consumer benefit from illegally exchanging food stamps for cash? Explain.
13. A recent newspaper circular advertised the following special on tires: "Buy three, get the fourth tire for free—limit one free tire per customer." If a consumer has \$500 to spend on tires and other goods and each tire usually sells for \$50, how does this deal impact the consumer's opportunity set?
14. Upscale hotels in the United States recently cut their prices by 20 percent in an effort to bolster dwindling occupancy rates among business travelers. A survey performed by a major research organization indicated that businesses are wary of current economic conditions and are now resorting to electronic media, such as the Internet and the telephone, to transact business. Assume a company's budget permits it to spend \$5,000 per month on either business travel or electronic media to transact business. Graphically illustrate how a 20 percent decline in the price of business travel would impact this company's budget set if the price of business travel was initially \$1,000 per trip and the price of electronic media was \$500 per hour. Suppose that, after the price of business travel drops, the company issues a report indicating that its marginal rate of substitution between electronic media and business travel is -1 . Is the company allocating resources efficiently? Explain.
15. Consider an employee who does not receive employer-based health insurance and must divide her \$700 per week in after-tax income between health insurance and "other goods." Draw this worker's opportunity set if the price of health

insurance is \$100 per week and the price of "other goods" is \$100 per week. On the same graph, illustrate how the opportunity set would change if the employer agreed to give this employee \$100 worth of health insurance per week (under current tax laws, this form of compensation is nontaxable). Would this employee be better or worse off if, instead of the health insurance, the employer gave her a \$100 per week raise that was taxable at a rate of 25 percent? Explain.

16. An internal study at Mimeo Corporation—a manufacturer of low-end photocopiers—revealed that each of its workers assembles three photocopiers per hour and is paid \$3 for each assembled copier. Although the company does not have the resources needed to supervise the workers, a full-time inspector verifies the quality of each unit produced before a worker is paid for his or her output. You have been asked by your superior to evaluate a new proposal designed to cut costs. Under the plan, workers would be paid a fixed wage of \$8 per hour. Would you favor the plan? Explain.
17. The Einstein Bagel Corp. offers a frequent buyer program whereby a consumer receives a stamp each time she purchases one dozen bagels for \$5. After a consumer accrues 10 stamps, she receives one dozen bagels free. This offer is an unlimited offer, valid throughout the year. The manager knows her products are normal goods. Given this information, construct the budget set for a consumer who has \$150 to spend on bagels and other goods throughout the year. Does Einstein's frequent buyer program have the same effect on the consumption of its bagels that would occur if it simply lowered the price of one dozen bagels by 3 percent? Explain.
18. The average 15-year-old purchases 12 CDs and 15 cheese pizzas in a typical year. If cheese pizzas are inferior goods, would the average 15-year-old be indifferent between receiving a \$30 gift certificate at a local music store and \$30 in cash? Explain.
19. A common marketing tactic among many liquor stores is to offer their clientele quantity (or volume) discounts. For instance, the second-leading brand of wine exported from Chile sells in the United States for \$8 per bottle if the consumer purchases up to eight bottles. The price of each additional bottle is only \$4. If a consumer has \$100 to divide between purchasing this brand of wine and other goods, graphically illustrate how this marketing tactic affects the consumer's budget set if the price of other goods is \$1. Will a consumer ever purchase exactly eight bottles of wine? Explain.
20. Suppose that a CEO's goal is to increase profitability and output from her company by bolstering its sales force and that it is known that profits as a function of output are $\pi = 25q - q^2$ (in millions of U.S. dollars). Graph the company's profit function. Compare and contrast output and profits using the following compensation schemes based on the assumption that sales managers view output and profits as "goods": (a) the company compensates sales managers solely based on output; (b) the company compensates sales managers solely based on profits; (c) the company compensates sales managers based on a combination of output and profits.