

# Exercises for microeconomics

[Economics](#), [Microeconomics](#)



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- REVIEW QUESTIONS

**EXERCISES FOR MICROECONOMICS****TOPIC 1 Economics:****An Introduction (Chapters 1 & 2 in the Textbook)**

EXPLAIN THE FOLLOWING TERMS ? Average benefit ? Average cost ?

Economic surplus ? Economics ? Microeconomics ? Macroeconomics ?

Marginal benefit ? Marginal cost ? Normative economics ? Positive economics

? Rational person ? Sunk cost ? Opportunity cost ? Absolute advantage ?

Comparative advantage ? Attainable point ? Unattainable point ? Efficient

point ? Inefficient point ? Production possibilities curve

**REVIEW QUESTIONS**

1. The most you would be willing to pay for having a freshly washed car before going out on a date is \$6. The smallest amount for which you would be willing to wash someone else's car is \$3.50. You are going out this evening, and your car is dirty. How much economic surplus would you receive from washing it?

2. Residents of your city are charged a fixed weekly fee of \$6 for garbage collection. They are allowed to put out as many cans as they wish. The average household disposes of three cans of garbage per week under this plan. Now suppose that your city changes to a "tag" system. Each can of refuse to be collected must have a tag affixed to it. The tags cost \$2 each and are not reusable. What effect do you think the introduction of the tag

system will have on the total quantity of garbage collected in your city?

Explain briefly.

3. Tom is a mushroom farmer. He invests all his spare cash in additional mushrooms, which grow on otherwise useless land behind his barn. The mushrooms double in weight during their first year, after which time they are harvested and sold at a constant price per pound. Tom's friend Dick asks Tom for a loan of \$200, which he promises to repay after 1 year. How much interest will Dick have to pay Tom in order for Tom to recover his opportunity cost of making the loan? Explain briefly.

4. Consider a society consisting only of Helen, who allocates her time between sewing dresses and baking bread. Each hour she devotes to sewing dresses yields 4 dresses, and each hour she devotes to baking bread yields 8 loaves of bread. If Helen works a total of 8 hours per day, graph her production possibilities curve and explain what is meant by the following statement: " An increase in productivity with respect to any one good increases our options for producing and consuming all other goods. "

5. Toby can produce 5 gallons of apple cider or 2. ounces of feta cheese per hour. Kyle can produce 3 gallons of apple cider or 1. 5 ounces of feta cheese per hour. Can Toby and Kyle benefit from specialization and trade? Explain.

## **TOPIC 2 The Basics Of Supply And Demand (Chapters 3 & 4 in the Textbook)**

EXPLAIN THE FOLLOWING TERMS Buyer's reservation price Seller's reservation price Change in demand Change in quantity demanded Change in supply Change in quantity supplied Complements Substitutes Demand

curve Supply curve Economic efficiency Equilibrium Equilibrium price  
Equilibrium quantity Excess demand Excess supply Income effect

Substitution effect Inferior good Normal good Market Market equilibrium  
Price ceiling Price floor Buyer's surplus Seller's surplus Total surplus Socially  
optimal quantity Price elasticity of demand Price elasticity of supply Elastic  
Inelastic Unit elastic Perfectly elastic demand Perfectly inelastic demand  
Perfectly elastic supply Perfectly inelastic supply Cross-price elasticity of  
demand Income elasticity of demand Total expenditure

#### REVIEW QUESTIONS

Indicate how you think each of the following would shift demand in the indicated market: Incomes of buyers in the market for vacations increase.

Buyers in the market for pizza read a study linking hamburger consumption to heart disease. Buyers in the market for CDs learn of an increase in the price of audiocassettes (a substitute for CDs). Buyers in the market for CDs learn of an increase in the price of CDs. Use supply and demand analysis to explain why hotel room rental rates near your campus during parents' weekend and graduation weekend might differ from the rates charged during the rest of the year. How will a new law mandating an increase in required levels of automobile insurance affect the equilibrium price and quantity in the market for new automobiles?

In an attempt to induce citizens to conserve energy, the government enacted regulations requiring that all air conditioners be more efficient in their use of electricity. After this regulation was implemented, government officials were then surprised to discover that people used more electricity

than before. Using the concept of price elasticity, explain how this increase might have occurred.

### **TOPIC 3 Theory Of Consumer Behavior (Chapter 5 in the Textbook)**

EXPLAIN THE FOLLOWING TERMS ? Law of demand ? Law of diminishing marginal utility ? Marginal utility Budget constraint line ? Optimal combination of goods ? Rational spending rule ? Marginal rate of substitution ? Indifference curve ? Giffen goods ? Engel's Law ? Engel's coefficient

#### **REVIEW QUESTIONS**

1. Martha's current marginal utility from consuming orange juice is 75 utils per ounce and her marginal utility from consuming coffee is 50 utils per ounce. If orange juice costs 25 cents per ounce and coffee costs 20 cents per ounce, is Martha maximizing her total utility from the two beverages? If so, explain how you know. If not, how should she rearrange her spending?
2. Ann lives in Princeton and commutes by train each day to her job in New York City (20 round trips per month). When the price of a round trip goes up from \$10 to \$20, she responds by consuming exactly the same number of trips as before, while spending \$200 per month less on restaurant meals. a) Does the fact that her quantity of train travel is completely unresponsive to the price increase imply that Ann is not a rational consumer? b) Explain why an increase in train travel might affect the amount she spends on restaurant meals.
3. Suppose a consumer's income is  $M = \$1,200$  per month, all of which he spends on some combination of rent and restaurant meals. If restaurant

meals cost \$12 each and if the monthly rent for an apartment is \$3 per square foot, draw this consumer's budget constraint with his monthly quantities of restaurant meals per month on the vertical axis and apartment size on the horizontal axis. Is the bundle (300 square feet/month, 50 meals/month) affordable?

4. Why does the law of diminishing marginal utility encourage people to spread their spending across many different types of goods?

#### **TOPIC 4 / PART I**

Firm Theory / Theory of Production EXPLAIN THE FOLLOWING TERMS ? Short run ? Long run ? Production function ? Factor of production ? Marginal product ? Average product ? Fixed factor of production ? Variable factor of production ? Law of diminishing returns ? Returns to scale ? Constant returns to scale ? Increasing returns to scale ? Economies of scale ? Marginal rate of technical substitution ? Isoquant curve ? Isocost curve ? Production expansion path

#### **REVIEW QUESTIONS**

1. What is a production function? How does a long-run production function differ from a short-run production function?
2. A firm has a production process in which the inputs to production are perfectly substitutable in the long run. Can you tell whether the marginal rate of technical substitution is high or low, or is further information necessary? Discuss.

3. The marginal product of labor is known to be greater than the average product of labor at a given level of employment. Is the average product increasing or decreasing? Explain.
4. Do the following production functions exhibit decreasing, constant or increasing returns to scale? a)  $Q = 0.5KL$  b)  $Q = 2K + 3L$
5. The production function for the personal computers of DISK, Inc. is given by  $Q = 10K^{0.5}L^{0.5}$ , where  $Q$  is the number of computers produced per day,  $K$  is hours of machine time, and  $L$  is hours of labor input. DISK's competitor, FLOPPY, Inc. , is using the production function  $Q = 10K^{0.6}L^{0.4}$ .
- a) If both companies use the same amounts of capital and labor, which will generate more output?
- b) Assume that capital is limited to 9 machine hours but labor is unlimited in supply. In which company is the marginal product of labor greater? Explain.
6. Diminishing returns to a single factor of production and constant returns to scale are not inconsistent. Discuss.

#### **TOPIC 4 / PART II**

Firm Theory / Theory of Cost EXPLAIN THE FOLLOWING TERMS ? Total cost ? Average cost ? Marginal cost ? Variable cost ? Fixed cost ? Accounting profit ? Economic profit ? Economic loss ? Normal profit ? Explicit cost ? Implicit cost

**REVIEW QUESTIONS**

1. If the marginal cost of production is increasing, does this tell you whether the average variable cost is increasing or decreasing? Explain.
2. If the marginal cost of production is greater than the average variable cost, does this tell you whether the average variable cost is increasing or decreasing? Explain.
3. If the firm's average cost curves are U-shaped, why does its average variable cost curve achieve its minimum at a lower level of output than the average total cost curve?
4. How does a change in the price of one input change the firm's long-run expansion path?
5. You manage a plant that mass produces engines by teams of workers using assembly machines. The technology is summarized by the production function  $Q = 4KL$  where  $Q$  is the number of engines per week,  $K$  is the number of assembly machines, and  $L$  is the number of labor teams. Each assembly machine rents for  $r = \$12,000$  per week and each team costs  $w = \$3,000$  per week. Engine costs are given by the cost of labor teams and machines, plus  $\$2,000$  per engine for raw materials. Your plant has a fixed installation of 10 assembly machines as part of its design.
  - a) What is the cost function for your plant — namely, how much would it cost to produce  $Q$  engines? What are average and marginal costs for producing  $Q$  engines? How do average costs vary with output?



b) How many teams are required to produce 80 engines? What is the average cost per engine? ) You are asked to make recommendations for the design of a new production facility. What would you suggest? In particular, what capital/labor (K/L) ratio should the new plant accommodate? If lower average cost were your only criterion, should you suggest that the new plant have more production capacity or less production capacity than the plant you currently manage?

### TOPIC 4 / PART III

Firm Theory / Perfect Competition (Chapter 6 in the Textbook) EXPLAIN THE FOLLOWING TERMS ? Perfectly competitive market ? Imperfectly competitive market ? Price taker ? Profit-maximizing firm Breakeven point ? Total revenue ? Marginal revenue ? Shutdown point ? Decreasing-cost industry ? Increasing-cost industry ? Constant-cost industry ? Producer surplus

### REVIEW QUESTIONS

1. Explain why you would expect short run supply curves in perfectly competitive markets to slope upward.
2. Explain why you would expect long run supply curves in perfectly competitive markets to slope upward.
3. Assume you and your friend Keiko each work for your own businesses solving economics and math problems. The table below shows how many hours it takes each of you to solve each type of problem. | Time to solve 1 economics problem | Time to solve 1 math problem | | You | 1 hour | 2 hours | | Keiko | 4 hours | 1 hour | a) If each of you works 8 hours per day, draw the individual production possibilities curves for you and Keiko. b) What is the

price of an economics problem in terms of math problems for you and Keiko?

c) A firm is willing to pay for economics problems. Graph the supply curve for economics problems, where the vertical axis represents the price of economics problems in terms of math problems.

4. The supply curve for a firm in the short run is the short-run marginal cost curve (above the point of minimum average variable cost). Why is the supply curve in the long run not the long-run marginal cost curve (above the point of minimum average total cost)?

5. Industry X is characterized by perfect competition, so every firm in the industry is earning zero economic profit. If the product price falls, no firms can survive. Do you agree or disagree? Discuss.

### **TOPIC 5 Factor Markets**

EXPLAIN THE FOLLOWING TERMS ? Marginal revenue product ? Economic rent ? Marginal product ? Value of marginal product ? Marginal factor cost ? Backward-bending supply curve of labor ? Rent ? Quasi-rent ? Economic rent ? Interest ? Lorenze curve ? Gini coefficient

### **REVIEW QUESTIONS**

1. Why might a labor supply curve be backward bending?
2. Suppose a firm's production function is given by  $Q = 12L - L^2$ , for  $L = 0$  to  $6$ , where  $L$  is labor input per day and  $Q$  is output per day. Derive and draw the firm's demand for labor curve if the firm's output sells for \$10 in a competitive market.

How many workers will the firm hire when the wage rate is \$30 per day? \$60 per day? (Hint: The marginal product of labor is  $12 - 2L$ .)

3. The demand for labor by an industry is given by the curve  $L = 1200 - 10w$ , where  $L$  is the labor demanded per day and  $w$  is the wage rate. The supply curve is given by  $L = 20w$ . What is the equilibrium wage rate and quantity of labor hired? What is the economic rent earned by workers? TOPIC 6 General Equilibrium and Welfare Economics (Chapters 7 & 8 in the Textbook)

EXPLAIN THE FOLLOWING TERMS ? Deadweight loss ? Pareto efficient ?

Allocative function of price Rationing function of price ? Invisible hand theory

#### REVIEW QUESTIONS

1. Why do economists emphasize efficiency as an important goal of public policy?
2. Why does the loss in total economic surplus directly experienced by participants in the market or a good that is taxed overstate the overall loss in economic surplus that results from the tax?
3. Why do price ceilings reduce economic surplus?
4. Suppose the weekly demand for a certain good, in thousands of units, is given by the equation  $P = 8 - Q$ , and the weekly supply of the good is given by the equation  $P = 2 + Q$ , where  $P$  is the price in dollars. ) Calculate the total weekly economic surplus generated at the market equilibrium. b) Suppose a per-unit tax of \$2, to be collected from sellers, is imposed in this market. Calculate the direct loss in economic surplus experienced by participants in this market as a result of the tax. c) How much government revenue will this

tax generate each week? If the revenue is used to offset other taxes paid by participants in this market, what will be their net reduction in total economic surplus?

### **TOPIC 7 Imperfect Competition (Chapter 9 in the Textbook)**

EXPLAIN THE FOLLOWING TERMS ? Imperfectly competitive firm Pure monopoly ? Monopolistic competition ? Oligopoly ? Price setter ? Price discrimination ? Market power ? Natural monopoly ? Perfect price discrimination

#### **REVIEW QUESTIONS**

1. What important characteristic do all three types of imperfectly competitive firm share?
2. Comment on the following statement: “ because a natural monopolist charges a price greater than marginal cost, it necessarily earns a positive economic profit. ”
3. What is the socially desirable price for a natural monopoly to charge? Why will a natural monopoly that attempts to charge the socially desirable price invariably suffer an economic loss?
4. You decide to open a lemonade stand outside your dorm on a hot summer day. You know the distribution of reservation prices for the people who will walk by your stand each day (given in the table below). Each cup of lemonade costs you 30 cents to produce and you have no fixed costs. |  

Person	Reservation Price
A	1.10
B	1.00
C	0.90
D	0.80
E	0.70
F	0.60
G	0.50
H	0.40
I	0.30
J	0.20

 a) Calculate

the marginal revenue of selling each additional cup of lemonade. b) What is your profit maximizing price? c) At the profit maximizing price, what are profit and consumer surplus? d) What price should you charge to maximize total economic surplus? e) How could you use price discrimination to increase your profits? If you use perfect price discrimination, how does profit compare to total economic surplus?

6. Why is the Cournot equilibrium stable (i. e. , why don't firms have any incentive to change their output levels once in equilibrium)? Even if they can't collude, why don't firms set their outputs at the joint profit-maximizing levels (i. e. , the levels they would have chosen had they colluded)? 6. In the Stackelberg model, the firm that sets output first has an advantage. Explain why.

7. The kinked demand curve describes price rigidity. Explain how the model works. What are its limitations? Why does price rigidity arise in oligopolistic markets? TOPIC 8 Game Theory: Strategic Behavior Analysis Chapter 10 in the Textbook) EXPLAIN THE FOLLOWING TERMS ? Game ? Payoff matrix ? Nash equilibrium ? Cartel ? Dominant strategy ? Dominated strategy ? Decision tree ? Credible promise ? Credible threat ? Prisoner's dilemma ? Tit-for-tat ? Repeated game REVIEW QUESTIONS 1. Explain why a military arms race is an example of a prisoner's dilemma? 2. Suppose your economics class is graded on a " curve" such that your grade on a quiz depends not only on your performance, but also on the performance of others in the class. You and your classmates have two choices, to study for a quiz or not.

If you and your classmates study for a quiz, you will receive Bs. If you study and they do not, you will receive an A and they will fail the quiz. If you choose not to study and neither do your classmates, you will receive Cs. But if your classmates study and you do not, they receive As and you will fail.

Assume that all of your classmates make the same choice. a) Who are the players? What are each player's strategies? b) Construct the payoff matrix.

c) What choice will you make? Explain why. d) Give examples of factors that could affect a student's choice of strategy in this situation. ) Is there a

dominant strategy or equilibrium in this case? If so, list. If not, why not? 3.

How is your incentive to defect in a prisoner's dilemma altered if you learn that you will play the game not just once but rather indefinitely many times with the same partner?

TOPIC 9 Externalities & Public Goods (Chapters 11 & 15 in the Textbook) EXPLAIN THE FOLLOWING TERMS ? Externalities ?

External benefit ? External cost ? Negative externality ? Positive externality ?

Coase theorem ? Tragedy of the Commons ? Public good ? Nonexcludable

good ? Nonrival good ? Collective good ? Pure commons good ? Pure private

good ? Pure public good Rent-seeking REVIEW QUESTIONS

1. Suppose the supply curve for cans of soda in your dorm is given by  $P = .20 + .001 Q$ , where  $P$  is price and  $Q$  is the number of cans sold per day. The demand curve for cans of soda in the dorm is given by  $P = .80 - .002 Q$ . a) Find the equilibrium price and quantity of soda cans per day sold in the dorm. b) If each soda can imposes \$.05 in costs on society (because they become litter or must be thrown away or recycled), what is the socially optimal number of soda cans for the dorm? c) How could a tax on soda cans be used to assure the socially optimal number of cans are sold?

2. You own an apple orchard and raise and sell apples at your own fruit stand. The neighbor next door to your orchard is a beekeeper. She keeps bees to make and sell honey. This year, the neighbor is considering getting rid of her bees because her honey business loses money. If she doesn't raise her bees, your apple production will fall without the bees to pollinate the trees. The following payoff matrix shows the returns to you and your neighbor with and without the bees.

	No bees	Bees
You	\$1000	\$1300
Neighbor	0	-\$100

a) If your neighbor makes her decision without considering your orchard, will she keep the bees? Why or why not? b) Is it socially optimal for your neighbor to keep the bees? Explain. c) If your neighbor consults with you, will she decide to keep the bees? What would you suggest to your neighbor if she consults you?

3. Refer to the graph provided below. You are deciding the optimal number of flower bulbs to plant in your front yard. Your house is by a well traveled road and people enjoy seeing the flowers in your yard as they pass by.

The relevant marginal cost and benefit curves are given below. a) What is the optimal number of bulbs for you to plant if you do not consider the people passing by your house? b) What is the socially optimal number of bulbs for you to plant? c) By how much would the government need to subsidize you per bulb to assure that you will plant the optimal number of flower bulbs?

4. You and your roommate would like to hire a cleaning service to clean your apartment each week. The value of the cleaning is \$35 to you and \$100 to your roommate. Regardless of who pays for the service, the entire apartment

gets cleaned. ) What is the most the cleaning service can charge per week and still be assured of being hired by one of you? b) Suppose the competitive fee for the cleaning service is \$80 per week. The owner of the apartment complex proposes that each of you pay 50% of the weekly fee. Will you and your roommate agree to the proposal? c) Is total economic surplus higher with or without the cleaning service?

5. Consider a good that would be provided optimally by private market forces. Why is the direct loss in surplus that would result from a tax on this good an overstatement of the loss in surplus caused by the tax?

TOPIC 10 The Economics Of Information (Chapter 12 in the Textbook)

EXPLAIN THE FOLLOWING TERMS ? Adverse selection ? Asymmetric Information ? Costly-to-Fake Principle ? Expected value ? Free-Rider Problem ? Lemons Model ? Statistical discrimination ? Moral hazard ? Risk-neutral and risk-averse REVIEW QUESTIONS

1. Explain why used cars offered for sale are different, on average, from used cars not offered for sale.

2. Explain why the used-car market would be likely to function more efficiently in a community in which moral norms of honesty are strong than in a community in which such norms are weak.

3. You have decided to sell your own home. On the first day, you receive an offer for \$150, 000. If you decline the offer and keep the house on the market for 30 days, there is a 60% chance you will receive an offer for \$250, 000 (your asking price). Alternatively, you can hire a real estate agent (for a



commission of \$12, 500) and have a 90% chance of selling your house for \$250, 000 in 30 days. To wait 30 days to sell the house costs you \$5000 in lost income because you cannot move to start your new job. a) If you decide to sell the house on your own, should you sell the house now or wait 30 days? Explain. ) If you wait 30 days, should you hire a realtor or not? Explain. You are hiring a manager for your firm for one year. You have three job candidates with different levels of education who, if they work out, will do the job equally well. You can hire the high school graduate for \$25, 000, with a 25% chance of it working out. You can hire the “ C” average college graduate for \$30, 000, with a 50% chance of it working out. You can hire the “ A” average college graduate for \$33, 000, with a 95% chance of it working out. If the manager you hire does not work out, it will cost you \$7500 to run a new hiring search.

Which candidate do you choose? Explain. EXERCISES FOR

MACROECONOMICS EXERCISE ONE: MEASURING A NATIONS INCOME KEY

CONCEPTS Microeconomics, p. 500 consumption, p. 505 nominal GDP, p. 508

Macroeconomics, p. 500 investment, p. 505 real GDP, p. 508 Gross domestic

product (GDP), p. 502 government purchases, p. 506 GDP deflator, p. 509

net exports, p. 506 QUESTIONS FOR REVIEW

1. Explain why an economy's income must equal its expenditure.
2. Which contributes more to GDP-the production of an economy car or the production of a luxury car? Why?

3. A farmer sells wheat to a baker for \$2. The baker uses the wheat to make bread, which is sold for \$3. What is the total contribution of these transactions to GDP?

4. Many years ago Peggy paid \$500 to put together a record collection. Today she sold her albums at a garage sale for \$100. How does this deal affect current GDP?

5. List the four components of GDP. Give an example of each. 6. Why do economists use real GDP rather than nominal GDP to gauge economic well-being?

7. In the year 2001, the economy produces 100 loaves of bread that sell for \$2 each. In the year 2000, the economy produces 200 loaves of bread that sell for \$3 each.

Calculate the nominal GDP and the GDP deflator for each year. (Use 2001 as the base year.) By what percentage does each of these three statistics rise from one year to the next? 8. Why is it desirable for a country to have a large GDP? Give an example of something that would raise GDP and yet be undesirable.

#### PROBLEMS AND APPLICATIONS

1. What components of GDP (if any) would each of the following transactions affect? Explain. a. A family buys a new refrigerator. b. Aunt Jane buys a new house. c. Ford sells a Thunderbird from its inventory. d. You buy a pizza. e.

California repaves Highway 101. . Your parents buy a bottle of French wine.

g. Honda expands its factory in Marysville, Ohio.

2. The “ government purchases” component of GDP does not include spending on transfer payments such as Social Security. Thinking about the definition of GDP, explain why transfer payments are excluded.

3. Why do you think households’ purchases of new housing are included in the investment component? Can you think of a reason why households’ purchases of new cars should also be included in investment rather than in consumption? To what other consumption goods might this logic apply?

4. As the chapter states, GDP does not include the value of used goods that are resold. Why would including such transactions make GDP a less informative measure of economic well-being?

5. Below are some data from the land of milk and honey. Year Price of Milk Quantity of Milk (quarts) Price of Honey Quantity of Honey 2001 \$1 100 \$2 50 2002 1 200 2 100 2003 2 200 4 100 a. Compute nominal GDP, real GDP, and the GDP deflator for each year, using 2001 as the base year. b.

Compute the percentage change in nominal GDP, real GDP, and the GDP deflator in 2002 and 2003 from the preceding year. For each year, identify the variable that does not change. Explain in words why your answer makes sense. c. Did economic well-being rise more in 2002 or 2003? Explain.

6. Consider the following data on U. S. GDP. Year Nominal GDP (in billions) GDP Deflator (base year 1996) 2000 9, 873 118 1999 9, 269 113 a. What

was the growth rate of nominal GDP between 1999 and 2000? (Note: The growth rate is the percentage change from one period to the next. b. What was the growth rate of the GDP deflator between 1999 and 2000? c. What was real GDP in 1999 measured in 1996 prices? d. What was real GDP in 2000 measured in 1996 prices? e. What was the growth rate of real GDP between 1999 and 2000? f. Was the growth rate of nominal GDP higher or lower than the growth rate of real GDP? Explain.

7. if prices rise, people's income from selling goods increases. The growth of real GDP ignores this gain, however. Why, then do economists prefer real GDP as a measure of economic well-being?

8. Revised estimates of U. S. GDP are usually released by the government near the end of each month. " Find a newspaper article that reports on the most recent release, or read the news release yourself at [http://www. bea. doc. gov](http://www.bea.doc.gov), the Web site of the U. S. Bureau of Economic Analysis. Discuss the recent changes in real and nominal GDP and in the components of GDP.

9. One day Barry the Barber, Inc. collects \$400 for haircuts. Over this day, his equipment depreciates in value by \$50. Of the remaining \$350, Barry sends \$30 to the government in sales taxes, takes home \$220 in wages, and retains \$100 in his business to add new equipment in the future.

From the \$220 that Barry takes home, he pays \$70 in income taxes. Based on this information, compute Barry's contribution to the following measures of income. a. Gross domestic product b. Net national product c. National income d. Personal income e. Disposable personal income

10. Goods and services that are not sold in markets, such as food produced and consumed at home, are generally not included in GDP. Can you think of how this might cause the numbers in the second column of Table 3 to be misleading in a comparison of the economic well-being of the United States and India? Explain.

11. Until the early 1990s, the U.

S. government emphasized GNP rather than GEP as a measure of economic well-being. Which measure should the government prefer if it cares about the total income of Americans? Which measure should it prefer if it cares about total amount of economic activity occurring in the United States?

12. The participation of women in the U. S. labor force has risen dramatically since 1970. a. How so you think this rise affected GDP? b. Now imagine a measure of well-being that includes time spent working in the home and taking leisure. How would the change in this measure of well-being compare to the change in GDP? . Can you think of other aspects of well-being that associated with the rise in women’s labor-force participation? Would it be practical to construct a measure of well-being that includes these aspects?

EXERCISE TWO: MEASURING THE COST OF LIVING KEY CONCEPTS Consumer price index (CPI), p. 520 producer price index, p. 523 real interest rate, p. 529 Inflation rate, p. 522 nominal interest rate, p. 529 QUESTIONS FOR REVIEW

1. Which do you think has a greater effect on the consumer price index: a 10 percent increase in the price of chicken or a 10 percent increase in the price of caviar? Why?
2. Describe the three problems that make the consumer price index an imperfect measure of the cost of living.
3. If the price of a Navy submarine rises, is the consumer price index or the GDP deflator affected more? Why?
4. Over a long period of time, the price of a candy bar rose from \$0.10 to \$0.60. Over the same period, the consumer price index rose from 150 to 300. Adjusted for overall inflation how much did the price of the candy bar change?
5. Explain the meaning of nominal interest rate and real interest rate. How are they related?

#### PROBLEMS AND APPLICATIONS

1. Suppose that people consume only three goods, as shown in this table:

	Tennis Balls	Tennis Racquets	Gatorade
2003 price	\$2	\$40	\$1
2003 quantity	100	10	200
2004 price	\$2	\$60	\$2
2004 quantity	100	10	200

a. What is the percentage change in the price of each of the three goods? What is the percentage change in the overall price level? b. Do tennis racquets become more or less expensive relative to Gatorade?

Does the well-being of some people change relative to the well-being of others? Explain.

2. Suppose that the residents of Vegopia spend all of their income on cauliflower, broccoli, and carrots. In 2003 they buy 100 heads of cauliflower for \$200, 50 bunches of broccoli for \$75, and 500 carrots for \$50. In 2004 they buy 75 heads of cauliflower for \$225, 80 bunches of broccoli for \$120, and 500 carrots for \$100. If the base year is 2003, what is the CPI in both years? What is the inflation rate in 2004?
3. Go to the Web site of the Bureau of Labor Statistics (<http://www.bls.gov>) and find data on the consumer price index. By how much has the index including all items risen over the past prices raised the most? The least? Have any categories experienced price declines? Can you explain any of these facts?
4. Beginning in 1994, environmental regulations have required that gasoline contain a new additive to reduce air pollution. This requirement raised the cost of gasoline. The Bureau of Labor Statistics (BLS) decided that this increase in cost represented an improvement in quality a. Given this decision, did the increased cost of gasoline raise the CPI? b. What is the argument in favor of the BLS's decision? What is the argument for a different decision?
5. Which of the problems in the construction of the CPI might be illustrated by each of the following situations? Explain a. The invention of the Sony Walkman b. The introduction of air bags in cars c. Increased personal computer purchases in response to a decline in their price d. More scoops of raisins in each package of Raisin Bran e. Greater use of fuel-efficient cars after gasoline prices increase

6. The New York Times cost \$0.15 in 1970 and \$0.75 in 2000. The average wage in manufacturing was \$3.36 per hour in 1970 and \$14.26 in 1999. a.

By what percentage did the price of a newspaper rise? b. By what percentage did the wage rise? c. In each year, how many minutes does a worker have to work to earn enough to buy a newspaper? d. Did workers' purchasing power in terms of newspapers rise or fall?

7. The chapter explains that Social Security benefits are increased each year in proportion to the increase in the CPI, even though most economists believe that the CPI overstates actual inflation. a. If the elderly consume the same market basket as other people, does Social Security provide the elderly with an improvement in their standard of living each year?

Explain. b. In fact, the elderly consume more health care than younger people, and health care costs have risen faster than overall inflation. What would you do to determine whether the elderly are actually better off from year to year?

8. How do you think the basket of goods and services you buy differs from the basket bought by the typical U. S. household? Do you think you face a higher or lower inflation rate than is indicated by the CPI? Why?

9. Income tax brackets were not indexed until 1985. When inflation pushed people's nominal incomes during the 1970s, what do you think happened to real tax revenue? Hint: this phenomenon was known as "bracket creep.")



10. When deciding how much of their income to save for retirement, should workers consider the real or the nominal interest rate that their savings will earn? Explain.

11. Suppose that a borrower and a lender agree on the nominal interest rate to be paid on a loan. Then inflation turns out to be higher than they both expected. a. Is the real interest rate on this loan higher or lower than expected? b. Does the lender gain or lose from this unexpectedly high inflation? Does the borrower gain or lose? c.

Inflation during the 1970s was much higher than most people had expected when the decade began. How did this affect homeowners who obtained fixed-rate mortgages during the 1960s? How did it affect the banks who lent the money?

EXERCISE THREE: PRODUCTION AND GROWTH KEY CONCEPTS  
Productivity, p. 541 natural resources, p. 542 catch-up effect, p. 547 Physical capital, p. 541 technological knowledge, p. 542 human capital, p. 542  
Diminishing returns, p. 546 QUESTIONS FOR REVIEW

1. What does the level of a nation's GDP measure? What does the growth rate of GDP measure? Would you rather live in a nation with a high level of GDP and a low growth rate, or in a nation with a low level of GDP and a high growth rate?

2. List and describe four determinants of productivity.

3. In what way is a college degree a form of capital?

4. Explain how higher saving leads to a higher standard of living. What might deter a policymaker from trying to raise the rate of saving?
5. Does a higher rate of saving lead to higher growth temporarily or indefinitely?
6. Why would removing a trade restriction, such as a tariff, lead to more rapid economic growth?
7. How does the rate of population growth influence the level of GDP per person?
8. Describe two ways in which the U. S. government tries to encourage advances in technological knowledge.

#### PROBLEMS AND APPLICATIONS

1. Most countries, including the United States, import substantial amounts of goods and services from other countries. Yet the chapter says that a nation can enjoy a high standard of living only if it can produce a large quantity of goods and services itself. Can you reconcile these two facts?
2. List the capital inputs necessary to produce each of the following.
  - a. Cars
  - b. High school educations
  - c. Plane travel
  - d. Fruits and vegetables
3. U. S. income per person today is roughly eight times what it was a century ago. Many other countries have also experienced significant growth over that period. What are some specific ways in which your standard of living differs from that of your great-grandparents?

4. The chapter discusses how employment has declined relative to output in the farm sector. Can you think of another sector of the economy where the same phenomenon has occurred more recently? Would you consider the change in employment in this sector to represent a success or a failure from the standpoint of society as a whole?
5. Suppose that society decided to reduce consumption and increase investment. a. How would this change affect economic growth? b. What groups in society would benefit from this change? What groups might be hurt?
6. Societies choose what share of their resources to devote to consumption and what share to devote to investment. Some of these decisions involve private spending; some of these decisions involve private spending; others involve government spending. a. Describe some forms of private spending that represent consumption, and some forms that represent investment. b. Describe some forms of government spending that represent consumption, and some forms that represent investment.
7. What is the opportunity cost of investing in capital? Do you think a country can “overinvest” in capital? What is the opportunity cost of investing in human capital? Do you think a country can “over-invest” in human capital? Explain.
8. Suppose that an auto company owned entirely by German citizens opens a new factory in South Carolina. a. What sort of foreign investment would

this represent? b. What would be the effect of this investment on U. S. GDP? Would the effect on U. S. GNP be larger or smaller?

9. In the 1980s Japanese investors made significant direct and portfolio investments in the United States. At the time, many Americans were unhappy that this investment was occurring. a. In what way was it better for the United States to receive this Japanese investment than not to receive it? b. In what way would it have been better still for Americans to have done this investment?

10. In the countries of South Asia in 1992, only 56 young women were enrolled in secondary school for every 100 young men. Describe several ways in which greater educational opportunities for young women could lead to faster economic growth in these countries.

1. International data show a positive correlation between political stability and economic growth. a. Through what mechanism could political stability lead to strong economic growth? b. Through what mechanism could strong economic growth lead to political stability? EXERCISE FOUR: SAVING, INVESTMENT, AND THE FINANCIAL SYSTEM KEY CONCEPTS Financial system, p. 562 mutual fund, p. 566 budget deficit, p. 570 Financial markets, p. 562 national saving (saving), p. 569 market for loanable funds, p. 571 bond, p. 563 private saving, p. 569 crowding out, p. 577 financial intermediaries, p. 64 budget surplus, p. 570 QUESTIONS FOR REVIEW 1. What is the role of the financial system? Name and describe two markets that are part of the financial system in our economy. Name and describe two financial intermediaries.

2. Why is it important for people who own stocks and bonds to diversify their holdings? What type of financial institution makes diversification easier?
3. What is national saving? What is private saving? What is public saving? How are these three variables related?
4. What is investment? How is it related to national saving?
5. Describe a change in the tax code that might increase private saving.

If this policy were implemented, how would it affect the market for loanable funds?

6. What is a government budget deficit? How does it affect interest rates, investment, and economic growth?

#### PROBLEMS AND APPLICATIONS

1. For each of the following pairs, which bond would you expect to pay a higher interest rate? Explain.
  - a. a bond of the U. S. government or a bond of an East European government
  - b. a bond that repays the principal in year 2005 or a bond that repays the principal in year 2025
  - c. a bond from Coca-Cola or a bond from a software company you run in your garage
  - d. bond issued by the federal government or a bond issued by New York State
2. Check a newspaper or the Internet for the stock listings of two companies you know something about (perhaps as a customer). What is the price-earnings ratio for each company? Why do you think they differ? If you were to buy one of these stocks, which would you choose? Why?

3. Theodore Roosevelt once said, “ there is no moral difference between gambling at cards or in lotteries or on the race track and gambling in the stock market. ” What social purpose do you think is served by the existence of the stock market?
4. Declines in stock prices are sometimes viewed as harbingers of future declines in real GDP. Why do you suppose that might be true?
5. When the Russian government defaulted on its debt to foreigners in 1998, interest rates rose on bonds issued by many other developing countries. Why do you suppose this happened?
6. Many workers hold large amounts of stock issued by the firms at which they work. Why do you suppose companies encourage this behavior? Why might a person not want to hold stock in the company where he works?
7. Explain the difference between saving and investment as defined by a macroeconomist.

Which of the following situations represent investment? Saving? Explain. a. Your family takes out a mortgage and buys a new house. b. You use your \$200 paycheck to buy stock in AT. c. Your roommate earns \$100 and deposits it in her account at a bank. d. You borrow \$1, 000 from a bank to buy a car to use in your pizza delivery business.

8. Suppose GDP is \$8 trillion, taxes are \$1. 5 trillion, private saving is \$0. 5 trillion, and public saving is \$0. 2 trillion. Assuming this economy is closed;

calculate consumption, government purchases, national saving, and investment.

9. Suppose that Intel is considering building a new chip-making factory. a. Assuming that Intel needs to borrow money in the bond market, why would an increase in interest rates affect Intel's decision about whether to build the factory? b. If Intel has enough of its own funds to finance the new factory without borrowing, would an increase in interest rates still affect Intel's decision about whether to build the factory? Explain.

10. Suppose the government borrows \$20 billion more next year than this year. a. Use a supply-and-demand diagram to analyze this policy. Does the interest rate rise or fall? b. What happens to investment?

To private saving? To public saving? To national saving? Compare the size of the changes to the \$20 billion of extra government borrowing. c. How does the elasticity of supply of loanable funds affect the size of these changes? d. How does the elasticity of demand for loanable funds affect the size of these changes? e. Suppose households believe that greater government borrowing today implies higher taxes to pay off the government debt in the future. What does this belief do to private saving and the supply of loanable funds today? Does it increase or decrease the effects you discussed in parts (a) and (b)?

11. Over the past ten years, new computer technology has enabled firms to reduce substantially the amount of inventories they hold for each dollar of sales. Illustrate the effect of this change on the market for loanable funds.

(Hint: expenditure on inventories is a type of investment. ) What do you think has been the effect on investment in factories and equipment?

12. “ Some economists worry that the aging populations of industrial countries are going to start running down their savings just when the investment appetite of emerging economies is growing” (Economist, May 6, 1995).

Illustrate the effect of these phenomena on the world market for loanable funds.

13. This chapter explains that investment can be increased both by reducing taxes on private saving and by reducing the government budget deficit. a. Why is it difficult to implement both of these policies at the same time? b. What would you need to know about private saving in order to judge which of these two policies would be a more effective way to raise investment?

EXERCISE FIVE: THE BASIC TOOLS OF FINANCE KEY CONCEPTS Finance, p. 584 diversification, p. 588 efficient markets hypothesis, p. 592 Present value, p. 584 idiosyncratic risk, p. 90 future value, p. 584 Aggregate risk, p. 590 informationally efficient, p. 592 compounding, p. 584 Fundamental analysis, p. 591 random walk, p. 592 risk averse, p. 586

#### QUESTIONS FOR REVIEW

1. The interest rate is 7 percent. Use the concept of present value to compare \$200 to be received in 10 years and \$300 to be received in 20 years.



2. What benefit do people get from the market for insurance? What two problems impede the insurance company from working perfectly?
3. What is diversification? Does a stockholder get more diversification going from 1 to 10 stocks or going from 100 to 120 stocks?
4. Comparing stocks and government bonds, which has more risk? Which pays a higher average return?
5. What factors should a stock analyst think about in determining the value of a share of stock?
6. Describe the efficient markets hypothesis, and give a piece of evidence consistent with this theory.
7. Explain the view of those economists who are skeptical of the efficient markets hypothesis.

#### PROBLEMS AND APPLICATIONS

1. About 400 years ago, native Americans sold the island of Manhattan for \$24. If they had invested this money at an interest rate of 7 percent per year, how much would they have today?
2. A company has an investment project that would cost \$10 million today and yield a payoff of \$15 million in four years. a. Should the firm undertake the project if the interest rate is 11 percent? 10 percent? 9 percent? 8 percent? b. Can you figure out the exact cutoff for the interest rate between profitability and nonprofitability?

3. For each of the following kinds of insurance, give an example of behavior that can be called moral hazard and another example of behavior that can be called adverse selection. a. Health insurance b. Car insurance

4. Imagine that you intend to buy a portfolio of ten stocks with some of your savings. Should the stocks be of companies in the same industry? Should the stocks be of companies located in the same country? Explain.

5. Which kind of stock would you expect to pay the higher average return: stock in an industry that is very sensitive to economic conditions (such as an automaker) or stock in an industry that is relatively insensitive to economic conditions (such as a water company). Why?

6. A company faces two kinds of risk. An idiosyncratic risk is that a competitor might enter its market and take some of its customers. An aggregate risk is that the economy might enter a recession, reducing sales.

Which of these two risks would more likely cause the company's shareholders to demand a higher return? Why?

7. You have two roommates who invest in the stock market. a. One roommate says she buys stock only in companies that everyone believes will experience big increases in profits in the future. How do you suppose the price-earnings ratio of these companies compares to the price-earnings ratio of other companies? What might be the disadvantage of buying stock in these companies? b. Another roommate says she only buys stock in companies that are cheap, which she measures by a low price-earnings ratio.

How do you suppose the earnings prospects of these companies compare to those of other companies? What might be the disadvantage of buying stock in these companies? 8. When company executives buy and sell stock based on private information they obtain as part of their jobs, they are engaged in insider trading. a. Given an example of inside information that might be useful for buying or selling stock. b. Those who trade stocks based on inside information usually earn very high rates of return. Does this fact violate the efficient market hypothesis? c. Insider trading is illegal.

Why do you suppose that is? 9. Find some information on an index fund (such as the Vanguard 500 Index, ticker symbol VFINX). How has this fund performed compared with other stock mutual funds over the past five or ten years? (Hint: one place to look for data on mutual funds is <http://www.morningstar.com>). What do you learn from this comparison? EXERCISE SIX: UNEMPLOYMENT AND ITS NATURAL RATE KEY CONCEPTS Labor force, p. 601 cyclical unemployment, p. 603 union, p. 613 Unemployment rate, p. 601 discouraged workers, p. 605 collective bargaining, p. 613 Labor-force participation rate, p. 02 frictional unemployment, p. 607 Strike, p. 613 structural unemployment, p. 607 efficiency wages, p. 616 Natural rate of unemployment, p. 603 unemployment insurance, p. 609 Job search, p. 607 QUESTIONS FOR REVIEW

1. What are the three categories into which the Bureau of Labor Statistics divides everyone? How does the BLS compute the labor force, the unemployment rate, and the labor-force participation rate?
2. Is unemployment typically short-term or long-term? Explain.

3. Why is frictional unemployment inevitable? How might the government reduce the amount of frictional unemployment?
- 4 . Are minimum-wage laws a better explanation for structural unemployment among teenagers or among college graduates? Why?
5. How do unions affect the natural rate of unemployment?
6. What claims do advocates of unions make to argue that unions are good for the economy?
7. Explain four ways in which a firm might increase its profits by raising the wages it pays.

#### PROBLEMS AND APPLICATIONS

1. The bureau of Labor Statistics announced that in December 1998, of all adult Americans, 138, 547, 000 were employed, 6, 021, 000 were unemployed, and 67, 723, 000 were not in the labor force.

How big was the labor force? What was the labor-force participation rate?

What was the unemployment rate?

2. Go to the Web site of the Bureau of Labor Statistics (<http://www.bls.gov>). what is the national unemployment rate right now? find the unemployment rate right now? find the unemployment rate for the demographic group that best fits a description of you (for example, based on age, se, and race). Is it higher or lower than the national average? Why do you think this is so?

3. As shown in figure 3, the overall labor-force participation rate of men declined between 197 and 1990.

This overall declined reflects different patterns for different age groups, however, as shown in the following table:

	All Men	Men 16-24	Men 25-54	Men 55 and over
1970	80%	69%	96%	56%
1990	76	72	93	40

Which group experienced the largest decline? Given this information, what factor may have played an important role in the decline in overall male labor-force participation over this period?

4. The labor-force participation rate of women increased sharply between 1970 and 1990, as shown in Figure 3.

As with men , however, there were different patterns for different age groups, as shown in this table:

	All Women	Women 25-54	Women 25-34	Women 35-44	Women 45-54
1970	43%	50%	45%	51%	54%
1990	58	74	74	77	71

Why do you think that younger women experienced a bigger increase in labor-force participation than older women?

5. Between 1997 and 1998, total U. S. employment increased by 2. 1 million workers, but the number of unemployed workers declined by only 0. 5 million.

How are these numbers consistent with each other? Why might one expect a reduction in the number of people counted as unemployed to be smaller than the increase in the number of people employed?

6. Are the following workers more likely to experience short-term or long-term unemployment? Explain. a. A construction worker laid off because of bad weather b. A manufacturing worker who loses her job at a plant in an isolated area c. A stagecoach-industry worker laid off because of competition from railroads d. A short-order cook who loses his job when a new restaurant opens across the street e.

An expert welder with little formal education who loses her job when the company installs automatic welding machinery

7. Using a diagram of the labor market, show the effect of an increase in the minimum wage on the wage paid to workers, the number of workers supplied, the number of workers demanded, and the amount of unemployment.

8. Do you think that firms in small towns or in cities have more market power in hiring? Do you think that firms generally have more market power in hiring today than 50 years ago, or less? How do you think this change over time has affected the role of unions in the economy Explain;

9. Consider an economy with two labor markets, neither of which is unionized. Now suppose a union is established in one market. a. Show the effect of the union on the market in which it is formed. In what sense is the quantity of labor employed in this market an inefficient quantity? b. Show the effect of the union on the nonunionized market. What happens to the equilibrium wage in this market?

10. It can be shown that an industry's demand for labor will become more elastic when the demand for the industry's product becomes more elastic, let's consider the implications of this fact for the U. S. automobile industry and the United Autoworkers Union (UAW). a. What happened to the elasticity of demand for American cars when the Japanese developed a strong auto industry? What happened to the elasticity of demand for American autoworker? Explain. b. As the chapter explains, a union generally faces a tradeoff in deciding how much to raise wages, because a bigger increase is better for workers who remain employed but also results in a greater reduction in employment. How did the rise in auto imports from Japan affect the wage-employment tradeoff faced by the UAW? Do you think the growth of the Japanese auto industry increased or decreased the gap between the competitive wage and the wage chosen by the UAW? Explain.

11. Some workers in the economy are paid a flat salary and some are paid by commission. Which compensation scheme would require more monitoring by supervisors? In which case do firms have an incentive to pay more than the equilibrium level (as in the worker-effort variant of efficiency-wage theory)? What factors do you think determine the type of compensation firms choose?

12. (This problem is challenging. Suppose that Congress passes a law requiring employers to provide employees some benefit (such as health care) that raises the cost of an employee by \$4 per hour. a. What effect does this employer mandate have on the demand for labor? (In answering this and the following questions, be quantitative when you can. ) b. If employees

place a value on this benefit exactly equal to its cost, what effect does this employer mandate have on the supply of labor? c. If the wage is free to balance supply and demand, how does this law affect the wage and the level of employment? Are employers better or worse off?

Are employees better or worse off? d. If a minimum-wage law prevents the wage from balancing supply and demand, how does the employer mandate affect the wage, the level of employment, and the level of unemployment?

Are employers better or worse off? Are employees better or worse off? e.

Now suppose that workers do not value the mandated benefit at all. How does this alternative assumption change your answers to parts (b), (c), and (d) above? EXERCISE SEVEN: THE MONETARY SYSTEM KEY CONCEPTS

Money, p. 628 currency, p. 631 fractional-reserve banking, p. 637 Medium of exchange, p. 629 demand deposits, p. 32 reserve ratio, p. 637 Unit of account, p. 629 Federal Reserve (Fed), p. 634 money multiplier, p. 638 Store of value, p. 629 central bank, p. 634 open-market operations, p. 639 Liquidity, p. 629 money supply, p. 634 reserve requirements, p. 639 Commodity money, p. 629 monetary policy, p. 634 discount rate, p. 640 Flat money, p. 630 reserves, p. 636 QUESTIONS FOR REVIEW

1. What distinguishes money from other assets in the economy?
2. What is commodity money? What is fiat money? Which kind do we use?
3. What are demand deposits, and why should they be included in the stock of money?



4. Who is responsible for setting monetary policy in the United States? How is this group chosen?
5. If the Fed wants to increase the money supply with open-market operations, what does it do?
6. Why don't banks hold 100 percent reserves? How is the amount of reserves banks hold related to the amount of money the banking system creates?
7. What is the discount rate? What happens to the money supply when the Fed raises the discount rate?
8. What are reserve requirements? What happens to the money supply when the Fed raises reserve requirement?
9. Why can't the Fed control the money supply perfectly?

#### PROBLEMS AND APPLICATIONS

1. Which of the following are money in the U. S. economy? Which are not? Explain your answers by discussing each of the three functions of money. a. A U. S. penny b. A Mexican peso c. A Picasso painting d. A plastic credit card
2. Every month Yankee magazine includes a “ Swopper’s [sic] Column” of offers to barter goods and services. Here is an example:” Will swop custom-designed wedding gown and up to 6 bridesmaids’ gowns for 2 round-trip plane tickets and 3 nights’ lodging in the countryside of England. ” Why would it be difficult to run our economy using a “ Swopper’s Column” instead

of money? In light of your answer, why might the Yankee “ Swopper’s Column” exist?

3. What characteristics of an asset make it useful as a medium of exchange? As a store of value?

4. Consider how the following situations would affect the economy’s monetary system. a. Suppose that the people on Yap discovered an easy way to make limestone wheels. How would this development affect the usefulness of stone wheels as money? Explain. b. Suppose that some one in the United States discovered an easy way to counterfeit \$100 bills. How would this development affect the U. S. monetary system? Explain.

5. Go to the Web site of the Federal Reserve Bank of St.

Louis (<http://www.stls.frb.gov>). a. Find the FRED database. Produce a graph of total currency in the U. S. economy. What happened to currency holdings at the end of 1999? Can you explain this phenomenon? b. Find a map of the Federal Reserve districts. If you live in the United States, find what district you live in . Where is the Federal Reserve Bank for your district located? (Extra credit: What state has two federal Reserve Banks? )

6. Your uncle repays a \$100 loan from Tenth National Bank by writing a \$100 check from his TNB checking account. Use T-accounts to show the effect of this transaction on your uncle and on TNB.

Has your uncle’s wealth changed? Explain.

7. Beleaguered State Bank (BSB) holds \$250 million in deposits and maintains a reserve ratio of 10 percent. a. Show a T-account for BSB. b. Now suppose that BSB'S largest depositor withdraws \$10 million in cash from her account. If BSB decides to restore its reserve ratio by reducing the amount of loans outstanding, show its new T-account. c. Explain what effect BSB's action will have on other banks. d. Why might it be difficult for BSB to take the action described in part (b)? Discuss another way for BSB to return to its original reserve ratio.

8. You take \$100 you had kept under your pillow and deposit it in your bank account. If this \$100 stays in the banking system as reserves and if banks hold reserves equal to 10 percent of deposits, by how much does the total amount of deposits in the banking system increase? By how much does the money supply increase?

9. The Federal Reserve conducts a \$10 million open-market purchase of government bonds. If the required reserve ratio is 10 percent, what is the largest possible increase in the money supply that could result? Explain. What is the smallest possible increase? Explain.

10. Suppose that the T-account for First National Bank is as follows: Assets  
Liabilities Reserves \$100, 000 Deposits \$500, 000 Loans 400, 000 a. If the Fed requires banks to hold 5 percent of deposits as reserves, how much in excess reserves does First National now hold? b. Assume that all other banks hold only the required amount of reserves. If first National decides to reduce its reserves to only the required amount, by how much would the economy's money supply increase?

11. Suppose that the reserve requirement for checking deposits is 10 percent and that banks do not hold any excess reserves. . If the Fed sells \$1 million of government bonds, what is the effect on the economy's reserves and money supply? b. Now suppose the Fed lowers the reserve requirement to 5 percent of deposits as excess reserves. Why might banks do so? What is the overall change in the money multiplier and the money supply as a result of these actions?

12. Assume that the banking system has total reserves of \$100 billion. Assume also that required reserves are 10 percent of checking deposits, and that banks hold no excess reserves and households hold no currency. a. What is the money multiplier?

What is the money supply? b. If the Fed now raises required reserves to 20 percent of deposits, what is the change in reserves and the change in the money supply?

13. (This problem is challenging. ) The economy of Elmendyn contains 2, 000 \$1 bills. a. If people hold all money as currency, what is the quantity of money? b. If people