Chapter Summary and Learning Objectives

1.1 Three Key Economic Ideas (pages 4–7)

*Explain these three key economic ideas: People are rational. People respond to incentives. Optimal decisions are made at the margin.*

Economics is the study of the choices consumers, business managers, and government officials make to attain their goals, given their scarce resources. We must make choices because of *scarcity*, which means that although our wants are unlimited, the resources available to fulfill those wants are limited. Economists assume that people are rational in the sense that consumers and firms use all available information as they take actions intended to achieve their goals. Rational individuals weigh the benefits and costs of each action and choose an action only if the benefits outweigh the costs. Although people act from a variety of motives, ample evidence indicates that they respond to economic incentives. Economists use the word *marginal* to mean extra or additional. The optimal decision is to continue any activity up to the point where the marginal benefit equals the marginal cost.

1.2 The Economic Problem That Every Society Must Solve (pages 7–11)

*Discuss how an economy answers these questions: What goods and services will be produced? How will the goods and services be produced? Who will receive the goods and services produced?* Society faces *trade-offs*: Producing more of one good or service means producing less of another good or service. The *opportunity cost* of any activity—such as producing a good or service—is the highest-valued alternative that must be given up to engage in that activity. The choices of consumers, firms, and governments determine what goods and services will be produced. Firms choose how to produce the goods and services they sell. In the United States, who receives the goods and services produced depends largely on how income is distributed in the marketplace. In a *centrally planned economy*, most economic decisions are made by the government. In a *market economy*, most economic decisions are made by consumers and firms. Most economies, including that of the United States, are *mixed economies* in which most economic decisions are made by consumers and firms but in which the government also plays a significant role. There are two types of efficiency: *Productive efficiency* occurs when a good or service is produced at the lowest possible cost. *Allocative efficiency* occurs when production is in accordance with consumer preferences. *Voluntary exchange* is a situation that occurs in markets when both the buyer and seller of a product are made better off by the transaction. Equity is more difficult to define than efficiency, but it usually involves a fair distribution of economic benefits. Government policymakers often face a trade-off between equity and efficiency.

1.3 Economic Models (pages 11–14)

*Understand the role of models in economic analysis.* Economists rely on *economic models*, which are simplified versions of reality used to analyze real-world economic situations. Economists accept and use an economic model if it leads to hypotheses that are confirmed by statistical analysis. In many cases, the acceptance is tentative, however, pending the gathering of new data or further statistical analysis. Economics is a *social science* because it applies the scientific method to the study of the interactions among individuals. Economics is concerned with *positive analysis*—what is—rather than *normative analysis*—what ought to be. As a social science, economics considers human behavior in every context of decision making, not just in business.
1.4 Microeconomics and Macroeconomics (pages 14–15)

*Distinguish between microeconomics and macroeconomics.* Microeconomics is the study of how households and firms make choices, how they interact in markets, and how the government attempts to influence their choices. Macroeconomics is the study of the economy as a whole, including topics such as inflation, unemployment, and economic growth.

1.5 A Preview of Important Economic Terms (pages 15–16)

*Become familiar with important economic terms.* A necessary step in learning economics is to become familiar with important economic terms, including entrepreneur, innovation, technology, firm, goods, services, revenue, profit, household, factors of production, capital, and human capital.

Appendix: Using Graphs and Formulas (pages 24–35)

*Review the use of graphs and formulas.*

## Chapter Review

Chapter Opener: Microsoft Versus the U.S. Congress on Worker Visas (page 3)

Information technology firms, like Microsoft, often have difficulty filling positions with U.S. citizens. While foreign workers could fill some of these vacancies, worker visas for foreign workers are limited in the United States. Tighter controls on worker visas continue to restrict the ability of U.S. firms to hire foreign workers.

The textbook describes how economics is used to answer many important questions, including the economic effect of the immigration of skilled workers. All of these questions represent a basic economic fact of life: people must make choices as they try to attain their goals. These choices occur because of scarcity, which is the most fundamental economic concept. The resources available to any society—for example, land and labor—to produce the goods and services its citizens want are limited. Society must choose which goods and services will be produced and who will receive them.

1.1 Three Key Economic Ideas (pages 4–7)

*Learning Objective: Explain these three key economic ideas: People are rational. People respond to incentives. Optimal decisions are made at the margin.*

Economics examines how people interact in markets. A market refers to a group of buyers and sellers of a good or service and the institution or arrangement by which they come together to trade. Economists make three important assumptions about the way people interact in markets. First, people are rational. This means that buyers and sellers use all available information to achieve their goals. Second, people act in response to economic incentives. Third, optimal decisions are made at the margin. The terms *marginal benefit* and *marginal cost* refer to the additional benefits and costs of a decision. Economists reason that the best, or optimal, decision is to continue any activity up to the point where the marginal benefit (or $MB$) equals the marginal cost ($MC$). In symbols, we can write $MB = MC$.

*Study Hint*

You should not assume that the phrase “people respond to economic incentives” means that people are greedy. This phrase is an objective statement or a statement shown to be true rather than a belief or an opinion. Economists do not believe people are motivated solely by monetary incentives. Many people voluntarily devote their time and financial resources to friends, family members, and charities.
The Economic Problem That Every Society Must Solve (pages 7–11)

Learning Objective: Discuss how an economy answers these questions: What goods and services will be produced? How will the goods and services be produced? Who will receive the goods and services produced?

The basic economic problem any society faces is that it has only a limited amount of economic resources and so can produce only a limited amount of goods and services. Societies face trade-offs when answering the three fundamental economic questions:

1. What goods and services will be produced?
2. How will the goods and services be produced?
3. Who will receive the goods and services produced?

The opportunity cost of any activity is the highest-valued alternative that must be given up to engage in that activity.

Societies organize their economies in two main ways. A centrally planned economy is an economy in which the government decides how economic resources will be allocated. From 1917 to 1991, the Soviet Union was the most important centrally planned economy. Today Cuba and North Korea are among the few remaining centrally planned economies. A market economy is an economy in which the decisions of households and firms interacting in markets allocate economic resources. The United States, Canada, Western Europe, and Japan all have market economies. Privately owned firms must produce and sell goods and services that consumers want to stay in business. An individual’s income is determined by the payments he receives for what he has to sell.

Study Hint

In a centrally planned economy, government officials or “planners” are responsible for determining how much of each good to produce, who should produce it, and where it should be produced. In contrast, in a market economy no government official determines how much corn, wheat, or potatoes should be produced. Individual producers and consumers interact in markets for these goods to determine the answers to What? How? and Who?. The role of government in a market economy is similar to that of an umpire in a baseball game. Government officials can pass and enforce laws that allow people to act in certain ways, but they do not participate directly in markets as consumers or producers.

The high rates of unemployment and business bankruptcies of the Great Depression caused a dramatic increase in government intervention in the economy in the United States and other market economies. Some government intervention is designed to raise the incomes of the elderly, the sick, and people with limited skills. In recent years, government intervention has expanded to meet social goals such as the protection of the environment and the promotion of civil rights. The expanded role of government in market economies has led most economists to argue that the United States and other nations have mixed economies rather than market economies.
Market economies tend to be more efficient than planned economies because market economies promote competition and voluntary exchange. There are two types of efficiency. Productive efficiency occurs when a good or service is produced at the lowest possible cost. Allocative efficiency is a state of the economy in which production represents consumer preferences. Specifically, every good or service is produced up to the point where the marginal benefit that the last unit produced provides to consumers is equal to the marginal cost of producing it. Inefficiencies do occur in markets for three main reasons. First, it may take time for firms to achieve productive efficiency. Second, governments may reduce efficiency by interfering with voluntary exchanges in markets. Third, production of some goods may harm the environment when firms ignore the costs of environmental damage.

Society may not find efficient economic outcomes to be the most desirable outcomes. Many people prefer economic outcomes that they consider fair or equitable even if these outcomes are less efficient. Equity is the fair distribution of economic benefits.

### Extra Solved Problem 1-2

**Advising New Government Leaders**

Supports Learning Objective 1.2: Discuss how an economy answers these questions: What goods and services will be produced? How will the goods and services be produced? Who will receive the goods and services?

Suppose that a poor nation experienced a change in government leadership. Prior to this change the nation employed a centrally planned economy to allocate its resources. The new leaders are willing to try a different system if someone can convince them that it will yield better results. They hire an economist from a nation with a market economy to advise them and will order their citizens to follow the advisor’s recommendations for change. The economist suggests that a market economy replace central planning to answer the nation’s economic questions (what, how, and who?).

a. What will the economist suggest the leaders order their citizens to do?

b. Do you believe the leaders and citizens will accept the economist’s suggestions?

### SOLVING THE PROBLEM:

**Step 1:** Review the chapter material.
The problem concerns which economic system a nation must select, so you may wish to review the section “Centrally Planned Economies versus Market Economies” on page 9 of the textbook.

**Step 2:** What will the economist suggest the leaders order their citizens to do?
Market economies allow members of households to select occupations and purchase goods and services based on self-interest and allow privately-owned firms to produce goods and services based on their self-interests. Therefore, the economist would advise the leaders of the poor country to not issue any orders.

**Step 3:** Do you believe the leaders and citizens will accept the economist’s suggestions?
Even democratically elected leaders, especially those with significant government involvement in the nation’s resource allocation, will find it difficult to accept the new system. They may wonder how self-interested individuals will produce and distribute goods and services to promote the welfare of the entire nation. This new system requires a significant reduction in government influence in people’s lives; history has shown that government officials are often reluctant to give up this influence. Acceptance is most likely when the leaders have some knowledge and experience with the successful operation of a market economy in other
Economic Models (pages 11–14)
Learning Objective: Understand the role of models in economic analysis.

Models are simplified versions of reality used to analyze real-world situations. To develop a model, economists generally follow five steps.

1. Decide on the assumptions to use in developing the model.
2. Formulate a testable hypothesis.
3. Use economic data to test the hypothesis.
4. Revise the model if it fails to explain well the economic data.
5. Retain the revised model to help answer similar economic questions in the future.

Models rely on assumptions because models must be simplified to be useful. For example, models make behavioral assumptions about the motives of consumers and firms. Economists assume that consumers will buy the goods and services that will maximize their satisfaction and that firms will produce the goods and services that will maximize their profits.

An economic variable is something measurable that can have different values, such as the wages of software programmers. A hypothesis is a statement that may be correct or incorrect about an economic variable. An economic hypothesis usually states a causal relationship where a change in one variable causes a change in another variable. For example, “outsourcing leads to lower wages for software programmers” means that an increase in the amount of outsourcing will reduce the wages of software programmers. Positive analysis is analysis concerned with what is and involves questions that can be estimated. Normative analysis is analysis concerned with what ought to be and involves questions of values and basic assumptions.

Study Hint
The feature Don’t Let This Happen to YOU! appears in each chapter to alert you to mistakes often made by economics students. To reinforce the difference between positive and normative statements, review Don’t Let This Happen To YOU! “Don’t Confuse Positive Analysis with Normative Analysis,” in which the minimum wage law is discussed. Positive analysis can show us the effects of the minimum wage law on the economy, but it cannot tell us whether the policy is good or bad. Nor can positive analysis tell us whether we should increase or decrease the minimum wage. The discussion of whether a policy is good or bad will depend on an individual’s values and experiences and falls under the realm of normative analysis.

Positive economic analysis deals with statements that can be proved correct or incorrect by examining facts. If your instructor stated, “It is snowing outside,” it would be easy to determine whether this statement is true or false by looking out a window. Normative analysis concerns statements of belief or opinion. If your instructor wants to go skiing that evening and states, “It should be snowing outside today,” you could not prove the statement wrong because it is a statement of opinion. It is important to recognize the difference between these two types of statements.
Extra Solved Problem 1-3

Sunspot Activity and Economic Growth
Supports Learning Objective 1.3: Understand the role of models in economic analysis.

Sunspots are sites of strong magnetic fields that appear as dark regions on the surface of the sun. The number of sunspots varies over an 11-year cycle. British economist William Stanley Jevons (1835–1882) advanced a theory, or model, of economic growth based on the occurrence of sunspots. Changes in the number of sunspots cause variations in the earth’s temperature and, according to this theory, changes in agricultural output. Agriculture accounted for a much greater share of total output of the economies of Great Britain and other nations in Jevons’ time than in modern times.


How can we develop and test a sunspot model of economic growth?

SOLVING THE PROBLEM:

Step 1: Review the chapter material.

The problem concerns how models are used to analyze economic issues, so you may wish to review the section “Economic Models,” which begins on page 11 of the textbook.

Step 2: To develop and test a sunspot model of economic growth, we follow these steps:

1. Decide on the assumptions to use in developing the model. Two assumptions of Jevons’ model are: (a) Changes in the earth’s temperature are related to the amount of sunspot activity. (b) Changes in the earth’s temperature cause variations in the value of a nation’s output of goods and services.

2. Formulate a testable hypothesis. The value of a nation’s output of goods and services is greater in years of greater than average sunspot activity than in years of lower than average sunspot activity.

3. Use economic data to test the hypothesis. Compare changes in sunspot activity with changes in a standard measure of the value of a nation’s output of goods and services; the most common measure is Gross Domestic Product or GDP. Because sunspot activity varies in 11-year cycles, data should cover at least one of these cycles. If data for the United States are used, years of greater than average sunspot activity should be associated with years of above average economic growth, while years of lower than average sunspot activity should be associated with years of below average economic growth.

4. Revise the model if it fails to explain well the economic data. The model could fail if factors other than sunspot activity have a significant impact on economic growth. These factors include variations in the price of energy, investments in new technologies, and changes in tax rates and other government policies. A revised model would examine the separate influence of sunspots and these other factors.

5. Retain the revised model to help answer similar economic questions in the future. Although the sunspot model is based on a plausible relationship between climate changes and changes in agricultural production, agriculture accounts for a much smaller percentage of the output produced in the United States, Great Britain, and other western nations in the 21st century than it did in the 19th century. In turn, other factors have been shown to be important in affecting economic growth.
1.4 Microeconomics and Macroeconomics (pages 14–15)
Learning Objective: Distinguish between microeconomics and macroeconomics.

Microeconomics is the study of how households and firms make choices, how they interact in markets, and how the government attempts to influence their choices. Macroeconomics is the study of the economy as a whole, including topics such as inflation, unemployment, and economic growth.

Extra Solved Problem 1-4
Watching From On High—and Low
Supports Learning Objective 1.4: Distinguish between microeconomics and macroeconomics.

Sports fans are accustomed to seeing game action on television from different camera angles. For popular events such as the Olympics, World Series, and Super Bowl, network coverage captures action from ground level as well as from higher locations. At many events there is a camera located in a blimp that circles above the venue where the event is held. The aerial view of the blimp’s camera is often visually appealing but is never broadcast for very long; the athletes can be seen only from a great distance, if they can be seen at all. Coverage of the events often includes a view from a mobile or “sideline” camera that can zoom in on individual players or fans sitting in the stands, a degree of detail in stark contrast to that provided by the aerial view. How do the different camera angles help to explain the difference between microeconomics and macroeconomics?

SOLVING THE PROBLEM:
Step 1: Review the chapter material.
The problem concerns the differences between microeconomics and macroeconomics, so you may want to review the section “Microeconomics and Macroeconomics” on page 14 in the textbook.

Step 2: Compare the focus of microeconomics with the television coverage of a sports event.
Microeconomics focuses on how individual households and firms make choices, how they interact in markets, and how the government attempts to influence their choices. This focus is similar to that of a sideline camera at a football game. The camera can focus in on an individual player or fan.

Step 3: Compare the focus of macroeconomics with the television coverage of a sports event.
Macroeconomics is the study of the economy as a whole, including topics such as inflation, unemployment, and economic growth. Macroeconomics does not study the decisions made by individuals but the consequences of the actions of all decision makers in an economy. This is similar to the blimp’s aerial view of the venue where a sports event occurs. You can see the entire venue, but the blimp’s point of view is too far away to see any individual player or fan.

1.5 A Preview of Important Economic Terms (pages 15–16)
Learning Objective: Become familiar with important economic terms.

This chapter introduces twelve economic terms that will each be covered in depth in future chapters. Those terms are: entrepreneur, innovation, technology, firm, goods, services, revenue, profit, household, factors of production, capital, and human capital.
Appendix

Using Graphs and Formulas (pages 24–35)

Learning Objective: Review the use of graphs and formulas.

Graphs of One Variable

Bar charts, pie charts, and time-series graphs are alternative ways to display data visually. Figures 1A-1 and 1A-2 illustrate how relationships are often easier to understand with graphs than with words or tables alone.

Graphs of Two Variables

Both microeconomics and macroeconomics use two-variable graphs extensively to show the relationship between two variables.

You need to understand how to measure the slope of a straight line drawn in a graph. The slope of a straight line can be measured between any two points on a line because the slope of a straight line has a constant value, so we don’t need to worry about the value of the slope changing as we move up and down the line. Slope can be measured as the change in the value measured on the vertical axis divided by the change in the value measured on the horizontal axis. In symbols, the slope formula is written as $\Delta y/\Delta x$. The formula is also described as “rise over run.” The usual custom is to place the variable $y$ on the graph’s vertical axis and the variable $x$ the horizontal axis. If the slope is negative, then the two variables are inversely (or negatively) related. If the slope is positive, then the two variables are directly (or positively) related. Keep in mind that a relationship between any two variables does not necessarily imply a cause and effect relationship between those two variables.

We can show the effect of more than two variables in a graph by shifting the line representing the relationship between the first two variables. For example, we can draw a graph showing the effect of a change in the price of pizza on the quantity of pizza demanded during a given week. We can then shift this line to show the effect of a change in the price of hamburgers on the quantity of pizza demanded.

If the relationship between two variables is nonlinear, you can still calculate the slope. The slope of a nonlinear curve at a given point is measured by the slope of the line that is tangent to that point.

Formulas

The formula for a percentage change of a variable over time (or growth rate) is:

$$\frac{\text{Value in the second period} - \text{Value in the first period}}{\text{Value in the first period}} \times 100$$

The formula for the area of a rectangle is $\text{Base} \times \text{Height}$. The formula for the area of a triangle is $\frac{1}{2} \times \text{Base} \times \text{Height}$.
Key Terms

**Allocative efficiency** A state of the economy in which production is in accordance with consumer preferences; in particular, every good or service is produced up to the point where the last unit provides a marginal benefit to society equal to the marginal cost of producing it.

**Centrally planned economy** An economy in which the government decides how economic resources will be allocated.

**Economic model** A simplified version of reality used to analyze real-world economic situations.

**Economic variable** Something measurable that can have different values, such as the wages of software programmers.

**Economics** The study of the choices people make to attain their goals, given their scarce resources.

**Equity** The fair distribution of economic benefits.

**Macroeconomics** The study of the economy as a whole, including topics such as inflation, unemployment, and economic growth.

**Marginal analysis** Analysis that involves comparing marginal benefits and marginal costs.

**Market** A group of buyers and sellers of a good or service and the institution or arrangement by which they come together to trade.

**Market economy** An economy in which the decisions of households and firms interacting in markets allocate economic resources.

**Microeconomics** The study of how households and firms make choices, how they interact in markets, and how the government attempts to influence their choices.

**Mixed economy** An economy in which most economic decisions result from the interaction of buyers and sellers in markets but in which the government plays a significant role in the allocation of resources.

**Normative analysis** Analysis concerned with what ought to be.

**Opportunity cost** The highest-valued alternative that must be given up to engage in an activity.

**Positive analysis** Analysis concerned with what is.

**Productive efficiency** A situation in which a good or service is produced at the lowest possible cost.

**Scarcity** A situation in which unlimited wants exceed the limited resources available to fulfill those wants.

**Trade-off** The idea that because of scarcity, producing more of one good or service means producing less of another good or service.

**Voluntary exchange** A situation that occurs in markets when both the buyer and seller of a product are made better off by the transaction.
Self-Test

(Answers are provided at the end of the Self-Test.)

Multiple-Choice Questions

1. Which of the following questions could be answered using economics?
   a. “How are the prices of goods and services determined?”
   b. “How does pollution affect the economy, and how should government policy deal with these effects?”
   c. “Why do firms engage in international trade, and how do government policies affect international trade?”
   d. All of the above are economic questions.

2. Which of the following statements best defines scarcity?
   a. Scarcity studies the choices people make to attain their goals.
   b. Scarcity is a situation in which unlimited wants exceed the limited resources available to fulfill those wants.
   c. Scarcity is an imbalance between buyers and sellers in a specific market.
   d. Scarcity refers to a lack of trade-offs.

3. When you think of an arrangement or institution that brings buyers and sellers of a good or service together, what are you thinking of?
   a. marginal analysis
   b. a market
   c. scarcity
   d. rational behavior

4. Fill in the blanks. In economics, as well as in life, optimal decisions are made ________________.
   a. once all costs have been considered
   b. only when all benefits have been considered
   c. in their totality
   d. at the margin

5. In Solved Problem 1-1: “Apple Computer Makes a Decision at the Margin” which of the concepts below is most applicable in solving the problem?
   a. the concept of what a market is
   b. rational behavior and how people respond to economic incentives
   c. marginal analysis
   d. the concept of scarcity and trade-offs

6. Which of the following is not among the fundamental economic questions that every society must solve?
   a. What goods and services will be produced?
   b. How will the goods and services be produced?
   c. What goods and services will be exchanged?
   d. Who will receive the goods and services produced?
7. What types of economies require that answers be given to the following questions: what goods and services will be produced, how will the goods and services be produced, and who will receive the goods and services produced?
   a. market economies
   b. centrally planned economies
   c. mixed economies
   d. all of the above

8. In what type of economy does the government decide how economic resources will be allocated?
   a. a market economy
   b. a mixed economy
   c. a centrally planned economy
   d. none of the above

9. Which of the following is the best classification for the economies of the United States, Canada, Japan, and Western Europe?
   a. market economies
   b. mixed economies
   c. centrally planned economies
   d. none of the above

10. Which of the following terms best refers to a fair distribution of economic benefits?
    a. productive efficiency
    b. allocative efficiency
    c. voluntary exchange
    d. equity

11. Which of the following is achieved when a good or service is produced up to the point where the marginal benefit to consumers is equal to the marginal cost of producing it?
    a. productive efficiency
    b. allocative efficiency
    c. equality
    d. equity

12. Which of the following terms summarizes the situation in which a buyer and a seller exchange a product in a market and, as a result, both are made better off by the transaction?
    a. productive efficiency
    b. allocative efficiency
    c. voluntary exchange
    d. equity

13. What does an economy achieve by producing a good or service at the least possible cost?
    a. productive efficiency
    b. allocative efficiency
    c. voluntary exchange
    d. equity
14. Which of the following best describes the characteristics of models used in economics?
   a. Models are approximations to reality that capture as many details as possible.
   b. Models are usually complex abstractions of reality that simulate practical problems.
   c. Models are concerned with what economic policies ought to be.
   d. Models are simplifications of reality that include only essential elements and exclude less relevant details.

15. Which of the following is not an essential component of an economic model?
   a. assumptions
   b. hypotheses
   c. variables
   d. normative statements

16. What is the purpose of an economic hypothesis?
   a. to establish a behavioral assumption
   b. to establish a causal relationship
   c. to make a statement based on fact
   d. to determine the validity of statistical analyses used in testing a model

17. What type of economic analysis is concerned with the way things ought to be?
   a. positive analysis
   b. marginal analysis
   c. normative analysis
   d. rational behavior

18. What type of statement would “A minimum wage actually reduces employment” be considered?
   a. a positive statement
   b. a marginal statement
   c. a normative statement
   d. an irrational conclusion

19. Which of the following is an example of a positive question?
   a. Should the university offer free parking to students?
   b. Should the university provide more financial aid assistance to students?
   c. If the college increased tuition, would class sizes decline?
   d. Should the college cut tuition to increase enrollments?

20. Which of the following questions can be answered using normative economic reasoning?
   a. If a college offers free parking, will more students drive to campus?
   b. If a college provided more financial aid, would more students go to college?
   c. If a college hires better qualified instructors, will more students attend?
   d. Should a college cut tuition to stimulate enrollments?

21. Which of the following involves an estimation of the benefits and costs of a particular action?
   a. positive analysis
   b. normative analysis
   c. the market mechanism
   d. an irrational conclusion
22. What type of assessment is one in which a person’s values and political views form part of that assessment?
   a. a positive assessment
   b. a normative assessment
   c. a microeconomic assessment
   d. a macroeconomic assessment

23. Fill in the blank: ___________ is the study of how households and businesses make choices, how they interact in markets, and how the government influences their choices.
   a. Microeconomics
   b. Macroeconomics
   c. A market mechanism
   d. Marginal analysis

24. Which of the following covers the study of topics such as inflation and unemployment?
   a. microeconomics
   b. macroeconomics
   c. Both microeconomics and macroeconomics give equal emphasis to these problems.
   d. none of the above

25. What is the name given to the development of a new good or a new process for making a good?
   a. an invention
   b. an innovation
   c. entrepreneurship
   d. capital

26. What is the name given to the practical application of an invention?
   a. a model
   b. an innovation
   c. voluntary exchange
   d. capital

27. What is the stock of computers, factory buildings, and machine tools used to produce goods better known as?
   a. physical capital
   b. technology
   c. innovation
   d. goods and services

28. Human capital is
   a. physical capital produced by human resources.
   b. stocks and bonds that are owned by humans rather than corporations.
   c. the accumulated training and skills that workers possess.
   d. physical capital owned by humans rather than corporations.
29. Which of the following graphs shown below is the graph of a single variable?

a. A  

b. B  

c. C  

d. all of the above

30. Which of the following is a graph of the relationship between two variables?

a. the graph on the left  

b. the graph on the right  

c. both graphs  

d. neither graph

31. Fill in the blanks. The slope of a straight line equals the change in value on the __________ axis by the change in the value on the other axis between any two points on the line.

a. horizontal; multiplied  

b. horizontal; divided  

c. vertical; multiplied  

d. vertical; divided
32. Refer to the graph below. What is the value of the slope of this line?

![Graph of a demand curve with points A, B, C, D, and E.]

a. $-5$
b. $-1/5$
c. $-1$
d. There is insufficient information to compute the slope of this line.

33. Refer to the graph below. Which of the following explains why the line shifts to the right?

![Graph showing two demand curves, curve 1 and curve 2, with points A, B, and C.]

a. There was a change in the price of pizza.
b. There was a change in the quantity of pizza demanded.
c. There was a change in a third variable other than the price or quantity of pizza demanded.
d. all of the above
34. Refer to the graph below. How many variables are involved in explaining the move from point A to point C on this graph?

- a. one
- b. two
- c. three
- d. more than three, at least four

35. Suppose that there are three variables involved in the graph below: (1) quantity, (2) price, and (3) a third variable. Which of those variables causes the move from point C to point D in the graph?

- a. the first variable, quantity
- b. the second variable, price
- c. the third variable
- d. either a. or b.
36. Refer to the graph below. What is the best descriptor of the relationship between disposable personal income and consumption spending?

![Graph showing the relationship between disposable personal income and consumption spending.](image)

a. a positive relationship  
   b. a negative relationship  
   c. a relationship that is sometimes positive and sometimes negative  
   d. a relationship that may be positive and negative, but sometimes neither positive nor negative

37. Refer to the graph below. What can be said about the value of the slope of this curve?

![Graph showing the relationship between study time and points on exam.](image)

a. The value of the slope is greater between points i and j than between points g and h.  
   b. The value of the slope is greater between points g and h than between points i and j.  
   c. The value of the slope is the same between any two points along the curve.  
   d. We cannot determine whether the slope is greater between g and h or i and j because the relationship between “Points on exam” and “Study time” is not linear.
38. Let $V_1$ equal the value of a variable in period 1, and $V_2$ equal the value of the same variable in period 2. What is the rate of growth between periods 1 and 2?
   a. $\left[\frac{(V_1 + V_2)}{2}\right] \times 100$
   b. $\left[\frac{(V_2 - V_1)}{V_1}\right] \times 100$
   c. $(V_2 - V_1)/(V_1 + V_2)$
   d. $V_2 - V_1$

39. Refer to the graph below. Which of the formulas below must you apply to compute the shaded area shown on the graph?

   ![Graph](image)

   a. Base × Height
   b. $\frac{1}{2} \times$ Base × Height
   c. 2 × Base × Height
   d. none of the above

40. Refer to the graph below. What is the name of the area contained in rectangle A?

   ![Graph](image)
41. Refer to the graph below. What is the value of the shaded area shown on the graph?

![Graph of demand curve for Pepsi]

- a. $300,000
- b. $225,000
- c. $62,500
- d. $6,250

42. Refer to the graph below. What is the value of the area contained in rectangle A?

![Graph of demand curve for Pepsi]

- a. $2.00
- b. $125,000
- c. $250,000
- d. There is not enough information to determine the area.
Short Answer Questions

1. Why do economists distinguish between financial capital and physical capital?

______________________________________________________________________________
______________________________________________________________________________

2. Explain the difference between productive efficiency and allocative efficiency.

______________________________________________________________________________
______________________________________________________________________________

3. Economists rely on economic models and tests of hypotheses to analyze real-world issues. The use of models and hypothesis testing is common in the natural sciences such as physics and chemistry. Yet, economics is considered a social science, not a natural science. Why?

______________________________________________________________________________
______________________________________________________________________________
______________________________________________________________________________
______________________________________________________________________________

4. Write an example of a positive statement and an example of a normative statement.

______________________________________________________________________________
______________________________________________________________________________
______________________________________________________________________________
______________________________________________________________________________

5. Duncan Grant, a freshman economics student at John Borts University, claimed that fresh water is a necessity for all human beings. When asked by his economics instructor if he would be willing to buy a 16 ounce bottle of water for $5.00, Duncan declined. What economic principle would explain Duncan’s refusal to buy something that he insists is a necessity?

______________________________________________________________________________
______________________________________________________________________________
True/False Questions

1. Stating a hypothesis in an economic model is an example of normative analysis.  
2. An entrepreneur is someone who works for a government agency.  
3. Economists assume that human beings respond only to monetary incentives.  
4. In a centrally planned economy, the goods and services produced are always distributed equally to all citizens.  
5. Equity is achieved when economic benefits are equally distributed.  
6. A mixed economy is an economy in which the three fundamental questions (What? How? Who?) are answered by a mixture of consumers and producers.  
7. Both market economies and centrally planned economies face trade-offs when producing goods and services.  
8. When economists assume people are rational, this means that consumers and firms use available information to achieve their goals.  
9. Government intervention in the U.S. economy increased dramatically as a result of the Great Depression.  
10. Economists use normative analysis to show that the minimum wage law causes unemployment.  
11. Microeconomics is the study of how households and firms make choices, how they interact in markets, and how the government attempts to influence their choices.  
12. The slope of a straight line is the same at any point.  
13. To measure the slope of a nonlinear curve at a particular point one must draw a straight line from the origin to the point. The slope of this line is equal to the slope of the curve at that point.  
14. All societies face the economic problem of having a limited amount of economic resources.  
15. Economic models can help analyze simple real-world economic situations but are of little value in analyzing complicated economic situations.

Answers to the Self-Test

Multiple-Choice Questions

<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>d</td>
<td>In this textbook, we use economics to answer questions such as those found in all of the choices given.</td>
</tr>
<tr>
<td>2</td>
<td>b</td>
<td>This is the textbook definition of scarcity.</td>
</tr>
<tr>
<td>3</td>
<td>b</td>
<td>This is the definition of a market.</td>
</tr>
<tr>
<td>4</td>
<td>d</td>
<td>The textbook presents three important ideas: People are rational; people respond to economic incentives; optimal decisions are made at the margin.</td>
</tr>
<tr>
<td>5</td>
<td>c</td>
<td>In solving the problem, the most applicable concept is that optimal decisions are made at the margin. An activity should be continued to the point where the marginal benefit is equal to the marginal cost.</td>
</tr>
<tr>
<td>6</td>
<td>c</td>
<td>The three questions are: What goods and services will be produced? How will the goods and services be produced? Who will receive the goods and services produced?</td>
</tr>
<tr>
<td>7</td>
<td>d</td>
<td>These questions refer to the economic problem every society must solve.</td>
</tr>
<tr>
<td>8</td>
<td>c</td>
<td>A centrally planned economy is an economy in which the government decides how economic resources will be allocated.</td>
</tr>
<tr>
<td>9</td>
<td>b</td>
<td>A mixed economy is an economy in which most economic decisions result from</td>
</tr>
</tbody>
</table>
the interaction of buyers and sellers in markets, but where the government plays a significant role in the allocation of resources.

10. d  Equity, or fairness, refers to the fair distribution of economic benefits.
11. b  This is a state of the economy in which production reflects consumer preferences; in particular, every good or service is produced up to the point where the last unit produced provides a marginal benefit to consumers equal to the marginal cost of producing it.
12. c  This occurs in markets when both the buyer and the seller of a product are made better off by the transaction.
13. a  Productive efficiency occurs when a good or service is produced at the lowest possible cost.
14. d  Economic models are simplified versions of some aspects of economic life used to analyze economic issues.
15. d  Normative statements, statements concerned with what ought to be, are not components of an economic model.
16. b  An economic hypothesis is usually about a causal relationship, or how one thing affects another.
17. c  Normative analysis is analysis concerned with “what ought to be.”
18. a  Positive statements describe “what is.” A positive analysis of the minimum wage law would use a model to estimate how many workers lost their jobs because of the law, its impact on firms, and the gains to workers who received the minimum wage.
19. c  This question objectively examines a relationship between tuition and class sizes, or “what is.”
20. d  This is a question of “what ought to be.”
21. a  Positive analysis uses economic models to estimate the benefit and cost of a particular action. Positive questions are questions that can be tested.
22. b  A normative assessment would concern what a person believed “ought to be,” not “what is.” The assessment would be influenced by the person’s values and political beliefs.
23. a  This is the definition of microeconomics.
24. b  Macroeconomics is the study of the economy as a whole, including topics such as inflation, unemployment, and economic growth.
25. a  An invention is the development of a new good or a new process for making a good.
26. b  An innovation is the application of an invention.
27. a  In economics, capital refers to physical capital, which includes manufactured goods that are used to produce other goods and services.
28. c  This is the definition of human capital. For example, college-educated workers generally have more skills and are more productive than workers who have only high school degrees.
29. d  The bar chart, pie chart, and time series graph are all graphs of a single variable.
30. a  The graph on the left shows the relationship between two variables: price and quantity demanded.
31. d  The slope of a line equals the change in the value on the vertical axis divided by the change in the value on the horizontal axis. The slope is sometimes referred to as “the rise over the run”.
32. b  Along this line, the value of the slope is the same between any two points. As an example, as we move from B (55, 14) to C (60, 13), the value of rise is (13 − 14) = −1 and the value of the run is (55 − 60) = −5. Therefore, the value of the slope is −1/5.
Shifting a line involves taking into account more than two variables on a graph. In this case, something other than the price of pizza has changed, causing the demand curve to shift to the right. As a result, the quantity of pizza demanded is greater for each of the prices shown.

The movement from A to C is explained by one and only one thing: a change in price. The (quantity demanded, price) combination at A is different from that at C, but the movement from A to C is explained by a change in only one variable: price.

A shift of the demand curve is caused by a change in something other than price, such as a change in income. For each price, the quantity of pizza demanded is less than it was before.

An upward sloping line shows that the relationship between two variables is positive, that is, the variables change in the same direction.

As you move upward along the curve, the value of the slope decreases. The slope between g and h is greater than the slope between i and j.

This is the formula for computing a percentage change or a growth rate.

You are computing the area of a triangle, which is \( \frac{1}{2} \times \text{Base} \times \text{Height} \).

Total revenue equals price \( \times \) quantity, which is the area of the rectangle (Base \( \times \) Height).

The area of the triangle is \( \frac{1}{2} \times (150,000 - 125,000) \times ($2.00 - $1.50) = $6,250 \).

The area of the rectangle is equal to $2.00/bottle \( \times \) 125,000 bottles = $250,000, which is $250,000 in total revenue.

**Short Answer Responses**

1. Economists distinguish financial capital and physical capital because only physical capital (for example, machinery, tools, and buildings) is a productive resource. Financial capital includes stocks, bonds, and holdings of money. Financial capital is not part of a country’s capital stock, because financial capital does not produce output.

2. Productive efficiency is the situation in which a good or service is produced at the lowest possible cost. Allocative efficiency is a state of the economy in which production reflects consumer preferences: every good or service is produced to the point at which the last unit provides a marginal benefit to consumers equal to the marginal cost of producing it.

3. Economics, unlike physics and chemistry, is a social science because it applies the use of models and hypothesis testing to the study of the interactions of people.

4. Positive statements are statements of facts, or statements that can be proven to be correct or incorrect. For example: “Abraham Lincoln was the 15th president of the United States.” (This is a false statement—Lincoln was the 16th president—but it is still a positive statement.) A normative statement is an opinion or a statement of what should or ought to be. For example: “The United States should elect a female as president of the United States.”

5. The principle that best describes Duncan’s refusal to pay for the bottle of water is marginal analysis. The total benefit to people from fresh water is very high but the marginal benefit of water—the benefit to Duncan from an additional 16 ounces of water—is very low. Duncan probably is not very thirsty. If Duncan had not had anything to drink for two days, the benefit to him of the next 16 ounces of water he drinks would be much higher, and he might have been willing to pay the $5, or more, for a bottle of water.
True/False Answers

1. F A hypothesis is a testable statement about how the world is.
2. F An entrepreneur is someone who operates a business.
3. F Economists believe people respond to incentives, but incentives may be monetary or nonmonetary.
4. F The distribution of goods and services is determined by the government, so goods and services may or may not be distributed equally.
5. F People differ on what they believe is equitable or fair.
6. F A mixed economy is one in which government influence on the choices of buyers and sellers is greater than in a market economy.
7. T All economies face trade-offs due to scarce resources.
8. T See page 5 in the textbook.
9. T The high number of bankruptcies and high level of unemployment resulted in greater government intervention. See the section titled “The Modern ‘Mixed’ Economy” on page 9 in the textbook.
10. F Economists would use positive economic analysis to address this issue.
11. T This is the definition of microeconomics.
12. T A straight line has a constant slope.
13. F The slope of a point on a nonlinear curve is measured by the slope of a tangent to the curve at that point.
14. T That all societies must make choices about how to use their scarce resources is a fundamental assumption of economics.
15. F Economic models provide a foundation to analyze both simplistic and complicated economic situations.