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The Scope and Method of Economics

Chapter objectives:

1. Define economics.
2. State four reasons for studying economics.
3. Distinguish between the concepts of opportunity cost and marginal cost.
4. Define market efficiency in terms of profit opportunities.
5. Make clear the difference between microeconomic and macroeconomic concerns.
6. Distinguish between positive economics and normative economics.
7. Explain the value of the *ceteris paribus* assumption within the context of economic modeling.
8. State the fallacies discussed in the text, give examples, and explain *why* such statements are fallacious.
9. State and explain the four criteria used to assess the outcomes of economic policy.
10. Construct and interpret graphs and linear equations.

Much of this chapter is devoted to setting out the framework of economics. Don't be overwhelmed and don't try to remember it all. Chapter 1 is simply a good place to gather together this information, which will be dealt with more fully as the chapters go by.

BRAIN TEASER: An increasing number of basketball players move directly to the NBA draft without graduating from college. Some, such as LeBron James, even go to the NBA straight from high school. James, the first pick in the NBA draft of 2003, went to the Cleveland Cavaliers with whom he signed a three-year, $12.96 million contract. He also signed a $90 million endorsement deal with Nike. What was the opportunity cost for LeBron James of choosing to go directly to the NBA, given that he was eligible for college?

SOLUTION: The answer to this and subsequent brain teasers will be found after our discussion of the learning objectives and before the Practice Tests.

OBJECTIVE 1:
Define economics.

Because of conditions imposed by nature and the choices previously made by society, resources are scarce. Economics studies how we choose to use these resources to best satisfy society's unlimited wants. In a sense, economics is the "scientific study of rational choice." (page 1)

Practice

1. Which one of the following best describes the study of economics? Economics studies
   (a) how businesses can make profits.
   (b) how the government controls the economy and how people earn a living.
   (c) how society uses its scarce resources to satisfy its unlimited desires.
   (d) the allocation of income among different sectors of the economy.

   ANSWER: (c) All of the options represent aspects of the study of economics. However, the most general statement is given in Option (c)—economics is the study of choice. ■

OBJECTIVE 2:
State four reasons for studying economics.

A study of economics helps one to learn a way of thinking, to understand society, to understand national and global affairs, and to be an informed citizen. Essential to the economic way of thinking is the concept of "opportunity cost"—choices involve forgoing some options. Accordingly, the applicability of the economic way of thinking is very extensive. (page 2)

OBJECTIVE 3:
Distinguish between the concepts of opportunity cost and marginal cost.

"Marginal" is a frequently used term in economics and it's important to understand it right away. "Marginal" means "additional" or "extra." "Marginal cost," then, means "additional cost."

Suppose you buy a nonreturnable, nontransferable ticket to the zoo for $10. This is not an additional cost. You've paid whether or not you visit the zoo.

Let's change the example a little. Suppose you win a free admission to the zoo and decide to go this Saturday. The trip is not entirely free, however. You still have to bear some costs—travel, for example. There is certainly an additional cost (caused by the trip to the zoo). It is a *marginal cost*. Suppose you always buy lunch on Saturdays. The cost of lunch is not a marginal cost as you'd have had lunch whether or not you went to the zoo. The cost of lunch is not contingent on the trip to the zoo—it's not an extra cost.

If wants exceed the resources to satisfy them, choices must be made and some alternatives must be forgone. You choose to visit the zoo this Saturday. The *opportunity cost* is the value of the activity you would have undertaken instead—that is, the next most-preferred activity. Perhaps it might be playing a round of golf or studying for a big economics test. The opportunity cost of the trip to the zoo is the value you attach to that *one* activity you would otherwise have chosen. (page 2)

Opportunity Cost and Marginalism: The "big concept" in this chapter is *opportunity cost*, with *marginalism* and *efficiency* a close second and third. You'll see all three repeatedly throughout the textbook. For practice on the concept of opportunity cost, try Application Questions 4 and 6 below in this chapter. For practice on marginal thinking, look at Application Question 7 below.

◗◗◗ LEARNING TIP: Any time you make a choice where one alternative is chosen over others, remember that an opportunity cost is involved.◖

Practice

2. Your opportunity cost of attending college does not include
   (a) the money you spend on meals while at college.
   (b) your tuition.
   (c) the money you spend on traveling between home and college.
   (d) the income you could have earned if you'd been employed full-time.

   ANSWER: (a) You would have bought food whether or not you were at college. All the other expenses occur solely because of attending college.

3. _____ may be defined as the extra cost associated with an action.
   (a) Marginal cost
   (b) Operational cost
   (c) Opportunity cost
   (d) Action cost

   ANSWER: (a) Refer to p. 2. Marginalism is a fundamental tool of economic analysis.

4. Jean owns a French restaurant—*La Crème*. Simply to operate this week, he must pay rent, taxes, wages, food costs, and so on. This amounts to $1,000 per week. This evening, a diner arrives and orders a bottle of Château Neuf du Pape wine to go with her meal. Jean has none and sends out to Wine World for a bottle. It costs $20, and Jean charges his guest $30. Which of the following is true for Jean?
   (a) The marginal cost of the wine is $20.
   (b) The marginal cost of the wine is $30.
   (c) The efficiency cost of the meal is $1,020.
   (d) The efficiency cost of the meal is $1,030.

   ANSWER: (a) The up-front expense is $1,000. The extra cost that Jean bears for buying the wine is $20. "Efficiency cost" is not a real term.■

ECONOMICS IN PRACTICE: Your textbook offers (page 6), as its example of "economics in practice" for this chapter, the case of Apple's iPod. Where is it manufactured? It's a more difficult question to answer than it might at first appear. Our northern neighbor and most important trading partner, Canada, imports 34% of its merchandise. Although the United States imports only 15% of its overall production, most of the goods that you buy do contain "foreign content". Can you think of any goods that are purely domestically produced? Of course, we don't buy only goods? What else do we buy? Are those items more likely to be domestically produced and, if so, why?

ANSWER: Agricultural produce, perhaps bought at a farmers' market, is (almost by definition) "home-grown). Even here, though, the labor used to harvest the crop may be foreign, as may other factors used in production, such as oil or fertilizer. Goods frequently have high levels of foreign content, but this is less true of services. Although your computer support may originate in Banglalore, India, your hairdresser, car mechanic or accountant offers services with a high domestic content. Services are more likely to have a relatively high domestic content because it's usually more difficult to transport services than goods.

OBJECTIVE 4:
Define market efficiency in terms of profit opportunities.

The rapid elimination of profit opportunities is a signal that a market is operating efficiently. The stock market is a good example. If a firm's stock is priced "too low," increased bidding will drive the price higher, eliminating the excess profits. At a farmers' market, Farmer Brown may charge $1.20 for a dozen eggs, although the going rate is $1.00. She might make excess profits for a while, but this will not persist in an efficient market. This means that sustained high profits indicate the presence of an inefficient market. (page 3)

OBJECTIVE 5:
Make clear the difference between microeconomic and macroeconomic concerns.

Economics is split into two broad parts. *Microeconomics* focuses on the operation of individual markets and the choices of individual economic units (firms and households). *Macroeconomics* deals with broad economic variables such as national production, total consumer spending, and overall price movements. Economics also contains a number of subfields, such as international economics, labor economics, and industrial organization. (page 7)

Practice

5. **Macroeconomics** approaches the study of economics from the viewpoint of
   (a) individual consumers.
   (b) the government.
   (c) the entire economy.
   (d) the operation of specific markets.

   ANSWER: (c) Macroeconomics looks at the big picture—the entire economy.

6. **Microeconomics** approaches the study of economics from the viewpoint of
   (a) the entire economy.
   (b) the government.
   (c) the operation of specific markets.
   (d) the stock market.

   ANSWER: (c) Microeconomics examines what is happening with individual economic units (households and firms) and how they interact in specific markets.

7. Which of the following is most appropriately a microeconomic issue?
   (a) The study of the relationship between the unemployment rate and the inflation rate
   (b) The forces determining the price level in an individual market
   (c) The determination of total output in the economy
   (d) The aggregate behavior of all decision-making units in the economy

   ANSWER: (b) Microeconomics examines what is happening with individual economic units (households and firms) and how they interact in specific markets. ■

OBJECTIVE 6:
Distinguish between positive economics and normative economics.

Economists classify issues as either positive or normative. Positive questions explore the behavior of the economy and its participants without judging whether the behavior is good or bad. *Positive economics* collects data that describe economic phenomena (descriptive economics) and constructs testable (cause-and-effect) theories to explain the phenomena (economic theory). *Normative economic questions* evaluate the results of behavior and explore whether the outcomes might be improved. (page 10)

Practice

8. A difference between positive statements and normative statements is that
   (a) positive statements are true by definition.
   (b) only positive statements are subject to empirical verification.
   (c) economists use positive statements and politicians use normative statements when discussing economic matters.
   (d) positive statements require value judgments.

   ANSWER: (b) A positive statement is not necessarily true by definition and can be disproved by empirical verification. ■

OBJECTIVE 7:
Explain the value of the *ceteris paribus* assumption within the context of economic modeling.

Economists (and other scientists) construct models—formal statements of relationships between variables of interest—that simplify and abstract from reality. Graphs, words, or equations can be used to express a model. In testing the relationships between variables within a model it is convenient to assume *ceteris paribus*, that all other variables have been held constant. (page 11)

Models focus on the most essential elements under examination. Distracting real-world detail is set aside. Many factors may have affected your decision to buy Case, Fair and Oster's textbook—theory attempts to isolate the key factors.

Practice

9. "An increase in the price of shampoo will cause less shampoo to be demanded, *ceteris paribus*." *Ceteris paribus* means that
   (a) there is a negative relationship between the price and quantity demanded of shampoo.
   (b) the price of shampoo is the only factor that can affect the amount of shampoo demanded.
   (c) other factors may affect the amount of shampoo demanded but that these are assumed not to change in this analysis.
   (d) the price of shampoo is equal for all buyers.

   ANSWER: (c) The price of shampoo is equal for all buyers, and there may be a negative relationship between the price and quantity of shampoo demanded, but *ceteris paribus* means that any other factors that may affect the amount of shampoo demanded are assumed to be constant. ■

OBJECTIVE 8:
State the fallacies discussed in the text, give examples, and explain *why* such statements are fallacious.

Beware false logic! The *fallacy of composition* involves the claim that what is good for one individual remains good when it happens for many. If one farmer gains by having a bumper harvest it *doesn't* mean that all farmers will gain if each has a bumper crop. The *post hoc, ergo propter hoc* fallacy occurs when we assume that an event that happens after another is caused by it. (page 12)

Two examples of the fallacy of composition: One person at a football game who stands up to see a good play derives a benefit—therefore, all will benefit similarly if the entire crowd stands up. Running to the exit when there is a fire in a theater will increase your chances of survival—therefore, in a fire, we should all run for the exit.

Practice

10. Which of the following is **not** an example of the fallacy of composition?
    (a) Jane leaves work at 4:00 each day and avoids the rush-hour traffic at 5:00. Therefore, if businesses regularly closed at 4:00, all commuters would avoid the rush-hour traffic.
    (b) John stands up so that he can see an exciting football play. Therefore, if the entire crowd stands up when there is an exciting play, all spectators will get a better view.
    (c) Because society benefits from the operation of efficient markets, IBM will benefit if markets become more efficient.
    (d) Because Mary on her own can escape from a burning building by running outside, individuals in a crowded movie theater are advised to run outside when there is a fire.

    ANSWER: (c) This example is arguing from the general to the specific. The fallacy of composition argues from the specific to the general. ■

OBJECTIVE 9:
State and explain the four criteria used to assess the outcomes of economic policy.

Economists construct and test models to aid policy making. Policy makers generally judge proposals in terms of efficiency, equity (fairness), growth, and stability. (page 14)

Practice

11. The nation of Arboc claims to have achieved an equitable distribution of income among its citizens. On visiting Arboc, we would expect to find that
    (a) each citizen receives the same amount of income.
    (b) Arbocali residents believe that the distribution of income is fair.
    (c) Arbocali residents believe that the distribution of income is equal.
    (d) each citizen receives the amount of income justified by the value of his or her contribution to production.

    ANSWER: (b) Whether or not the distribution of income is equitable depends on what Arbocali citizens believe to be fair.

Use the following information to answer the next two questions. Nicola and Alexander each have some dollars and some apples. Nicola values a pound of apples at $3 whereas Alexander values a pound of apples at $1.

12. In which of the following cases has an allocatively efficient trade taken place?
    (a) The market price of apples is $3 per pound. Nicola sells apples to Alexander.
    (b) The market price of apples is $1 per pound. Nicola sells apples to Alexander.
    (c) The market price of apples is $2 per pound. Nicola sells apples to Alexander.
    (d) The market price of apples is $2 per pound. Alexander sells apples to Nicola.

    ANSWER: (d) When the market price of apples is $2 per pound and Alexander is the seller, he gains $1. Nicola also gains because she receives goods she values at $3 for a payment of only $2.

13. In which of the following cases has an allocatively efficient trade **not** taken place?
    (a) The market price of apples is $3 per pound. Alexander sells apples to Nicola.
    (b) The market price of apples is $1.50 per pound. Alexander sells apples to Nicola.
    (c) The market price of apples is $1.50 per pound. Nicola sells apples to Alexander.
    (d) The market price of apples is $2 per pound. Alexander sells apples to Nicola.

    ANSWER: (c) An efficient trade can occur only when some participant is better off and no participant is worse off (or if the gainer can adequately compensate the loser). In Option (a), Alexander gains $2 and Nicola does not lose. In Option (b), Nicola and Alexander both gain. In Option (d), Alexander and Nicola both gain. In Option (c), Alexander gains 50¢ but Nicola loses $1.50. ■

OBJECTIVE 10 (APPENDIX):
Construct and interpret graphs and linear equations.

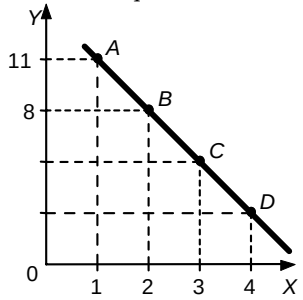
Economic graphs depict the relationship between variables. A curve with a "rising" (positive) slope indicates that as one variable increases, so does the other. A curve with a "falling" (negative) slope indicates that as one variable increases in value, the other decreases in value. Slope is easily measured by "rise over run"—the extent of vertical change divided by the extent of horizontal change. (page 18)

◗◗◗ LEARNING TIP: It is a natural tendency to shy away from graphs—they may seem threatening—but this is a mistake. To work with economic concepts, you must master all the tools in the economist's tool kit. Economists almost automatically begin to scribble diagrams when asked to explain ideas, and you'll need to learn how to use the tools of the trade. In economics, graphs often feature financial variables like "price," "the interest rate," or "income." Usually the dependent variable is placed on the vertical axis and the independent variable on the horizontal axis. In graphing economic variables, it's a pretty safe bet that the *financial* variable will go on the vertical axis every time. Application Questions 9 and 10 and the Graphing Tutorial below offer some graphing practice.◖

◗◗◗ LEARNING TIP: Examine the graphs you see accompanying economics-based articles in the daily newspaper or news magazines. It's common to find examples of deceptive graphs, especially when variables are being compared over time. A graph comparing, say, the difference between government spending and tax revenues can be quite misleading if the vertical axis does not start at zero.◖

Practice

Use the following diagram to answer the next four questions.



14. In the diagram, the slope of the line is
    (a) positive and variable.
    (b) positive and constant.
    (c) negative and variable.
    (d) negative and constant.

    ANSWER: (d) The diagram shows a straight line—straight lines have a constant slope. Visually, or by using the "rise over run" formula, the relationship is negative because, as one variable increases in value, the other decreases in value.

15. The slope of line between Point *A* and Point *B* is
    (a) 3.
    (b) 1/3.
    (c) –3.
    (d) –1/3.

    ANSWER: (c) Use the "rise over run" formula. The rise is –3 (from 11 to 8) and the run is +1 (from 1 to 2).

16. At Point *D*, the value of *Y* is
    (a) –3.
    (b) 3.
    (c) 5.
    (d) 2.

    ANSWER: (d) As *X* "steps up" in value by 1, *Y* "steps down" in value by 3. At Point *B*, *X* has a value of 2 and *Y* has a value of 8. Moving to Point *D*, *X* increases by 2 and *Y* decreases by 6, from 8 to 2.

17. In the diagram, when the line reaches the vertical (*Y*) axis the value of *Y* will be
    (a) 3.
    (b) 8.
    (c) 11.
    (d) 14.

    ANSWER: (d) As *X* "steps down" in value by 1, *Y* "steps up" in value by 3. At Point *A*, *X* has a value of 1 and *Y* has a value of 11. *X* decreases by 1 and *Y* increases by 3, from 11 to 14. ■

BRAIN TEASER SOLUTION: James's opportunity cost was the value of the next most-preferred alternative to going to the NBA. We might assume that that choice would be college. Was it a sensible choice for him? In fact, it's a no-brainer. Taking only the three-year contract amount of $12.96 million, and dividing by 40 (earning years), James would have to have averaged $324,000 per year from his college degree to match his earnings. You should note that the present discounted value of those earnings decades into the future will be significantly less than $324,000. Also, we are ignoring any earnings James might have made in addition to the sum from the player's contract, for example, the Nike endorsement or income from future contracts. So, not only was LeBron James a talented basketball player, but he had a solid grasp of economics!

PRACTICE TEST

I. MULTIPLE-CHOICE QUESTIONS

Select the option that provides the single best answer.

_____ 1. Local farmers reduce the price of their tomatoes at the farmers' market. The price of corn is 30¢ per ear. A passing economist theorizes that, *ceteris paribus*, buyers will purchase more tomatoes than before. Which of the following is TRUE? The economist is
(a) implying that the price of tomatoes will fall even further.
(b) assuming that the price of corn will remain at 30¢ per ear.
(c) assuming that tomatoes are of a better quality than before.
(d) implying that corn is of a poorer quality than before.

_____ 2. Which of the following is **not** given in the textbook as a criterion for judging the results of economic policy?
(a) Economic stability
(b) Employment
(c) Efficiency
(d) Equity

_____ 3. Economic growth may occur if
(a) more machines become available.
(b) more workers become available.
(c) workers become more efficient.
(d) All of the above

_____ 4. Economics is the study of how
(a) scarce resources are used to satisfy unlimited wants.
(b) we choose to use unlimited resources.
(c) limitless resources are used to satisfy scarce wants.
(d) society has no choices.

_____ 5. The opportunity cost of Choice *X* can be defined as
(a) the cheapest alternative to Choice *X*.
(b) the most highly valued alternative to Choice *X*.
(c) the price paid to obtain *X*.
(d) the most highly priced alternative to Choice *X*.

_____ 6. In economics, efficiency means that
(a) income is distributed equally among all citizens.
(b) there is a low level of inflation and full unemployment of economic resources.
(c) total productivity is increasing at a constant and equal rate within each sector of the economy.
(d) the economy is producing those goods and services that citizens desire and is doing so at the least possible cost.

_____ 7. Which of the following statements is true?
(a) Microeconomics studies consumer behavior, whereas macroeconomics studies producer behavior.
(b) Microeconomics studies producer behavior, whereas macroeconomics studies consumer behavior.
(c) Microeconomics studies behavior of individual households and firms, whereas macroeconomics studies national aggregates.
(d) Microeconomics studies inflation and opportunity costs, whereas macroeconomics studies unemployment and marginal costs.

_____ 8. Which of the following statements is true?
(a) There is a positive relationship between the price of a product and the quantity demanded.
(b) There is a positive relationship between the number of umbrellas bought and the amount of rainfall.
(c) There is a negative relationship between height and weight.
(d) There is a negative relationship between sales of ice cream and noon temperature.

_____ 9. Oliver Sudden discovers that if he cuts the price of his tomatoes at the farmers' market, his sales revenue increases. Expecting similar results, all the other tomato sellers follow his example. They are guilty of committing
(a) the fallacy of composition.
(b) the fallacy of *post hoc, ergo propter hoc*.
(c) the fallacy of correlation.
(d) *ceteris paribus*.

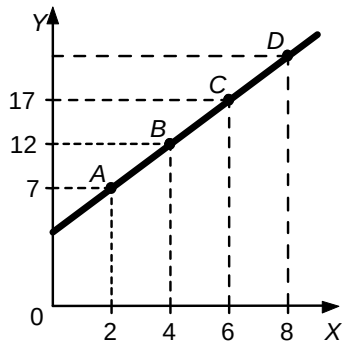
_____ 10. The quantity of six-packs of Quite Lite beer demanded per week (Qd) in Hometown is described by the following equation:

$$Qd = 400 - 100P,$$

where P (in dollars) is the price of a six-pack. This equation predicts that
(a) 300 six-packs will be bought this week.
(b) a $1 rise in price will cause 100 more six-packs to be bought this week.
(c) 300 six-packs will be bought per $100 this week.
(d) a 50¢ rise in price will cause 50 fewer six-packs to be bought this week.

_____ 11. The *ceteris paribus* assumption is used to
(a) make economic theory more realistic.
(b) make economic analysis more realistic.
(c) avoid the fallacy of composition.
(d) focus the analysis on the effect of a single factor.

Use the following diagram below to answer the next four questions.



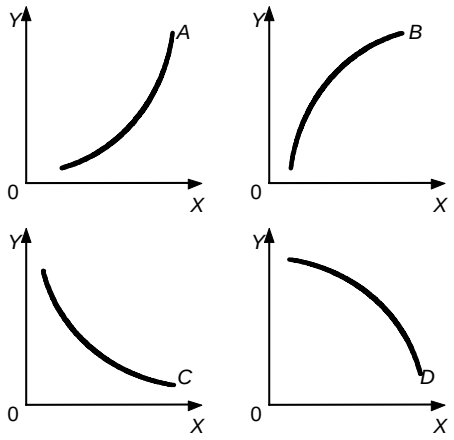
_____ 12. In the preceding diagram, the slope of the line is
(a) positive and variable.
(b) positive and constant.
(c) negative and variable.
(d) negative and constant.

_____ 13. In the preceding diagram, the slope of the line between Point *A* and Point *B* is
(a) 5/2.
(b) 2/5.
(c) –2/5.
(d) –5/2.

_____ 14. In the preceding diagram, at Point *D*, the value of *Y* is
(a) 5.
(b) 8.
(c) 19.5.
(d) 22.

_____ 15. In the preceding diagram, when the line reaches the vertical (*Y*) axis the value of *Y* will be
(a) 2.
(b) 5/2.
(c) 7.
(d) 12.

Use the following diagrams to answer the next four questions.



_____ 16. Of the four curves, which curve has a slope that is negative and decreasing?
(a) *A*
(b) *B*
(c) *C*
(d) *D*

_____ 17. Of the four curves, which curve has a slope that is positive and increasing?
(a) *A*
(b) *B*
(c) *C*
(d) *D*

_____ 18. Of the four curves, which curve has a slope that is positive and decreasing?
(a) *A*
(b) *B*
(c) *C*
(d) *D*

_____ 19. Of the four curves, which curve appears to be described by the equation $y = x^2$?
(a) *A*
(b) *B*
(c) *C*
(d) *D*

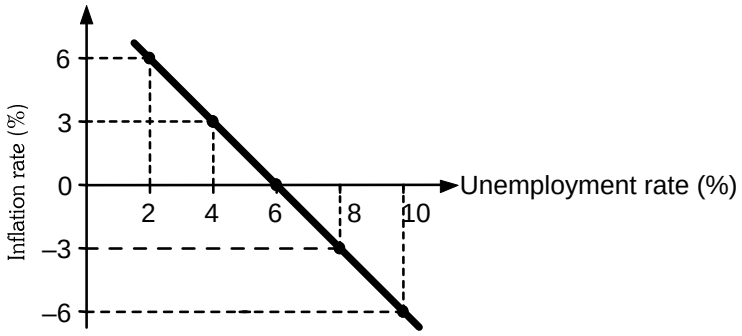
_____ 20. During the debate about balancing the federal government's budget, it was proposed that Medicaid benefits be reduced. This proposal was criticized because low-income families (who receive Medicaid) would spend a higher percentage of their income on medical services than high-income families would spend. This argument was based on concerns about
(a) economic growth.
(b) efficiency.
(c) economic stability.
(d) equity.

_____ 21. The Channel Tunnel, linking the United Kingdom and France, was originally planned to cost $100 million. After work had begun and the two excavators were under the English Channel, with $70 million already spent, the estimate of the total bill was revised to $150 million. At this point the marginal cost of completion was best estimated as
(a) $30 million.
(b) $50 million.
(c) $70 million.
(d) $80 million.

II. APPLICATION QUESTIONS

1. The small nation of Smogland is unhappily situated in a valley surrounded by mountains. Smogland's Secretary of the Environment has determined that there are 4,000 cars in operation, each of which pollutes the air. In fact, Smogland's air is so unhealthy that it is rated as "hazardous." If emission controls, costing $50 per car, are introduced, the air quality will improve to a rating of "fair." A survey has revealed that of the 40,000 inhabitants, 10,000 would value the air quality improvement at $5 each, and the other 30,000 would value it at $7 each. The Secretary of the Environment has asked you to analyze the issue and make a recommendation. Should emission controls be introduced?

2. Refer to the following diagram, which plots inflation rate and unemployment rate.



(a) Construct a table from the data presented in the diagram.
(b) Calculate the slope of the line.
(c) What is the inflation rate when the unemployment rate is 9%?
(d) What is the inflation rate when the unemployment rate is 5%?

3. What are some elements of the opportunity cost of "clean" air? In total, the "cost" of cleaner air increases as we remove more and more pollution. Do you think, however, that the extra (marginal) cost of cleaner air increases as we progressively remove pollution? Graph the behavior of "extra cost" (vertical axis) and "cleanness of air" (horizontal axis).

4. Suppose that the opportunity cost of attending today's economics class is study time for a math test. By not studying you will lose 15 points on your test. Attending the econ. class will increase your future econ. test score by no more than three points. Was your choice—to attend the econ. class—rational?

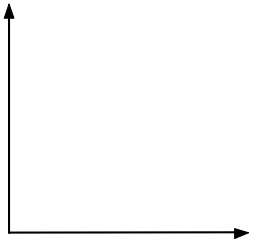
5. You have a summer internship in a bank just before your senior year. You are "noticed" and are offered a full-time position in the bank, with a salary of $35,000 a year. A rival bank, keen to attract you, offers you $37,000 for a similar position. After much thought, you decide to return to college to complete your economics degree. Based on the information given, what was the opportunity cost of your decision?

   If you had chosen one of the banking jobs instead of resuming your studies, how could you have explained your decision to your parents, who would have pointed out that you would have "wasted" three years of college?

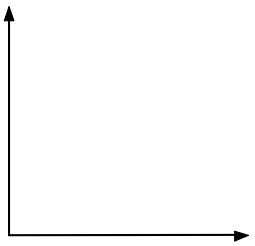
6. Choose a local natural resource with which you are familiar, e.g., an acre of farmland or a nearby lake.
   (a) List three alternative uses for your chosen raw material.
   (b) Choose one of the three uses. What is the opportunity cost of this use? Should you include the cost of clean-up (if this is appropriate) following use?
   (c) Is the resource renewable or not? If not, should this be factored into your calculations?
   (d) Describe how your community has chosen to use the resource so far, if at all. Who and what have determined that choice?

7. You're offered three deals, each of which will give you $11 in return for $8. Your profit will be $3 in each case. *Deal A* is a straight swap—$11 for $8.
   Deal B involves four steps and you can quit at any point.
   Step 1. $5 in exchange for $2
   Step 2. $3 for $2
   Step 3. $2 for $2
   Step 4. $1 for $2
   What would you do? Go all the way through the four steps and collect a total of $3 profit? A better solution, stopping after two steps, would yield $4.
   Deal C also involves four steps.
   Step 1. $4 in exchange for $1
   Step 2. $4 for $2
   Step 3. $2 for $2
   Step 4. $1 for $3
   Would you collect your $3 profit or stop after two steps and gain $5?
   Moral: If you assess the effects of extra (marginal) steps, you can raise your profits above $3. Without examining each step, the chance of greater profits would have been missed.

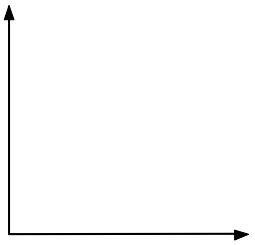
8. Using your intuition, graph each of the following relationships in the space below.
   (a) Height and weight of adult females.
   (b) Height and weight of adult males (on the same graph).



   (c) Do these lines have a positive slope or negative slope?
   (d) Have you drawn the relationships differently? If so, why? By referring to your own observations, you have constructed a model!
   (e) Which factors have you "held constant"?
   (f) (i) In the space following, sketch the relationship between the price of California wine and the consumption of California wine. Use your intuition.
   (ii) According to your theory and your diagram, is there any point, even if wine is free, at which consumers will not wish to buy any more wine?
   (iii) Will the total number of dollars spent on wine remain the same at every price level?



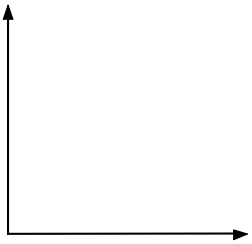
   (g) (i) In the space following, sketch the relationship between the interest rate and house purchases. Use your intuition.
   (ii) According to your theory and your graph, is there any interest rate that will completely deter house purchases?



9. Suppose there is a relationship between two variables, *X* (on the horizontal axis) and *Y* (on the vertical axis), and that you have collected the following data.

X	2	4	6	8	10
Y	5	6	7	8	9

(a) Do we have a positive or a negative relationship?
(b) Describe (in words) what these data would look like graphically.
(c) Calculate the slope (rise over run) of the line.
(d) Graph the relationship here.



10. You have a new brand of low-alcohol, reduced-calorie beer, "Quite Lite," that you intend to market. What variables do you think will be important in determining the amount of Quite Lite that people will want to buy? You should be able to develop a fairly long list of variables. You have begun to construct an economic model of consumption behavior. Now prune down your list to include, say, the five most important variables.

Now work out in which way each variable will impact the consumption of Quite Lite. You should be able to work out a specific cause-and-effect pattern in each case. A higher price for Quite Lite should cause less to be bought. A price hike for competing beers should increase the demand for Quite Lite. Note that not all variables have been included in the model; an all-inclusive list would (1) be cumbersome and (2) distract from the major elements in the model. You have wielded Ockham's razor!

The variables that you have compiled in your list will be continually changing their values. To isolate the effect of any one on the consumption of Quite Lite, you must invoke the *ceteris paribus* assumption. You might think of this as being the economic equivalent of the "standard temperature and pressure" conditions applied in the natural sciences.

Use the model that you developed for Quite Lite beer. Putting "quantity demanded" on the horizontal axis, graph each of the relationships in the model.

11. Which of the following statements are positive and which are normative?
(a) The moon is made of green cheese.
(b) States to the west of the Mississippi have lower state income tax rates than states to the east have.
(c) The federal government should be made to balance its budget.
(d) The most serious economic problem confronting the nation is unemployment.
(e) We should abolish the minimum wage.
(f) We should index-link the minimum wage to the rate of price inflation.
(g) If the federal budget deficit is reduced, then interest rates will decrease.

12. Which of the following—your campus bookstore or Amazon.com—is more likely to be efficient and why?

13. Opportunity cost may well be the biggest concept in all of economics—it's everywhere. Any time you make a choice, you choose to get something and you necessarily choose to give up the next-best alternative. Consider your Economics course. What is the opportunity cost of your course?

14. Some time ago, you bought a ticket for a concert by a local group, Saxon Violins, for $40. However, more recently, a friend invited you to a party that you'd much prefer to attend. All your efforts to sell your concert ticket have been unsuccessful. Should you go to the concert, which you've paid for, or to the party?

PRACTICE TEST SOLUTIONS

I. Solutions to Multiple-Choice Questions

1. (b) If the price of corn fell, perhaps very sharply, buyers might buy more corn and fewer tomatoes. Therefore, the economist is assuming that the price of corn is not going to change. That's what *ceteris paribus* implies.

2. (b) Unemployment is certainly an important economic variable, but it is not one of the criteria for evaluating the results of economic policy. Refer to p. 14.

3. (d) Growth will occur if resources become more plentiful or more productive.

4. (a) Economics is about choice—how we ration scarce resources to meet limitless wants.

5. (b) Price is not necessarily a reliable guide to value for a particular individual. Opportunity cost is the measure of the value placed on the next most-preferred item forgone as a result of Choice *X*.

6. (d) Efficiency means that producers are using the least costly method of production to supply those goods that are desired by consumers.

7. (c) To review the micro/macro distinction, refer to p. 8.

8. (b) There is a *negative* relationship between price and quantity demanded, so A is incorrect. The greater the rainfall, the larger the number of umbrellas bought.

9. (a) Just because an action done by one individual produces a given outcome, the same action done by many need not.

10. (d) Put in numbers. If P = \$2, then Qd will equal 400 – 100(2), or 200. If the price rises by 50¢, then Qd will equal 400 – 100(2.5), or 150—a fall of 50.

11. (d) The *ceteris paribus* assumption freezes the effect of all but one change so that the effects of that change may be examined.

12. (b) The diagram shows a straight line—straight lines have a constant slope. Visually, or by using the "rise over run" formula, the relationship is positive because, as one variable increases in value, the other also increases in value.

13. (a) Use the "rise over run" formula. The rise is +5 (*Y* goes from 7 to 12) and the run is +2 (*X* goes from 2 to 4).

14. (d) As *X* "steps up" in value by 2, *Y* "steps up" in value by 5. At Point *C*, *X* has a value of 6 and *Y* has a value of 17. Moving to Point *D*, *X* rises by 2 and *Y* rises by 5, from 17 to 22.

15. (a) As *X* "steps down" in value by 2, *Y* "steps down" in value by 5. At Point *A*, *X* has a value of 2 and *Y* has a value of 7. *X* decreases by 2 and *Y* decreases by 5, from 7 to 2.

16. (c) The relationship shows that as the *X* variable increases in value, the *Y* variable decreases in value—a negative relationship. The slope is decreasing because, as *X* increases in value, the decrease in the value of *Y* becomes smaller and smaller.

17. (a) The relationship shows that as the *X* variable increases in value, the *Y* variable also increases in value—a positive relationship. The slope is increasing because, as *X* increases in value, the increase in the value of *Y* becomes larger and larger.

18. (b) The relationship shows that as the *X* variable increases in value, the *Y* variable also increases in value—a positive relationship. The slope is decreasing because, as *X* increases in value, the increase in the value of *Y* becomes smaller and smaller.

19. (a) As *X* assumes higher values, the values of *Y* will increase more rapidly.

20. (d) For equity, read "fairness." Critics of the proposal argue that it is unfair to make poor families spend a larger part of their lower income on medical services.

21. (d) To complete the project would cost $80 million more than had already been spent.

II. Solutions to Application Questions

1. The (marginal) cost of the air quality improvement is valued at $50 × 4,000, or $200,000. The benefit derived from the improvement is valued at ($5 × 10,000) + ($7 × 30,000), or $260,000. Smogland should proceed with the implementation of emission controls.

2. (a)

Unemployment Rate (%)	Inflation Rate (%)
2.0	6.0
4.0	3.0
6.0	0.0
8.0	–3.0
10.0	–6.0

(b) Slope is –1.5.
(c) –4.5%.
(d) 1.5%.

3. To have cleaner (if not clean) air, we might wish to reduce emissions of cars, homes, and factories. The next most-preferred use of the resources used to achieve this would be included in the opportunity cost. An initial 5% improvement in the quality of the air might be accomplished quite simply—perhaps by requiring more frequent car tune-ups—but, progressively, the "cost" of achieving more stringent air cleanliness standards will rise. The marginal cost will increase. This will graph as an upward-sloping line that rises progressively more steeply.

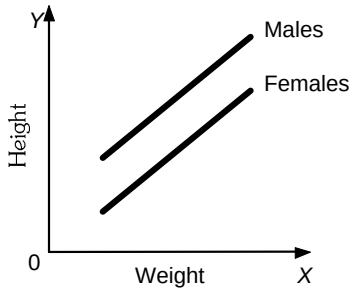
4. The answer cannot be determined given the information. This choice may well have been rational. Perhaps the three extra points will save you from flunking the course whereas, in the math class, you are confident of making an easy "A."

5. The opportunity cost is the salary forgone—$37,000 if you had chosen the first bank. Presumably, the offer of the job at the bank was based on your abilities—some of which would have been developed while at college. That time, then, was not wasted. You could have taken the bank job and explained that the three years of college got you the internship and sufficient skills to be noticed in the first place. Also, the three college years cannot be relived—decisions should be based on the future, not the past.

6. This is an open question. The natural resource might be a river, a seam of coal, deer, a piece of waste land used as a dump, prime agricultural land, or downtown lots. The main point is that using the resource one way means that it is not available for other uses. The final part of the question may lead you into a consideration of private property rights, social pressure, and the role of the government.

7. The answer to Question 7 is included in the question.

8. (a, b) Refer to the diagram below.



(c) Both positive—as height increases, so does weight.

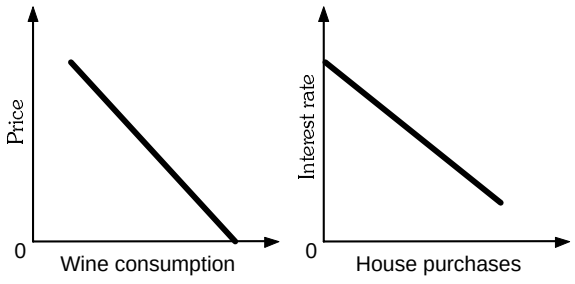
(d) Probably the lines will be different. Perhaps, at any given height, males may weigh more than females, for example.

(e) Race, geographical location, and age are factors that have been ignored.

(f) (i) Refer to the following diagram.

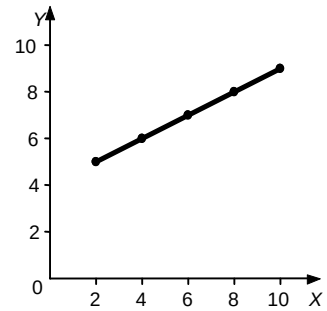
(ii) Even if wine is free, consumers are likely to reach a point of satiation. This is shown on the diagram as the quantity at which the line reaches the horizontal axis.

(iii) It depends on your demand for wine, of course, but probably not. We take up this issue in Chapter 5, when we consider elasticity of demand. In general, we'll find that total spending declines at high prices.



(g) (i) Refer to the preceding diagram.
(ii) It depends on the demand for houses, of course, and is shown as the point at which the line reaches the vertical axis.

9. (a) It's a positive relationship.
(b) The line would be "rising" to the right.
(c) Rise over run: *Y* rises by one unit every time *X* rises by two units, so the slope is +1/2.
(d) Refer to the following diagram.



10. Your short list of variables probably will include the price of Quite Lite, the prices of its competitors, advertising, the time of year, health attitudes, the income of potential buyers (launching a new product during an economic downturn might be difficult, for instance), and so on.

The negative relationship you will have modeled (if not, why not?) between price and quantity demanded is called the demand curve. A movement along this curve indicates that price has changed causing a change in the amount of beer demanded, with all other variables held constant (*ceteris paribus*). (Keep this conclusion in mind when you read Chapter 3.)

11. Positive statements are testable; normative statements are opinions.
(a) Positive. A statement need not be correct to be positive.
(b) Positive. Data can be gathered and analysis undertaken.
(c) Normative, as signaled by the use of *should*.
(d) Normative. This is an opinion, even during the Great Depression.
(e) Normative. This is an opinion, as signaled by the use of *should*.
(f) Normative. This is an opinion, as signaled by the use of *should*.
(g) Positive. This statement can be tested.

12. With all due respect to your campus bookstore, it is less likely to be as efficient than Amazon. Amazon is open to competition from other internet firms and it's fairly easy to make comparisons between offers from different sellers. High prices at Amazon will be penalized as customers go elsewhere. Your campus bookstore, on the other hand, may have no local competition and, with "captive" customers, can afford to sustain high prices.

13. Your opportunity cost is the value of the next most-preferred alternative you gave up in order to take the course. Perhaps you would have taken another course in the same time-slot. Or worked. Or used the time to study. Whatever. The most-valued alternative you couldn't pursue is the opportunity cost of your Economics course.

14. Go to the party! The $40 you paid should be irrelevant to your decision. In either case, the $40 has been spent.

APPENDIX

Introduction: Why a Special Section on Graphing?

You may be surprised by the amount of mathematics—geometry in particular—that you encounter in economics. The professor introduces a new concept and quickly draws a graph to illustrate the idea—economic theory and graphs are inseparable. This union of a social science course and mathematical techniques can baffle some students. You could struggle so much with the techniques that you miss the powerful insights that economics has to offer. This section is designed to help you gain a working understanding of graphing techniques and to help you apply this knowledge to economics.

Why Are Graphs Important?

Graphs are important for several reasons. First, graphs are a compact way of conveying a large amount of information. An old adage says that "one picture is worth one thousand words." This is particularly true in economics, as the movement of an economic variable over time or the relationship between two economic variables can be quickly grasped through the use of graphs. Second, as Case, Fair and Oster mention in the Appendix to Chapter 1, economics uses quantitative (mathematical) techniques more than any other social science. Every academic discipline possesses its own "tool kit," which must be mastered in order to truly appreciate the content of the course. In an economic principles class, the primary "tool" is graphs. Third, there is a clear relationship between student success in economics and skill with graphs. Research on student performance indicates that of the skills that lead to success (verbal, quantitative reasoning, graphing) graphing ability is vital. Fourth, an important component of a vibrant democratic society is *economic literacy*: a basic understanding of certain central economic concepts. Citizens who follow current events constantly encounter graphs, as print and television journalists use the visual medium to communicate with its audience.

Why Graphs Trouble Many Students

Several factors may cause you to have difficulty with graphs. Several years may have elapsed since you completed a high school geometry course. Consequently, many graphing skills that were developed have been forgotten. More fundamentally, you read every day; however, you do not practice math every day. Therefore, most students enter an economic principles class with a stronger reading ability than a mathematical ability. Because of this, you must remember that the graphs in your textbook are not photographs worthy of only a glance; *graphs must be studied*.

General Tips for Studying Graphs

Here are some general tips that should assist you in developing graphing skills:

1. *Relax*! Remember that math is simply another language; therefore, graphs are just a specific form of communication.
2. When studying a graph, first identify the labels that are on the graph axes and curves. These labels are like road signs, which inform the reader.
3. Once the labels are recognized, try to understand what economic intuition lies behind the curve (e.g., the demand curve indicates that as the product price falls, the amount that consumers wish to buy increases).
4. Get into the habit of tracing the graphs that are in the text and copying the graphs as reading notes are taken.
5. *Draw, draw, draw*!!! The process of learning economics must be an active process. Graphing skills can be enhanced only by repeated attempts to graph economic concepts.

What Are Graphs?

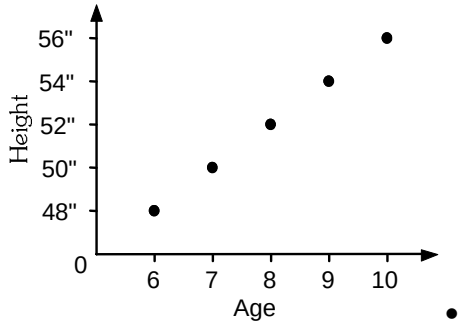
Graphs are visual expressions of quantitative information. Economic theory attempts to establish relationships between important concepts. If the value of a concept changes, the concept is considered a *variable*. Graphs illustrate the relationship between two variables. If two variables have a *direct* (positive) relationship the value of one variable increases as the value of the other variable increases. If two variables have an *inverse* (negative) relationship, the value of one variable decreases as the value of the other variable increases.

EXAMPLE 1

As children get older, they grow taller. There exists a direct relationship between a child's age and its height.

Age	6	7	8	9	10
Height	48"	50"	52"	54"	56"

This relationship can be graphed:

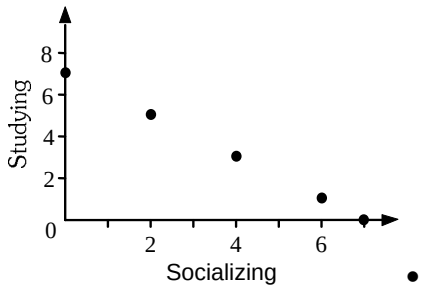


EXAMPLE 2

After attending class, sleeping, eating, and working at a part-time job, a student has seven hours that can be used for studying or socializing. There exists an inverse relationship between time spent studying and time spent socializing.

Studying	7	5	3	1	0
Socializing	0	2	4	6	7

A graph of this relationship is shown below:

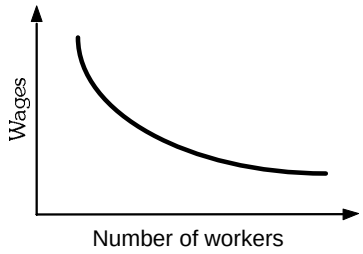


Types of Graphs

There are two types of graphs. *Descriptive* graphs relate the observed association of two variables. The graphs in Examples 1 and 2 are descriptive graphs. Newspapers often express monthly unemployment data in descriptive graphs. *Analytical* graphs convey the hypothetical relationship between two variables. The existence of association is derived from economic theory, and its accuracy is the object of economic research.

EXAMPLE 3

An understanding of a firm's goals and its constraints leads to the development of a hypothesis, which states that as wages rises, a firm would hire fewer workers. Graphically, this relationship is expressed as:



Often, the value of one variable determines the value of the other variable. In these cases, the former variable is called the *independent* variable; the latter variable is called the *dependent* variable. The independent variable is the cause; the dependent variable is the effect. Normally (but not always), the independent variable is placed on the horizontal axis and the dependent variable is placed on the vertical axis. •

Drawing Graphs

Earlier, we examined the direct relationship between a child's age and its height. One would expect another direct relationship between a child's age and its weight.

EXAMPLE 4

Age	6	7	8	9	10
Weight	70 lbs	75 lbs	80 lbs	85 lbs	90 lbs

Graph this relationship on the axes below.

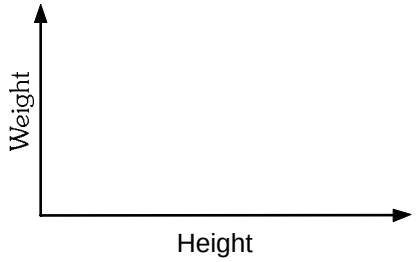
Combining the two series of data yields the following table:

Age	6	7	8	9	10
Height	48"	50"	52"	54"	56"
Weight	70 lbs	75 lbs	80 lbs	85 lbs	90 lbs

•

EXAMPLE 5

Graph the height-weight combination for each age on the axes below.

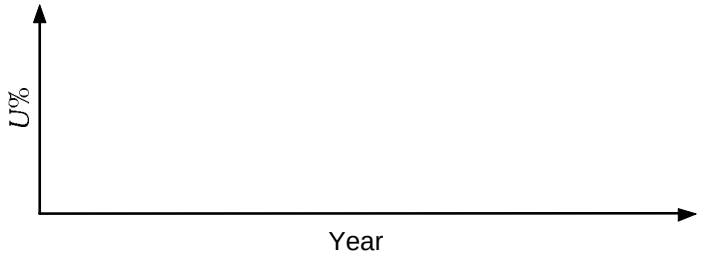


Is the relationship between height and weight direct or inverse? _____ •

EXAMPLE 6

Graph the relationship between the annual U.S. unemployment rate (*U*%) and the years 1986–1999.

Year	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
U%	7.0	6.2	5.4	5.3	5.5	6.7	7.4	6.8	6.1	5.6	5.4	4.9	4.5	4.2



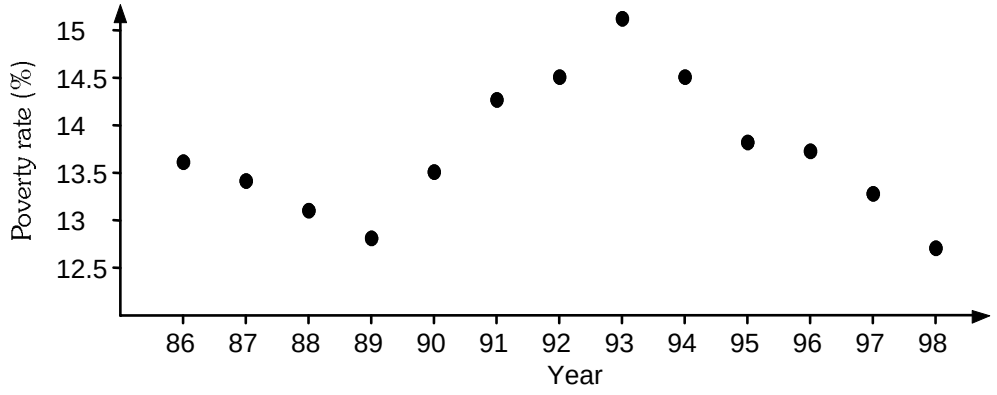
This graph, depicting the movement of one variable over time, it is called a *time-series* graph. Between which years is there a direct relationship? _____
Between which years is there an inverse relationship? _____ •

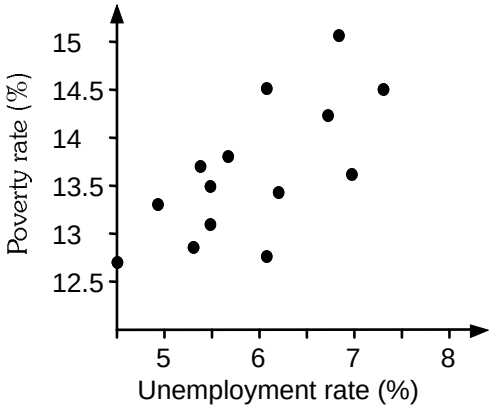
Reading Graphs

In addition to graphing economic relationships, students must develop the skill of reading graphs.

EXAMPLE 7

Following are a time-series graph of the movement of the poverty rates for U.S. families between 1986 and 1998 and a scatter diagram indicating the association between poverty rates and unemployment rates. Study both graphs and answer the following questions:





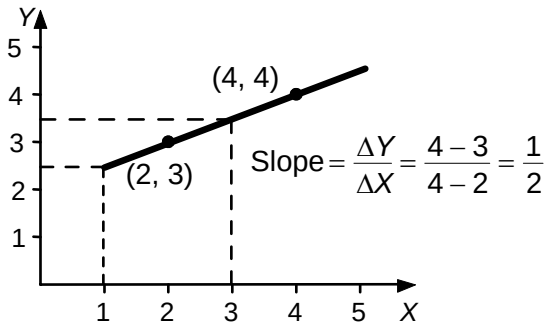
Year	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
U%	7.0	6.2	5.5	5.3	5.5	6.7	7.4	6.8	6.1	5.6	5.4	4.9	4.5
Poverty Rate %	13.6	13.4	13.1	12.8	13.5	14.2	14.5	15.1	14.5	13.8	13.7	13.3	12.7

1. What are the poverty rates in:
   (a) 1987 _____
   (b) 1990 _____
   (c) 1995 _____
2. What are the poverty rate/unemployment rate combinations in:
   (a) 1988 _____ _____
   (b) 1992 _____ _____
   (c) 1996 _____ _____
3. When is there a direct relationship between poverty rate and unemployment rate?
4. Is there ever an inverse relationship between poverty rate and unemployment rate?●

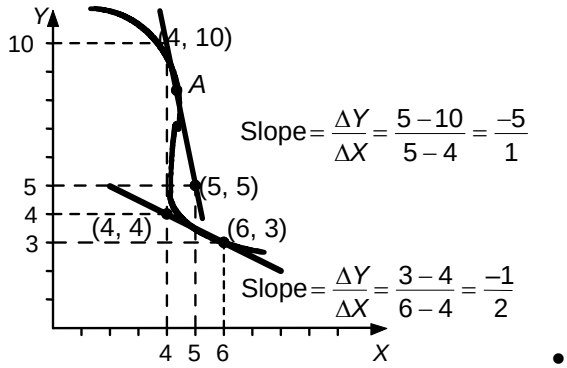
Understanding and Calculating Slopes

The *slope* of a curve is one measure of the relationship between two variables. It indicates both the type of relationship (direct or inverse) and the rate of change of one variable as the other variable changes. For a straight line, the slope is constant. For a curve, the slope changes from one point along the curve to another. At any particular point, the slope of the curve is identical to the slope of the straight line that is tangent to that point. The slope of a line is calculated by identifying two points on the line and computing the ratio of the change in the variable on the vertical axis and the change in the variable on the horizontal axis. (In high school geometry, this was referred to as "the 'rise' over the 'run'"; more formally, slope is the "change in *Y* divided by the change in *X*.")

EXAMPLE 8



EXAMPLE 9



In Example 8, any two points alone that line will show a slope of 1/2. In Example 9, the slope varies: at point *A*, the slope is –5/1; at point *B* the slope is –(1/2). These slope numbers can be interpreted indicating the unit change in the value of *Y* in response to a one unit change in *X*. For Example 8, *Y* will increase by 1/2 in response to a one unit change in *X*. At Point *A* in Example 9, *Y* decreases by 1 and, at Point *B*, *Y* decreases by 1/2. The fact that the slope is positive in Example 8 means that there is a direct relationship between *Y* and *X*. The negative slope in Example 9 illustrates an inverse relationship between *Y* and *X*.

Solving Equations

Often, the economic relationship between two concepts can be expressed in algebra with an equation. The advantage of this approach is that we can calculate the specific impact that a change in one variable has upon another variable.

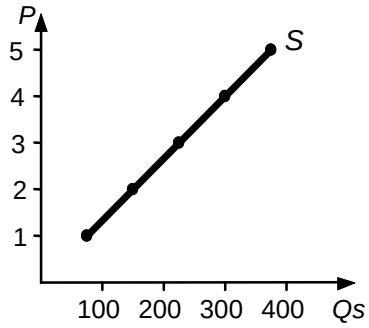
EXAMPLE 10

It is a reasonable assumption that as the price of a good rises, more of that good will be supplied. This positive relationship can be expressed with an equation. Let *P* represent price and *Qs* represent quantity supplied. For our purposes, let $Q_S = -10 + 80P$. Thus, if $P = 1$, then $Q_S = 70$. The table below captures this relationship:

Price	1	2	3	4	5
Quantity supplied	70	150	230	310	390

1. What is *Qs* if *P* = 7? _____
2. What is *Qs* if *P* = 10? _____

The table can be graphed. The line is a supply curve, as you will see in Chapter 3—it is usually labeled "*S*."

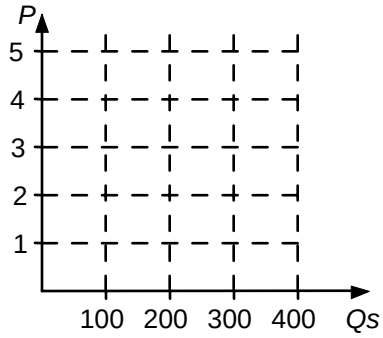


3. What is the slope of the line? _____

If the equation is $Qs = -10 + 50P$, the slope of the line will change. Below is the new table.

Price	1	2	3	4	5
Quantity supplied	40	90	140	190	240

4. Draw this new line on the graph below. Label it S_1.



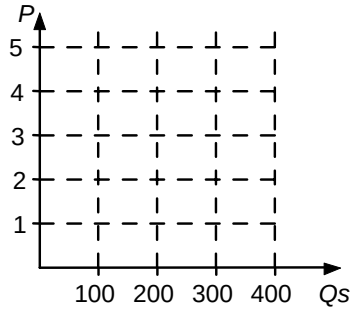
5. What is the slope of this line? _____

If the equation for the supply curve is $Qs = -20 + 75P$, answer the following question.

6. Complete the following table.

Price	1	2	3	4	5
Quantity supplied					

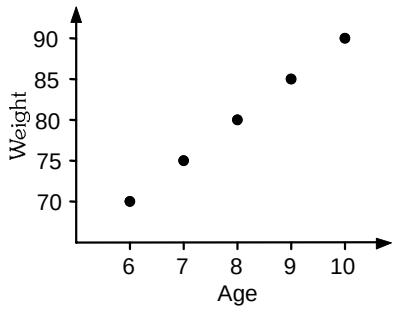
7. Graph the line shown in the table on the following graph. Label it S_2.



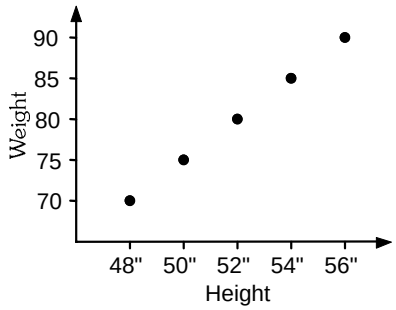
8. What is the slope of the line? _____
9. What is Qs if $P = 8$? _____
10. What is Qs if $P = 20$? _____ •

SOLUTIONS TO APPENDIX PROBLEMS

Example 4:
Refer to the following diagram.

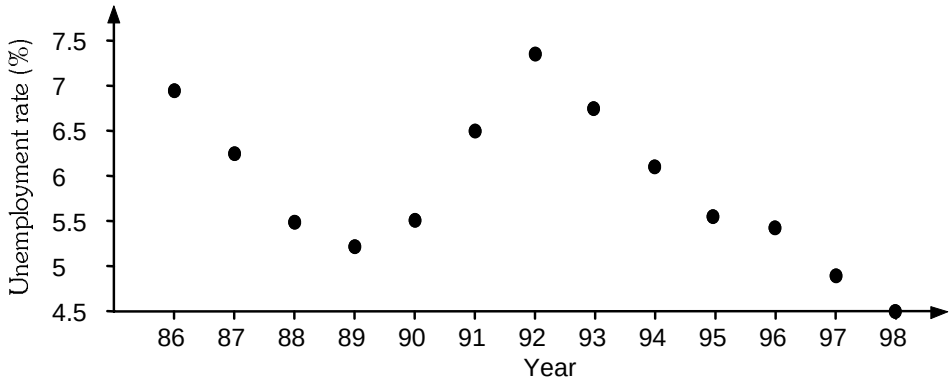


Example 5:
Refer to the following diagram.



The relationship between height and weight is direct (positive).

Example 6:
Refer to the following diagram.



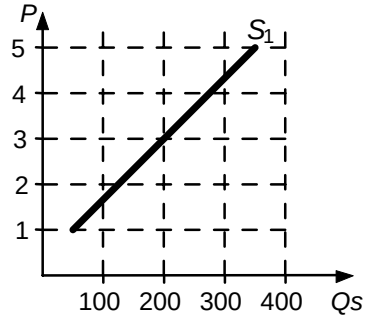
Between 1989 and 1992, there is a direct (positive) relationship.
Between 1986 and 1989, there is an inverse (negative) relationship. There is also an inverse relationship between 1992 and 1999.

Example 7:

1. (a) 13.4%
   (b) 13.5%
   (c) 13.8%
2. (a) 1988 5.5% 13.1%
   (b) 1992 7.4% 14.5%
   (c) 1996 5.4% 13.7%
3. There is a direct relationship between poverty rate and unemployment rate in all years except 1993.
4. There is an inverse relationship between poverty rate and unemployment rate only in 1993.

Example 10:

1. $Qs = -10 + 80P = -10 + 80(7) = 550$.
2. $Qs = -10 + 80P = -10 + 80(10) = 790$.
3. Slope = rise/run = 1/80. A 1-unit increase in *P* leads to an 80-unit increase in *Qs*.
4. Refer to the following diagram.

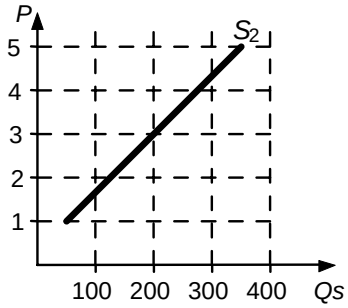


5. Slope = rise/run = 1/50. A 1-unit increase in *P* leads to a 50-unit increase in *Qs*.

6.

Price	1	2	3	4	5
Quantity supplied	55	130	205	280	355

7. Refer to the following diagram.



8. Slope = rise/run = 1/75. A 1-unit increase in *P* leads to a 75-unit increase in *Qs*.
9. $Qs = -20 + 75P = -20 + 75(8) = 580$.
10. $Qs = -20 + 75P = -20 + 75(20) = 1480$.