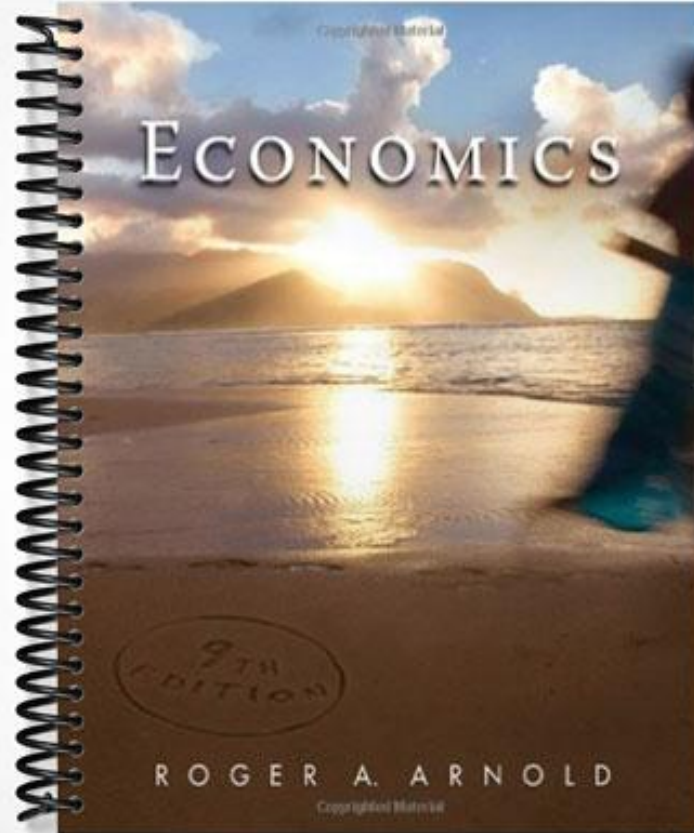


**SOLUTIONS MANUAL**



# CHAPTER 2

## Economic Activities: Producing and Trading

Chapter 2 introduces the basics of the PPF, comparative advantage, and trade. This is not exactly a “tools of economics” chapter; instead it explores basic premises that underlie the economic analysis presented throughout the text.

### ■ KEY IDEAS

1. The PPF is a framework used to examine production.
2. The PPF can be used to demonstrate several economic concepts.
3. The purpose of trade is for people to make themselves better off.
4. Individuals can make themselves better off by specializing in production according to their comparative advantages, and then trading for other goods.

### ■ CHAPTER OUTLINE

#### I. THE PRODUCTION POSSIBILITIES FRONTIER

The production possibilities frontier is a framework in which to examine production; it represents the combination of two goods that can be produced in a certain period of time, under the conditions of a given state of technology and fully employed resources.

##### A. The Straight-Line PPF: Constant Opportunity Costs

A straight-line PPF indicates that the opportunity cost of producing additional units of output is fixed.

##### B. The Bowed-Outward (Concave-Downward) PPF: Increasing Opportunity Costs

A bowed-outward PPF indicates that the law of increasing opportunity costs holds, that is, for most goods, opportunity costs increase as more of the good is produced. The law of increasing opportunity costs holds because people have varying abilities, so that they aren't equally adept at producing all goods.

##### C. Law of Increasing Opportunity Costs

For most goods, the opportunity costs increase as more of the good is produced.

##### D. Economic Concepts Within a PPF Framework

###### 1. Scarcity

The PPF separates two regions: an attainable region, which consists of the points on the PPF and all points below it, and an unattainable region, which consists of all points above and beyond the PPF. Within the attainable region, individuals must choose which combination of goods they want to produce. There is an opportunity cost associated with each choice whenever there is a movement along a PPF.

## **2. Productive Efficiency**

An economy is productive efficient if it is producing the maximum output with given resources and technology (that is, if it is producing at a point on the frontier), and is productive inefficient if it is not.

## **3. Unemployed Resources**

One reason that an economy may exhibit productive inefficiency is that it is not using all its resources.

## **4. Economic Growth**

Economic growth refers to the increased productive capabilities of an economy, and is illustrated by a shift outward in the PPF. An increase in the quantity of resources or an advance in technology will lead to economic growth.

# **II. EXCHANGE OR TRADE**

## **A. The Purpose of Trade**

People trade to make themselves better off.

## **B. Periods Relevant to Trade**

Before a trade is made, a person is said to be in the *ex ante* position. Individuals will trade only if they believe *ex ante* that the trade will make them better off. The second relevant period is at the point of trade, where a person's actions reflect his valuations. After the trade is made, a person is said to be in the *ex post* position.

## **C. Trade and the Terms of Trade**

The terms of trade refer to how much of one thing is given up for how much of something else.

## **D. Costs of Trades**

A potential trade might not become an actual exchange if transaction costs are too high. Transaction costs are the costs associated with the time and effort needed to search out, negotiate, and consummate a trade. One role of an entrepreneur is to try to turn potential trades into actual trades by lowering transaction costs.

**E. Trades and Third-Party Effects**

If someone other than the parties involved in an exchange is affected by that exchange, then the trade is said to have third-party effects.

**III. PRODUCTION, TRADE, AND SPECIALIZATION****A. Producing and Trading**

A person who can produce a good at a lower cost than another person can is said to have a comparative advantage in the production of that good. Individuals can make themselves better off by specializing in the production of goods that they have a comparative advantage in, and then trading for other goods.

**B. Profit and a Lower Cost of Living**

Another way to view the gains from specialization is in terms of profit and a lower cost of living.

**C. A Benevolent and All-Knowing Dictator versus the Invisible Hand**

Self-interest guides individuals to make decisions that happen to be best for society.

**■ TEACHING ADVICE**

1. Go to <http://news.ebay.com/history.cfm> for a history of eBay, which was founded in 1995 after Pierre Omidyar experimented with “how equal access to information and opportunities affects the efficiency of marketplaces.” When a broken laser that he had posted as part of his experiment sold, he knew that he had found a good idea for a business. When eBay went public in 1998 Omidyar became an instant billionaire.
2. One of the most important things that students can learn from studying the production possibilities frontier is that choices have consequences. Emphasize that when we choose to produce at one point rather than at some other point on the PPF, we obtain more of one good than we would have had at the other point, but we don’t get to have as much of the other good as we would have had at the other point. Use the Production Possibilities Frontier Exercise (presented below as a sheet that can easily be reproduced for students) to reinforce this point and the point that the law of increasing opportunity cost holds.
3. <http://www.dismal.com> provides daily examples of economic life in government-controlled versus less-controlled environments, and examples that can be used to discuss tradeoffs, efficiency, and the production possibilities frontier. The same is true for <http://cnn.com> and <http://cnfn.com>.

**■ ASSIGNMENTS FOR MASTERING KEY IDEAS**

**Assignment 2.1**

Key Idea: The PPF is a framework used to examine production.

1. Tell what a production possibilities frontier represents.
2. Analyze what it means for the PPF to be bowed out from the origin (curved), and what it means for the PPF to be a straight line.
3. State the Law of Increasing Opportunity Cost and explain why it holds.

**Assignment 2.2**

Key Idea: The PPF can be used to demonstrate several economic concepts.

1. Explain how the PPF is used to demonstrate scarcity.
2. Use the PPF to demonstrate choice and opportunity cost.
3. Define productive efficiency and use the PPF to demonstrate it.
4. Use the PPF to show unemployment.
5. Use PPF curves to show economic growth and list the sources of economic growth.

**Assignment 2.3**

Key Idea: The purpose of trade is for people to make themselves better off.

1. Explain the difference between *ex ante* and *ex post* exchange.
2. Describe the condition under which an individual will trade.
3. Discuss the difference between trade and the terms of trade.
4. Describe why potential trades might not occur, and the entrepreneur's role in turning potential trades into actual trades.
5. Explain when third-party effects occur.

**Assignment 2.4**

Key Idea: Individuals can make themselves better off by specializing in production according to their comparative advantages, and then trading for other goods.

1. Use the concept of comparative advantage to describe who should produce a particular good.
2. Explain why people should specialize and trade.
3. Explain how acting in one's self interest benefits society.

**■ ANSWERS TO ASSIGNMENTS FOR MASTERING KEY IDEAS****Assignment 2.1 Answers**

1. A production possibilities frontier represents the combination of two goods that can be produced in a certain period of time, under the conditions of a given state of technology and fully employed resources.
2. A straight line PPF indicates that the opportunity cost of producing additional units of output is fixed, while a bowed-outward PPF indicates that the opportunity cost rises.
3. The law of increasing opportunity costs says that as more of a good is produced, the opportunity costs of producing that good increase. It holds because people have varying abilities, and aren't equally adept at producing all goods.

**Assignment 2.2 Answers**

1. The PPF separates an attainable region (all points on or under the PPF) from an unattainable region (all points above the PPF). Scarcity makes the points above the PPF unattainable.

2. Only one point on a PPF can be chosen. When choosing one point over another point, the value of what could have been chosen but wasn't chosen is the opportunity cost of our choice.
3. An economy is productive efficient if it is producing the maximum output with given resources and technology. All of the points on the frontier are points of productive efficiency.
4. If there is unemployment, then the economy will be at a point below the PPF.
5. Economic growth is illustrated by a shift outward in the PPF, and would be caused by more resources or an advance in technology.

### Assignment 2.3 Answers

1. *Ex ante* is the period before a trade is made; while *ex post* is the period after a trade occurs.
2. Individuals will trade only if they believe *ex ante* that the trade will make them better off.
3. Trade is the process of giving up one thing for something else, while the terms of trade refer to how much of one thing is given up for something else.
4. High transaction costs might keep potential trades from occurring. One role of the entrepreneur is to lower transaction costs in order to turn potential trades into actual trades.
5. Third-party effects occur when someone other than the parties involved in the exchange is affected.

### Assignment 2.4 Answers

1. A person who can produce a good at a lower cost than another person has a comparative advantage in the production of that good, and is the person who should produce it.
2. Specialization and trade increase production and make people better off. When someone specializes and trades his surplus he earns a profit. The person who buys the surplus lowers her cost of living.
3. When people act in their own self interest, the overall output of society increases.

## ■ ANSWERS TO CHAPTER QUESTIONS AND PROBLEMS

1. **Describe how each of the following would affect the U.S. production possibilities frontier: (a) an increase in the number of illegal aliens entering the country; (b) a war; (c) the discovery of a new oil field; (d) a decrease in the unemployment rate; (e) a law that requires individuals to enter lines of work for which they are not suited.**
  - (a) *Ceteris paribus*, an increase in the number of illegal aliens entering the country will increase the available productive human resources of the economy; therefore, the PPF should shift outward, as shown in Exhibit 5.
  - (b) A war would remove individuals, capital, and potentially other resources from the productive process; therefore, *ceteris paribus*, the PPF would shift inward.
  - (c) The discovery of a new oil field would represent an addition to the country's resources; therefore, the PPF would shift outward.
  - (d) A decrease in the unemployment rate would be represented by movement from a point below the PPF to another point closer to or on the frontier, such as from point F to point D, in Exhibit 4.

- (e) Such a law would decrease the productive efficiency of labor, thereby moving the economy from a point on or inside the frontier to another point further inside the frontier.
2. **Explain how the following can be represented in a PPF framework: (a) the finiteness of resources implicit in the scarcity condition; (b) choice; (c) opportunity cost; (d) productive efficiency; and (e) unemployed resources.**

Scarcity is illustrated by the existence of the frontier: if there were unlimited resource availability, there would be no limit on output. Choice is illustrated by the variety of possible combinations along the frontier: there is not a single optimum combination. Opportunity cost is represented by the slope of the frontier. Productive efficiency is represented by points on the frontier. Unemployed resources are represented by points below the frontier.

3. **What condition must hold for the production possibilities frontier to be bowed outward? to be a straight line?**

In order for a nation's PPF to be bowed outward, resources must be somewhat specialized, so that the law of increasing opportunity cost holds. With specialized resources, additional units of a good can only be produced at increasing opportunity costs. In order for a nation's PPF to be a straight line, there must be complete interchangeability of resources, with no specialization, so that the law of increasing opportunity costs does not apply.

4. **Give an example to illustrate each of the following: (a) constant opportunity costs and (b) increasing opportunity costs.**

Answers will vary. Constant opportunity costs occur when increasing output of a good does not cause society to give up more and more resources in order to produce that good. Although at some point increasing opportunity costs will occur, over some level of output constant opportunity costs could prevail. For example, if a college has a \$20 million budget and each class costs \$25,000 to offer, then the school can offer 800 classes during the year. If the college received a \$500,000 grant, it could offer another 20 classes if its costs did not increase, perhaps because there were unemployed professors ready and willing to work at the going wage rate. Increasing opportunity costs occur when society has to give up more and more of one resource in order to obtain another resource. If the college received a second \$500,000 grant, it might not be able to offer another 20 classes, if there were no unemployed professors ready and willing to work at the going wage rate. In order to hire more teachers, the college would have to hire individuals who had a higher opportunity cost.

5. **Why are most production possibilities frontiers for goods bowed outward (concave downward)?**

Most production possibilities frontiers are concave downward because the law of increasing opportunity costs holds. This law says that as society devotes more resources to the production of a given good, the opportunity cost of producing that good will increase. The reason for this is that the most efficient resources will be used to initially produce that good. Only as those resources are used up will society employ less productive resources. Farmers will plant wheat in Kansas before they plant wheat in Alaska or Nevada.

6. **Within the PPF framework, explain each of the following: (a) a disagreement between a person who favors more domestic welfare spending and one who**

**favors more national defense spending; (b) an increase in the population; and (c) a technological change that makes resources less specialized.**

- (a) This first question deals with choices among possible output combinations along a frontier representing total government spending. For illustrative purposes, substitute “domestic welfare spending” for “good X” and “national defense spending” for “Houses” in Exhibit 3. The person favoring more welfare spending would prefer point C, while the person favoring more defense spending would prefer point D.
  - (b) An increase in population, *ceteris paribus*, will shift the PPF outward, as in Exhibit 5.
  - (c) A technological change that makes resources less specialized will lessen the opportunity cost of switching production from one good to another. The production possibility frontier will become less bowed outward (straighter relative to the origin).
- 7. Explain how to derive a production possibilities frontier. For instance, how is the extreme point on the vertical axis identified? How is the extreme point on the horizontal axis identified?**

The extreme point on the vertical axis is identified by figuring out how much of the good on that axis can be produced using all of the economy’s available resources. The extreme point on the horizontal axis is identified by figuring out how much of the good on *that* axis can be produced using all of the economy’s available resources. Once the extreme point on the vertical axis (for example) has been identified, other points can be identified by asking how much of that good must be given up in order increase production of the good on the horizontal axis by some discrete amount.

- 8 If the slope of the production possibilities frontier is the same between any two points, what does this imply about costs? Explain your answer.**

A PPF slope that is the same between any two points implies that the opportunity cost of producing the two goods represented on the axes is constant.

- 9 Suppose a nation’s PPF shifts inward as its population grows. What happens, on average, to the material standard of living of the people? Explain your answer.**

It would tend to decrease. The economy, as a whole, would have fewer goods and services to go around and would be distributing them to more people. Consequently, each person would get less and less.

- 10. “A nation may be able to live beyond its means, but the world cannot.” Do you agree or disagree? Explain your answer.**

The law of comparative advantage encourages countries to specialize. If they specialize and make exchanges at beneficial terms of exchange, they should be able to increase their utility beyond that which they could have obtained in isolation from trade.

- 11. Can a technological advancement in sector X of the economy affect the number of people who work in sector Y of the economy? Explain your answer.**



Yes. A technological advancement in sector X makes it possible to produce X with fewer people, freeing those people to produce other things (Y, for example).

**12. Use the PPF framework to explain something in your everyday life that was not mentioned in the chapter.**

Answers will vary. Study time versus income producing work, study on one class versus another, etc.

**13. Describe the three time periods relevant to the trading process.**

The three time periods relevant to the trading process are before the trade, at the point of trade, and after the trade. Before the trade is made, a person is said to be in the *ex ante* (“before”) position. In the *ex ante* position, an individual will only make a trade if they believe that the trade will make them better off than they currently are. After a trade is made, a person is said to be in the *ex post* position. At this time the individual may reevaluate the trade and assess their satisfaction with the results.

**14. Are all exchanges or trades beneficial to both parties in the ex post position? Explain your answer.**

No. People enter into exchanges because they believe, *ex ante*, that the exchange will make them better off. Sometimes the person discovers that he was harmed by the exchange, or it did not do what he had expected (the new car turns out to be a lemon).

**15. A person who benefits from a trade can be disgruntled over the terms of exchange. Do you agree or disagree? Explain your answer.**

A person can always believe that he could have gotten better terms than he received. We always wonder if we could have negotiated the price of our new car down a little more. However, the person would not rationally have agreed to the exchange without expecting to get higher utility from the good than from what he gave up (money, trade, etc), so his utility should have risen. *Ex post*, however, he may find the value of the exchange to have been less than he expected, or new information might lead him to believe that he could have done better.

**16. Give a numerical example that illustrates high transaction costs preventing an exchange or trade from taking place.**

Answers will vary. One example would be as follows: I am willing to pay \$20 for a massage; Jin is willing to accept \$10 to give a massage; I am in the U.S. and Jin is in China and a plane ticket from China to the U.S. costs more than \$10 (not to mention other travel difficulties, such as obtaining an entrance visa).

**17. Give an example of a negative third-party effect (negative externality).**

Examples will vary, but all examples should include a situation where a third-party is adversely affected by the trade. Typical examples involve pollution, littering, or cigarette smoke.

**18. On any given day, 16 million items in 27,000 different categories are listed on sale on eBay.com. What does eBay do? It brings buyers and sellers together. But how does it do this?**

eBay lowered the transaction costs of trading. It charges a small fee for creating a place where buyers and sellers can find each other.

**19. Bob and Susan are married. Instead of splitting the various tasks in the home equally (you cook half the meals and I'll cook the other half of the meals), they end up specializing in certain tasks. For example, Susan does the cooking and Bob washes the dishes; Susan does the laundry and Bob mows the lawn. Why might Bob and Susan find it better to specialize in certain tasks instead of equally splitting each task?**

Bob and Susan find that by concentrating on the tasks where they have a comparative advantage, they can complete their various household tasks at a lower total cost.

**20. Is it always possible to imagine better terms of trade? Give an example of why it is or why it is not.**

It is always possible to imagine better terms of trade for at least one of the trading partners. For example, if the terms of trade are 1 item for \$10, then the buyer would like a lower price and the seller would like a higher price. Even if the terms of trade fell to 1 item for \$0, the seller would prefer a better term.

**21. “A profit for one person does not necessarily imply a loss for someone else.” Do you agree or disagree? Explain your answer with an example.**

Agree. Answers will vary, but one example would be the purchase of a book. The buyer's utility from purchasing the book exceeds the price he paid for it, and is not diminished by the fact that the seller earned a profit by selling it, or by the size of the profit.

**22. What does it mean to say that someone has a comparative advantage in the production of good X?**

It means that they can produce good X at a lower opportunity cost than can someone else.

**23. The frontier or boundary of the PPF says “Here is scarcity.” What does this mean?**

This means that there are not enough resources available to produce beyond the boundary.

**24. Why might there be more people working as doormen in New York City than Topeka, Kansas?**

There are more doormen in New York City than in Topeka, Kansas, because there are more apartment buildings and condos in New York City than in Topeka, Kansas. That is, there is a larger market for doormen in New York City.

## ■ ANSWERS TO CHAPTER WORKING WITH NUMBERS AND GRAPHS

**1. Tina can produce any of the following combinations of goods X and Y: (a) 100X and 0Y, (b) 50X and 25Y, and (c) 0X and 50Y. David can produce any of the**

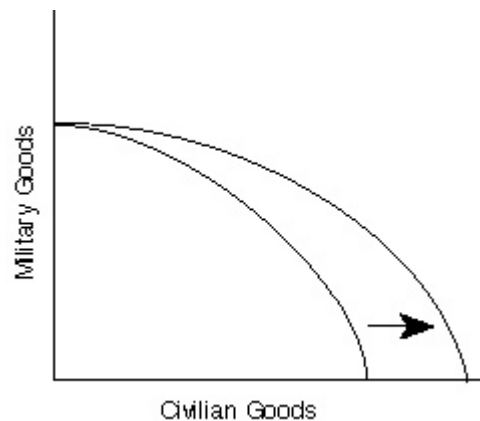
following combinations of goods X and Y: (a) 50X and 0Y, (b) 25X and 40Y, and (c) 0X and 80Y. Who has a comparative advantage in the production of good X? of good Y? Explain your answer.

Tina gives up 50X to produce 25Y (100 – 50 and 0 – 25). David gives up 25X to produce 40Y (50 – 25 and 0 – 40). Tina's opportunity cost is  $2X = 1Y$  ( $1X = 1/2Y$ ) and David's is  $5/8X = 1Y$  ( $1X = 8/5Y$ ). David can give up 50X and get 80Y, Tina gets only 25Y for 50X. So David has the lower opportunity cost of Y and Tina of X.

2. Using the data in Problem 1, prove that both Tina and David can be made better off through specialization and trade.

Start with Tina producing 50X and 25Y and David producing 25X and 40Y. Together, they produce 75X and 65Y. Now have Tina produce 100X and 0Y and David produce 0X and 80Y. Together they now produce 100X and 80Y. Tina could now consume (for example) 60X and 35Y and David could consume 40X and 45Y, making both better off.

3. Exhibit 6 represents an advance in technology that made it possible to produce more of both military and civilian goods. Represent an advance in technology that makes it possible to produce more of only civilian goods. Does this indirectly make it possible to produce more military goods? Explain your answer.



Yes. Since resources can be moved between uses, the improvement in productivity in civilian production can be used to shift resources to military production.

4. In the following figure, which graph depicts a technological breakthrough in the production of good X only?

Graph (3).

5. In the preceding figure, which graph depicts a change in the PPF that is likely as a consequence of war?

Graph (2). A likely consequence of war is decreased production of all goods.

6. If  $PPF_2$  in the following graph is the relevant production possibilities frontier, then which points are unattainable? Explain your answer.

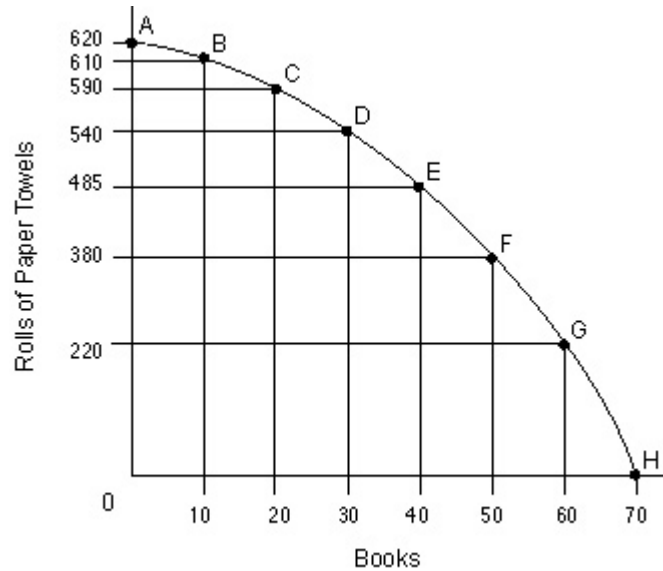
J, I and H are unattainable. They are farther from the origin than  $PPF_2$ , which represents maximum possible output.

**7. If  $PPF_1$  in the preceding figure is the relevant production possibilities frontier, then which point(s) represent efficiency? Explain your answer.**

A, B, and C represent efficiency because all are located on the frontier itself. By definition, a point on the frontier requires us to use all our existing resources and technology to their most efficient level.

## ■ PRODUCTION POSSIBILITIES FRONTIER EXERCISE

Pinnacle Paper Products Inc. can produce books or rolls of paper towels. Here is its PPF for the resources and technology it has available:



1. What is gained by choosing to produce at point B, instead of at point A?
2. What is the opportunity cost of choosing to produce at point B, instead of at point A?
3. What is gained by choosing to produce at point C, instead of at point B?
4. What is the opportunity cost of choosing to produce at point C, instead of at point B?
5. Continue moving point by point down the PPF. What is the pattern of gains as one chooses to move down this PPF from point A to B to C to D and so forth?
6. What is the pattern of opportunity costs as one chooses to move down this PPF from point A to B to C to D and so forth?
7. Does the law of increasing opportunity costs hold for book production at Pinnacle Paper Products? How do you know?
8. Explain how to determine whether the law of increasing opportunity cost holds for paper towel production at Pinnacle Paper Products.

**■ PRODUCTION POSSIBILITIES FRONTIER EXERCISE ANSWERS**

1. 10 books are gained by producing at point B, instead of at point A.
2. 10 rolls of paper towels is the opportunity cost of producing at point B, instead of at point A.
3. 10 books are gained by producing at point C, instead of at point B.
4. 20 rolls of paper towels is the opportunity cost of producing at point C, instead of at point B.
5. The gains are constant. 10 books are gained with each move.
6. Opportunity cost increases with each move. Increasingly larger numbers of rolls of paper towels are given up (10, then 20, 50, 55, 160, and finally, 220).
7. The law of increasing opportunity costs holds for book production at Pinnacle Paper Products, because each additional 10 books are more expensive than the previous 10 books in terms of the rolls of paper towels that must be given up in order to produce them.
8. Answers will vary, but should discuss finding the opportunity cost of obtaining constant gains in paper towels (for instance, from 0 to 155 rolls, to 310 rolls, to 465 rolls, to 620 rolls). Students can graphically show that the opportunity cost of obtaining these gains will rise. More and more books have to be given up to maintain this constant rate of gains. Therefore, the law of increasing opportunity costs does hold for paper towel production at Pinnacle Paper Products.