1-1 What is an opportunity cost? How does the idea relate to the definition of economics? Which of the following decisions would entail the greatest opportunity cost: Allocating a square block in the heart of Toronto for a surface parking lot or allocating a square block at the edge of a typical suburb for such a lot? Explain.

An opportunity cost is what was sacrificed to do or acquire something else. The condition of scarcity creates opportunity cost. If there was no scarcity, there would be no need to sacrifice one thing to acquire another.

The opportunity cost would be much higher in Toronto as the alternative uses for that square block are much more valuable than for a typical suburban city block.

1-2 What is meant by the term “utility” and how does it relate to purposeful behaviour?

“Utility” refers to the pleasure, happiness, or satisfaction gained from engaging in an activity (eating a meal, attending a ball game, etc.). It is an important component of purposeful behaviour because people will allocate their scarce time, energy, and money in an attempt to gain the most utility possible.

1-3 **(Key Question)** Cite three examples of recent decisions that you made in which you, at least implicitly, weighed marginal costs and marginal benefits.

Student answers will vary, but may include the decision to come to class, to skip breakfast to get a few extra minutes of sleep, to attend college or university, or to make a purchase. Marginal benefits of attending class may include the acquisition of knowledge, participation in discussion, and better preparation for an upcoming examination. Marginal costs may include lost opportunities for sleep, meals, or studying for other classes. In evaluating the discussion of marginal benefits and marginal costs, be careful to watch for sunk costs offered as a rationale for marginal decisions.

1-4 What are the key elements of the scientific method and how does this method relate to economic principles and laws?

The key elements include the gathering of data (observation), the formulation of possible explanations (hypothesis), testing the hypothesis, determining the validity of the hypothesis, and repeated testing of hypotheses that have appeared to be valid in prior tests.

The scientific method is the technique used by economists to determine economic laws or principles. These laws or principles are formulated to explain and/or predict behaviour of individuals or institutions.

1-5 **(Key Question)** Indicate whether each of the following statements applies to microeconomics or macroeconomics:

- a. The unemployment rate in Canada was 8.0 percent in March 2009.
- b. A Canadian software firm discharged 15 workers last month and transferred the work to India.
- c. An unexpected freeze in central Florida reduced the citrus crop and caused the price of oranges to rise.
- d. Canadian output, adjusted for inflation, grew by 0.4 percent in 2008.
- e. Last week the Scotia Bank lowered its interest rate on business loans by one-half of 1 percentage point.
- f. The consumer price index rose by 2.3 percent in 2008.
Macroeconomics: (a), (d), and (f)
Microeconomics: (b), (c), and (e)

1-6 State (a) a positive economic statement of your choice, and then (b) a normative economic statement relating to your first statement.

Student answers will vary. Example: (a) The unemployment rate is 4.8 percent; (b) the unemployment rate is too high. In general we treat “what is” statements as positive, “what should be” as normative, but keep an eye out for statements like “at full employment an increase in the production of pizzas should come at the cost of less robots.” Some students may incorrectly identify the statement as normative because of the term “should.”

1-7 (Key Question) Suppose you won $15 on a Lotto Canada ticket at the local 7-Eleven and decided to spend all the winnings on candy bars and bags of peanuts. The price of candy bars is $.75 and the price of peanuts is $1.50.

a. Construct a table showing the alternative combinations of the two products that are available.

b. Plot the data in your table as a budget line in a graph. What is the slope of the budget line? What is the opportunity cost of one more candy bar? Of one more bag of peanuts? Do these opportunity costs rise, fall, or remain constant as each additional unit of the product is purchased.

c. How, in general, would you decide which of the available combinations of candy bars and bags of peanuts to buy?

d. Suppose that you had won $30 on your ticket, not $15. Show the $30 budget line in your diagram. Why would this budget line be preferable to the old one?

(a) Consumption alternatives

<table>
<thead>
<tr>
<th>Goods</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Candy bars</td>
<td>0</td>
<td>4</td>
<td>8</td>
<td>12</td>
<td>16</td>
<td>20</td>
</tr>
<tr>
<td>Bags of peanuts</td>
<td>10</td>
<td>8</td>
<td>6</td>
<td>4</td>
<td>2</td>
<td>0</td>
</tr>
</tbody>
</table>

(b)
The slope for the budget line above, with candy bars on the horizontal axis, is $-0.5$ ($= -\frac{P_{cb}}{P_{bp}}$). Note that the figure could also be drawn with bags of peanuts on the horizontal axis. The slope of that budget line would be $-2$.

The opportunity cost of one more candy bar is $\frac{1}{2}$ of a bag of peanuts. The opportunity cost of one more bag of peanuts is 2 candy bars. These opportunity costs are constant. They can be found by comparing any two of the consumption alternatives for the two goods.

(c) The decision of how much of each to buy would involve weighing the marginal benefits and marginal costs of the various alternatives. If, for example, the marginal benefits of moving from alternative C to alternative D are greater than the marginal costs, then this consumer should move to D (and then compare again with E, and so forth, until MB=MC is attained).

(d)
1-8 What are economic resources? What categories do economists use to classify them? Why are resources also called factors of production? Why are they called inputs?

Economic resources are the natural, human, and manufactured inputs used to produce goods and services. Economic resources fall into four main categories: labour, land (natural resources), real capital (machines, factories, buildings, etc.,) and entrepreneurs. Economic resources are also called factors of production because they are used to produce goods and services. They are called inputs because they go in to a production process (like ingredients go into a bowl to make a cake), with the resulting goods and services also being referred to as output.

1-9 Why isn’t money considered a capital resource in economics? Why is entrepreneurial ability considered a category of economic resources, distinct from labour? What are the major functions of the entrepreneur?

Money is not considered a capital resource because money is not productive – it provides access to resources but itself does not directly contribute to the production of goods and services. Additionally, the quantity of money in circulation does not determine an economy’s productive capacity, while the amount of capital and other resources does. Doubling the amount of money in circulation does not change the economy’s physical capacity to produce goods and services. Money is, however, referred as a financial resource and financial capital, reflecting its ability to acquire real economic resources.

Entrepreneurial ability and labour are both human resources, but they perform different functions in the productive process. Entrepreneurial ability does not directly produce goods and services; it organizes the resources that do. Labour refers to the human inputs that directly engage in production.

Entrepreneurs are risk-takers: They coordinate the activities of the other three inputs for profit—or loss, which is why they are called risk-takers. Entrepreneurs sometimes manage companies that they own, but a manager who is not an owner is not necessarily an entrepreneur but may be performing some of the entrepreneurial functions for the company. Entrepreneurs are also innovators, or perhaps inventors, and profits help to motivate such activities.

1-10 (Key Question) Below is a production possibilities table for consumer goods (automobiles) and capital goods (forklifts):

<table>
<thead>
<tr>
<th>Type of Production</th>
<th>Production Alternatives</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
</tr>
<tr>
<td>Automobiles</td>
<td>0</td>
</tr>
<tr>
<td>Forklifts</td>
<td>30</td>
</tr>
</tbody>
</table>

a. Show these data graphically. Upon what specific assumptions is this production possibilities curve based?

b. If the economy is at point C, what is the cost of one more automobile? Of one more forklift? Explain how the production possibilities curve reflects the law of increasing opportunity costs.

c. If the economy characterized by this production possibilities table and curve were producing 3 automobiles and 20 forklifts, what could you conclude about its use of available resources?
d. What would production at a point outside the production possibilities curve indicate? What must occur before the economy can attain such a level of production?

(a) See curve EDCBA. The assumptions are full employment, fixed supplies of resources, fixed technology and two goods.

(b) 4.5 forklifts; .33 automobiles, as determined from the table. Increasing opportunity costs are reflected in the concave-from-the-origin shape of the curve. This means the economy must give up larger and larger amounts of rockets to get constant added amounts of automobiles—and vice versa.

(c) The economy is underutilizing its available resources. The assumption of full employment has been violated.

(d) Production outside the curve cannot occur (consumption outside the curve could occur through foreign trade). To produce beyond the current production possibilities curve this economy must realize an increase in its available resources and/or technology.

**Key Question** Specify and explain the typical shapes of the marginal-benefit and marginal-cost curves. How are these curves used to determine the optimal allocation of resources to a particular product? If current output is such that marginal cost exceeds marginal benefit, should more or fewer resources be allocated to this product? Explain.

The marginal benefit curve is downward sloping, MB falls as more of a product is consumed because additional units of a good yield less satisfaction than previous units. The marginal cost curve is upward sloping, MC increases as more of a product is produced since additional units require the use of increasingly unsuitable resource. The optimal amount of a particular product occurs where MB equals MC. If MC exceeds MB, fewer resources should be allocated to this use. The resources are more valuable in some alternative use (as reflected in the higher MC) than in this use (as reflected in the lower MB).

**1-12** Explain how (if at all) each of the following affects the location of a country’s production possibilities curve:

a. The quality of education increases.

b. The number of unemployed workers increases.
c. A new technique improves the efficiency of extracting iron from ore.
d. A devastating earthquake destroys numerous production facilities.
   (a) Assuming better education translates into better work skills, then productivity should rise and this would shift the curve outward.
   (b) Should not affect location of curve. Production moves inward, away from the curve.
   (c) The curve should shift outward as more production is possible with existing resources.
   (d) The curve should shift inward with the destruction of resources (capital).

1-13 **(Key Question)** Suppose improvement occurs in the technology of producing forklifts but not in the technology of producing automobiles. Draw the new production possibilities curve. Now assume that a technological advance occurs in producing automobiles but not in producing forklifts. Draw the new production possibilities curve. Now draw a production possibilities curve that reflects technological improvement in the production of both products.

See the graph for question 1-10. PPC\(_1\) shows improved forklift technology. PPC\(_2\) shows improved auto technology. PPC\(_3\) shows improved technology in producing both products.

1-14 **(Key Question)** On average, households in China save 40 percent of their annual income each year, whereas households in the United States save less than 5 percent. Production possibilities are growing at roughly 9 percent annually in China and 3.5 percent in Canada. Use graphical analysis of “present goods” versus “future goods” to explain the differences in growth rates.

Figure 1.6 on page 17 depicts this situation. Canada would be represented by Figure 1.6a (“Presentville”), producing primarily goods for the present. China’s situation is depicted by Figure 1.6b (“Futureville”), where emphasis on goods for the future leads to a greater expansion of production possibilities.

Figure 1.6 is not a perfect representation for a couple of reasons. Both nations are further down the PPC (i.e. closer to the horizontal axis) than is represented by points “P” and “F.” Also, if drawn to scale, Canada’s PPC would start further to the right than China’s, even though China’s would expand more in relative terms.

1-15 Suppose that, on the basis of a nation’s production possibilities curve, an economy must sacrifice 10,000 pizzas domestically to get the 1 additional industrial robot it desires, but that it can get the robot from another country in exchange for 9,000 pizzas. Relate this information to the following statement: “Through international specialization and trade, a nation can reduce its opportunity cost of obtaining goods and thus ‘move outside its production possibilities curve.’”

The message of the production possibilities curve is that an individual nation is limited to the combinations of output indicated by its production possibilities curve. International specialization means directing domestic resources to output which a nation is highly efficient at producing. International trade involves the exchange of these goods for goods produced abroad. Specialization and trade have the same effect as having more and better resources or discovering improved production techniques. The output gains from greater international specialization and trade are the equivalent of economic growth.

***(Answer to The Last Word)*** Studies indicate that married men on average earn more income than unmarried men of the same age and education level. Why must we be cautious in concluding that marriage is the cause and higher income is the effect?

Correlation does not necessarily mean that there is causation. The relationship could be purely coincidental or dependent on some other factor not included in the analysis. It is also possible that higher income is the variable that “causes” marriage.
Chapter 2 end of chapter key

2-1 Contrast how a market system and a command economy try to cope with economic scarcity.

A market system allows for the private ownership of resources and coordinates economic activity through market prices. Participants act in their own self-interest and seek to maximize satisfaction or profit through their own decisions regarding consumption or production. Goods and services are produced and resources are supplied by whoever is willing to do so. The result is competition and widely dispersed economic power.

The command economy is characterized by public ownership of nearly all property resources and economic decisions are made through central planning. The planning board, appointed by the government determines production goals for each enterprise. The division of output between capital and consumer goods is centrally decided based on the board’s long-term priorities.

2-2 How does self-interest help achieve society’s economic goals? Why is there such a wide variety of desired goods and services in a market system? In what way are entrepreneurs and businesses at the helm of the economy but commanded by consumers?

The motive of self-interest gives direction and consistency to the economy. The primary driving force of the market system is self-interest. Entrepreneurs try to maximize their profits; property owners want the highest price for their resources; workers choose the job with the best wages, fringe benefits and working conditions. Consumers apportion their expenditures to maximize their utility, while seeking the lowest possible prices. As individuals express their free choice, the economy is directed to produce the most wanted goods at the lowest possible cost.

Each individual consumer will choose a variety of goods and services that in combination will maximize his/her satisfaction (utility). There is a wide variety because individual wants are diverse. To maximize profits, producers must respond to the desires of the individual consumer. Although producers are free to choose what products they will produce, if the producers are to maximize profits, these good and services must be what consumers desire. Entrepreneurs can drive the economic ship where they want (at least for a while), but the ship will run aground (businesses will fail) if entrepreneurs at the helm don’t listen to the consumers that command them.

2-3 Why are private property, and the protection of property rights, so critical to the success of the market system?

The ownership of private property and the protection of property rights encourages investment, innovation, and, therefore, economic growth. Property rights encourage the maintaining of the property and they facilitate the exchange of the property.

2-4 What are the advantages of using capital in the production process? What is meant by the term “division of labour”? What are the advantages of specialization in the use of human and material resources? Explain why exchange is the necessary consequence of specialization.

Capital goods enable producers to operate more efficiently and to produce more output. “Division of labour” means that workers perform those tasks that are best suited to their individual abilities and skills.

The advantages of specialization for workers are that they can choose work according to their natural aptitudes, have the opportunity to perfect those skills, and save time in not having to shift continually from one task to another. Material resources will be developed and adapted for a specific use. On a regional basis, each region will produce those products for which it is best suited. By specializing in its comparative advantage, each region or set of human and material resources is being used to maximize efficiency.

When resources are specialized, they are no longer self-sufficient. To obtain the goods and services one needs, exchange is necessary. Also, specialization will result in a surplus of a

...
specific good being produced. The surplus of one good will be exchanged for the surplus production of other goods.

2-5 What problem does barter entail? Indicate the economic significance of money as a medium of exchange. What is meant by the statement: “We want money only to part with it”?

Barter requires the “double coincidence of wants.” If someone wants something, he/she will have to find someone who wishes to part with that good and at the same time wishes to exchange the good for something that the first party wishes to part with.

With money as a medium of exchange, one knows the purchase price of the item to be purchased and its relative price to other items. Money is a very convenient common denominator, a common measure of value that is also used as a medium of exchange. Money also encourages specialization. Without money, workers and other resources could not be paid except in the output produced. All those who participated in the production of the good would have to collectively exchange it for all the goods and service desired by the resource owners.

Money itself has value only in relation to the resources, goods, and services that can be obtained with it. When people say that they want money, they really mean that they want the things that money can buy. In this sense, money imparts value only when someone parts with it.

2-6 Evaluate and explain the following statements:

a. The market system is a profit-and-loss system.

b. Competition is the disciplinarian of the market economy.

(a) The quotation is accurate. In a market system, producer decisions are motivated by the attempt to earn profits. Those products that enable a firm to earn at least a normal profit (minimum compensation for the entrepreneur for his/her time and talents) will be produced. If the product cannot be produced for a profit—in other words, if losses are involved in production—the capitalist firm will respond by seeking lower cost production methods and may halt the production of goods completely. Because profits and/or losses are the motivation behind the fundamental decisions made in a market system, it could be called a “profit and loss economy.”

(b) Competition provides discipline in two ways. First, it forces firms to seek the least-cost production methods or face being driven out of business by their rivals. Second, it prevents successful producers from charging whatever the market will bear. Competition keeps prices at a level where total revenue will just cover the total cost of production including a normal profit, but no more in the long run. If sellers try to charge a price that will earn them economic profits, new firms will enter the industry, increasing supply, and lowering prices until the economic profits are eliminated. Competition is indispensable in this role, because otherwise some other method would have to be found to direct firms to use the least-cost production technique and to charge a price that provides only a normal return. Where competition does not exist, such as in natural monopolies like public utility companies, regulators or publicly owned companies must assume the role of disciplinarian. Experience has shown that this is a difficult process and does not achieve the same results as easily as a competitive market situation.

2-7 In the 1990s thousands of “dot-com” companies emerged with great fanfare to take advantage of the Internet and new information technologies. A few, like Yahoo, eBay, and Amazon, generally thrived and prospered, but many others struggled and eventually failed. Explain these varied outcomes in terms of how the market system answers the question “What goods and services will be produced?”

The expectation of economic profits lured many new firms into the “dot-com” industries. However, because of a lack of information and a market unable to sustain so many firms, many failed to realize even a normal profit and failed. [Technically many of the early dot-coms were
not earning economic profits, but their shareholders were reaping huge windfalls from the stock market speculation.] When these new firms found that they could not profitably produce in this industry, they dropped out and the industry declined. The problem was not so much one of consumer sovereignty – consumers demonstrated an interest in these services. The heavy competition of so many firms trying to establish themselves in the market led to prices that were insufficient to cover economic costs. In a few cases, most notably Napster (an internet company that allowed users to download music at little or no cost), government restrictions on activities (copyright infringement in Napster’s case) led to firm failure (at least for a time).

2-8 (Key Question) With current technology, suppose a firm is producing 400 loaves of banana bread daily. Also, assume that the least-cost combination of resources in producing those loaves is 5 units of labour, 7 units of land, 2 units of capital, and 1 unit of entrepreneurial ability, selling at prices of $40, $60, $60, and $20, respectively. If the firm can sell these 400 units at $2 per unit, will it continue to produce banana bread? If this firm’s situation is typical for the other makers of banana bread, will resources flow to or away from this bakery good?

The firm will continue to produce as it is earning economic profits of $40 (Total revenue of $800 minus total cost of $760). If this firm is typical, more resources will flow toward banana bread as other potential firms are attracted to the economic profits.

2-9 (Key Question) Some large hardware stores such as Canadian Tire boast of carrying as many as 20,000 different products in each store. What motivated the producers of those individuals to make them and offer them for sale? How did producers decide on the best combinations of resources to use? Who made these resources available, and why? Who decides whether these particular hardware products should continue to be produced and offered for sale?

The quest for profit led firms to produce these goods. Producers looked for and found the least-cost combination of resources in producing their output. Resource suppliers, seeking income, made these resources available. Consumers, through their dollar votes, ultimately decide on what will continue to be produced.

2-10 What is meant by the term “creative destruction”? How does the emergence of MP3 (iPod) technology relate to this idea?

Creative destruction refers to the process by which the creation of new products and production techniques destroys the market positions of firms committed to producing only existing products or using outdated methods. The ability to download and store a large number of songs, and the superior quality of MP3 is causing a decline in the CD industry, just as CDs once replaced cassette tapes, which had previously replaced phonographs (records).

2-11 In a sentence, describe the meaning of the phrase “invisible hand.”

Market prices act as an “invisible hand,” coordinating an economy by rationing what is scarce, and providing incentives to produce the most desired goods and services.

2-12 In market economies, firms rarely worry about the availability of inputs to produce their products, whereas in command economies input availability is a constant concern. Why the difference?

In market economies, buyers of inputs know that sellers want to make resources available for sale because that is how they earn their profits. If there aren’t enough resources available, prices will rise until suppliers come forth with the desired amounts. In command economies the availability of inputs depends on what was specified in the plan, and how well the plan was executed. There is no opportunity (at least not legally) to offer greater payments to get those resources provided.

2-13 Distinguish between the factor market and product market in the circular flow model. In what way are businesses and households both sellers and buyers in this model? What are the flows in the circular flow model?
The resource markets are where the owners of the resources (the households) sell their resources to the buyers of the resources (businesses). In the product markets, businesses sell the goods and services they have produced to the buyers of the goods and services, the households. Households (individuals) either own all economic resources directly or own them indirectly through their ownership of business corporations. These households are willing to sell their resources to businesses because attractive prices draw them into specific resource markets. Businesses buy resources because they are necessary for producing goods and services. The interaction of the buyers and sellers establishes the price of each resource.

In the product market, businesses are the sellers and householders are the buyers; their role in the market has been reversed. Each group of economic units both buys and sells. One flow is the flow of real goods and services (including resource services) and the other flow is the flow of money (money income, consumption expenditures, revenue, production costs).

(Answer to The Last Word) What explains why millions of economic resources tend to get arranged logically and productively rather than haphazardly and unproductively?

The institution of private property is a primary reason why resources are arranged logically and productively. Private property eliminates randomness to the allocation of resources, as property owners act in deliberate ways to protect and maximize the benefits from their property. Owners pursue the greatest possible returns from their property, drawing resources to their most valued uses. Through the interaction of millions of economic agents all trying to use their private property to maximize well-being, a complex, logical, and productive arrangement of resources results.

Chapter 3 end of chapter key

3-1 Explain the law of demand. Why does a demand curve slope downward? How is a market demand curve derived from individual demand curves?

As prices change because of a change in supply for a commodity, buyers will change the quantity they demand of that item. If the price drops, a larger quantity will be demanded. If the price rises, a lesser quantity will be demanded.

The demand curve slopes downward because of diminishing marginal utility, and the substitution and income effects. Because successive units of a good provide less additional utility than the previous units, buyers will only pay for these smaller amounts of utility if the price is lowered. When the price of a commodity decreases relative to that of substitutes, a buyer will substitute the now cheaper commodity for those whose prices have not changed. At the same time, the decreased price of the commodity under discussion will make the buyer wealthier in real terms. More can be bought of this commodity (as well as of others whose prices have not changed). Thus, the substitution and income effects reinforce each other: More will be bought of a normal (or superior) commodity as its price decreases. On a graph with price on the vertical axis and quantity on the horizontal, this is shown as a demand curve sloping downward from left to right.

The market demand curve is derived by horizontally summing the individual demand curves.
What are the determinants of demand? What happens to the demand curve when each of these determinants changes? Distinguish between a change in demand and a change in the quantity demanded, noting the cause(s) of each.

The fundamental determinant of demand is the price of the commodity under consideration: a change in price causes movement along the commodity’s demand curve. This movement is called a change in quantity demanded. Decreased price leads to movement down the demand curve: There is an increase in quantity demanded. Increased price leads to movement up the demand curve: There is a decrease in quantity demanded.

In addition, there are determinants of demand, which are factors that may shift the demand curve, i.e., cause a “change in demand.” These are the number of buyers, the tastes (or desire) of the buyers for the commodity, the income of the buyers, the changes in price of related commodities (substitutes and complements), and expectations of the buyers regarding the future price of the commodity under discussion.

The following will lead to increased demand: more buyers, greater desire for the commodity, higher incomes (assuming a normal good), lower incomes (assuming an inferior good), an increased price of substitutes, a decreased price of complements, and an expectation of higher future prices or incomes. This increased demand will show as a shift of the entire demand curve to the right.

The reverse of all the above will lead to decreased demand and will show as a shift of the entire demand curve to the left.

(Key Question) What effect will each of the following have on the demand for small automobiles such as the Mini Cooper and Smart car?

a. Small automobiles become more fashionable.

b. The price of large automobiles rises (with the price of small autos remaining the same).

c. Income declines and small autos are an inferior good.

d. Consumers anticipate the price of small autos will greatly come down in the near future.

e. The price of gasoline substantially drops.

Demand increases in (a), (b), and (c); decreases in (d). The last one (e) is ambiguous. As autos and gas are complements, one could argue that the decrease in gas prices would stimulate demand for all cars, including small ones. However, one could also argue that small cars are attractive to consumers because of fuel efficiency, and that a decrease in gas prices effectively reduces the price of the “gas guzzling” substitutes. That would encourage consumers to switch from smaller to larger cars (SUVs), and demand for small automobiles would fall. [This presents a good illustration of the complexity of many of these changes.]

Explain the law of supply. Why does the supply curve slope upward? How is the market supply curve derived from the supply curves of individual producers?

As prices rise because of increased demand for a commodity, producers find it more and more profitable to increase the quantity they offer for sale; that is, the supply curve will slope upward from left to right. Clearly, firms would rather sell at a higher price than at a lower price. Moreover, it is necessary for firms to demand a higher price as they increase production. This comes about because as they produce more and more, they start to run up against capacity constraints and costs rise. At any given time, a plant has a given size. As production increases, the firm will need to add an extra shift and then a third shift, both perhaps at higher wages. It may run out of warehouse space and have to rent at higher cost from another firm. It may have to pay extra to get increasingly urgent raw material, and so on.

The market supply curve is derived by horizontally adding the individual supply curves.
What are the determinants of supply? What happens to the supply curve when each of these determinants changes? Distinguish between a change in supply and a change in the quantity supplied, noting the cause(s) of each.

The fundamental determinant of supply is the price of the commodity. As price increases, the quantity supplied increases. An increase in price causes a movement up a given supply curve. A decrease in price causes a movement down a given supply curve.

The non-price determinants of supply are: resource (input) prices, technology, taxes and subsidies, prices of other related goods, expectations, and the number of sellers. If one or more of these change, there will be a change in supply and the whole supply curve will shift to the right or the left.

The following will cause an increase in supply: a decrease in resource (input) prices; improved (lower cost) technology; a decrease in business taxes, an increase in subsidies to business; a decrease in the price of another commodity that this firm was making, provided that commodity is a substitute in production (the firm can switch from the now lower priced one to our commodity); an expectation of lower prices in the future; and an increase in the number of sellers. The increase in supply caused by the noted change in one or more of the above will cause the entire supply curve to shift to the right. More will now be supplied at any given price. Alternatively expressed, any given amount will now be supplied at a lower price.

The reverse of any or all the above changes in the determinants of demand will cause a decrease in demand and will be shown as a shift of the supply curve to the left. Less will now be supplied at any given price. Alternatively expressed, any given amount will now be supplied at a higher price.

(Key Question) What effect will each of the following have on the supply of automobile tires?

- A technological advance in the methods of producing tires.
- A decline in the number of firms in the tire industry.
- An increase in the price of rubber used in the production of tires.
- The expectation that the equilibrium price of auto tires will be lower in the future than it is currently.
- A decline in the price of large tires used for semi-trucks and earth hauling rigs (with no change in the price of auto tires).
- The levying of a per-unit tax in each auto tire sold.
- The granting of a 50-cent-per-unit subsidy for each auto tire produced.

Supply increases in (a), (d), (e), and (g); decreases in (b), (c), and (f).

“In the corn market, demand often exceeds supply and supply sometimes exceeds demand.” “The price of corn rises and falls in response to changes in supply and demand.” In which of these two statements are the terms “supply” and “demand” used correctly? Explain.

In the first statement “supply” and “demand” are used incorrectly. Supply and demand are both schedules or curves that intersect where quantity supplied and quantity demanded are equal. One cannot talk of curves that intersect as exceeding or not exceeding each other.

Supply and/or demand can change (the entire curves can shift). Each time this happens, it will create a new intersection of the two curves that will lead to changes in the equilibrium quantity and price of corn. Thus, the terms “supply” and “demand” are used correctly in the second statement.

(Key Question) Suppose the total demand for wheat and the total supply of wheat per month in the Kansas City grain market are as follows:
### Table: Supply and Demand

<table>
<thead>
<tr>
<th>Thousands of bushels demanded</th>
<th>Price per bushel</th>
<th>Thousand of bushels supplied</th>
<th>Surplus (+) or shortage (-)</th>
</tr>
</thead>
<tbody>
<tr>
<td>85</td>
<td>$3.40</td>
<td>72</td>
<td></td>
</tr>
<tr>
<td>80</td>
<td>3.70</td>
<td>73</td>
<td></td>
</tr>
<tr>
<td>75</td>
<td>4.00</td>
<td>75</td>
<td></td>
</tr>
<tr>
<td>70</td>
<td>4.30</td>
<td>77</td>
<td></td>
</tr>
<tr>
<td>65</td>
<td>4.60</td>
<td>79</td>
<td></td>
</tr>
<tr>
<td>60</td>
<td>4.90</td>
<td>81</td>
<td></td>
</tr>
</tbody>
</table>

a. What is the equilibrium price? What is the equilibrium quantity? Fill in the surplus-shortage column and use it to explain why your answers are correct.

b. Graph the demand for wheat and the supply of wheat. Be sure to label the axes of your graph correctly. Label equilibrium price \( P \) and the equilibrium quantity \( Q \).

c. Why will $3.40 not be the equilibrium price in this market? Why not $4.90? “Surpluses drive prices up; shortages drive them down.” Do you agree?

Data from top to bottom: -13; -7; 0; +7; +14; and +21.

(a) \( P_e = $4.00; Q_e = 75,000 \). Equilibrium occurs where there is neither a shortage nor surplus of wheat. At the immediately lower price of $3.70, there is a shortage of 7,000 bushels. At the immediately higher price of $4.30, there is a surplus of 7,000 bushels. (See graph above).

(b) See graph above.

c. Because at $3.40 there will be a 13,000 bushel shortage which will drive price up. Because at $4.90 there will be a 21,000 bushel surplus which will drive the price down. Quotation is incorrect; just the opposite is true.

### Key Question

How will each of the following changes in demand and/or supply affect equilibrium price and equilibrium quantity in a competitive market; that is do price and quantity rise, fall, remain unchanged, or are the answers indeterminate because they depend on the magnitudes of the shifts? Use supply and demand diagrams to verify your answers.

a. Supply decreases and demand is constant.
b. Demand decreases and supply is constant.
c. Supply increases and demand is constant.
d. Demand increases and supply increases.
e. Demand increases and supply is constant.
f. Supply increases and demand decreases.
g. Demand increases and supply decreases.
h. Demand decreases and supply decreases.
(a) Price up; quantity down;
(b) Price down; quantity down;
(c) Price down; quantity up;
(d) Price indeterminate; quantity up;
(e) Price up; quantity up;
(f) Price down; quantity indeterminate;
(g) Price up, quantity indeterminate;
(h) Price indeterminate and quantity down.

3-10 In 2001 an outbreak of foot-and-mouth disease in Europe led to the burning of millions of cattle carcasses. What impact do you think this had on the supply of cattle hides, hide prices, the supply of leather goods, and the price of leather goods? In 2004, millions of chickens were culled in British Columbia due to the avian flu. What impact do you think this had on the supply of eggs, and the price of eggs?

The supply of cattle hides was reduced, raising the price of hides. Because hides were more expensive, it became more costly to produce leather, reducing the supply and raising the price of leather goods. Millions of chicken culled resulted in higher egg prices.

3-11 Critically evaluate: “In comparing the two equilibrium positions in Figure 3.7b, I note that a smaller amount is actually demanded at a lower price. This refutes the law of demand.”

The key point here is that the second equilibrium occurs after demand has decreased, that is demand has shifted because of a change in determinants, which has caused buyers to want less at every price compared to the original D1 demand curve and schedule. Each equilibrium price refers to a different demand situation. Therefore, the fact that less is purchased at a lower price when demand decreases does not refute the law of demand. Note that on the second demand curve and schedule, less would still be purchased at a higher price.

3-12 For each stock in the stock market, the number of shares sold daily equals the number of shares purchased. That is, the quantity of each firm’s shares demanded equals the quantity supplied. So, if this equality always occurs, why do the prices of stock shares ever change?

During any given stock trading session, there will be both prospective buyers and sellers, each willing to buy or sell a certain number of shares depending on price. If at the current price (e.g. the day’s opening price) the quantity of shares demanded exceeds the quantity of shares supplied, buyers must increase their price offers to induce sellers to offer enough shares. This will cause share prices to rise until quantity demanded equals quantity supplied. Suppose that during the trading session there is a report of bad economic news. Sellers may respond by trying to sell more shares than buyers are wanting at the current price. In order to find enough willing buyers, sellers will have to offer their shares at lower prices. On any given trading day, there will be multiple equilibrium prices, many of them not lasting for more than a few minutes (or even seconds).

3-13 Using the schedules given, plot the demand curve and the supply curve on the below graph. Label the axes and indicate for each axis the units being used to measure price and quantity. Then answer the questions.
(a) Give the equilibrium price and quantity for wheat.

(b) Indicate the equilibrium price and quantity on a graph by drawing lines from the intersection of the supply and demand curves to the price and quantity axes.

(c) If the federal government decided to support the price of wheat at $4.00 per bushel, tell whether there would be a surplus or shortage and how much it would be.

(d) Demonstrate your answer to part (c) on your graph being sure to label the quantity you designated as the shortage or surplus.

(a) The equilibrium price and quantity for wheat will be $3.60 and 200,000 bushels.

(b) The equilibrium price and quantity on the graph are labelled $P_e$ and $Q_e$.

(c) If the federal government decided to support the price of wheat at $4.00 per bushel, there would be a surplus of $220,000 – 150,000 = 70,000$ bushels.

(d) See surplus labelled on figure.

(Key Question) Refer to the table in question 8. Suppose that the government establishes a price ceiling of $3.70 for wheat. What might prompt the government to establish this price ceiling?
Explain carefully the main effects. Demonstrate your answer graphically. Next, suppose that the government establishes a price floor of $4.60 for wheat. What will be the main effects of this price floor? Demonstrate your answer graphically.

At a price of $3.70, buyers will wish to purchase 80,000 bushels, but sellers will only offer 73,000 bushels to the market. The result is a shortage of 7,000 bushels. The ceiling prevents the price from rising to encourage greater production, discourage consumption, and relieve the shortage. See the graph below.

At a price of $4.60, buyers only want to purchase 65,000 bushels, but sellers want to sell 79,000 bushels, resulting in a surplus of 14,000 bushels. The floor prevents the price from falling to eliminate the surplus. See the graph below.

What do economists mean when they say that “price floors and ceilings stifle the rationing function of prices and distort resource allocation”?

When unrestrained, prices rise and fall to correct imbalances between the quantity supplied and quantity demanded in a market. If sellers find themselves at a given price with more output than consumers are willing to purchase, the price will fall. Likewise, if the market is not offering enough of a good to satisfy consumer demand, the price will rise. Price floors and ceilings
prevent price movements to correct these imbalances. When a price is set above equilibrium (i.e. a price floor), sellers will produce more than the market can support, diverting resources away from more highly valued uses. Price ceilings result in an underallocation of resources toward a particular good, where the excess demand (shortage) reveals that consumers value the good (and therefore the resources used to produce it) more than what the market currently offers.

3-16 Use data in the following table to explain the economic effects of a price ceiling at $6, at $5, and at $4.

<table>
<thead>
<tr>
<th>Price</th>
<th>Quantity demanded</th>
<th>Quantity supplied</th>
</tr>
</thead>
<tbody>
<tr>
<td>$7</td>
<td>4,500</td>
<td>4,500</td>
</tr>
<tr>
<td>6</td>
<td>5,000</td>
<td>3,500</td>
</tr>
<tr>
<td>5</td>
<td>5,500</td>
<td>2,500</td>
</tr>
<tr>
<td>4</td>
<td>6,000</td>
<td>1,500</td>
</tr>
</tbody>
</table>

A price ceiling means that the price will not be permitted to rise above a maximum price. If the price ceiling is below the competitive equilibrium price of $7, it would produce a shortage of the product. For example, if the price ceiling was set at $6, the quantity demanded would be 5,000 units and the quantity supplied would be 3,500 for a shortage of 1,500 units. With a price ceiling set at $5, the shortage would be 3,000 units, and with a price ceiling of $4, the shortage would be 4,500 units. A price ceiling interferes with the rationing function of price that serves to balance the decisions of demanders and suppliers. The price ceiling produces a shortage that indicates that resources are being underallocated; output is not being produced because some producers cannot make a profit at the price ceiling level.

3-17 Use data in the following table to explain the economic effects of a price floor at $8, at $9, and at $10. Explain the economic effects.

<table>
<thead>
<tr>
<th>Price</th>
<th>Quantity demanded</th>
<th>Quantity supplied</th>
</tr>
</thead>
<tbody>
<tr>
<td>$10</td>
<td>3,000</td>
<td>7,500</td>
</tr>
<tr>
<td>9</td>
<td>3,500</td>
<td>6,500</td>
</tr>
</tbody>
</table>
A price floor means that the price is not allowed to fall below a minimum price set by government. If the price floor is above the competitive equilibrium price of $7, a surplus of the product would result. If the price floor was set at $8, the quantity demanded would be 4,000 units but the quantity supplied would be 5,500 units for a surplus of 1,500 units. At a price floor of $9, the surplus would be 3,000 units, and with a price floor of $10, the surplus would be 4,500 units. A price floor interferes with the rationing function of price that serves to balance the decisions of suppliers and demanders. The price floor that produces a surplus indicates that resources are being overallocated and that there is economic inefficiency; output is being produced which consumers do not want to purchase at the price floor.

Advanced analysis: Assume that the demand for a commodity is represented by the equation $P = 10 - 0.2Q_d$ and supply by the equation $P = 2 + 0.2Q_s$, where $Q_d$ and $Q_s$ are quantity demanded and quantity supplied, respectively, and $P$ is price. Using the equilibrium condition $Q_s = Q_d$, solve the equations to determine equilibrium price. Now determine equilibrium quantity. Graph the two equations to substantiate your answers.

Demand is $P = 10 - 2Q_d$

Therefore $5P = 50 - Q_d = 50 - 5P$

Supply is $P = 2 + 2Q_s$

Therefore $5P = 10 + Q_s$ and $Q_s = -10 + 5P$

Substitute $Q_d$ and $Q_s$ into $Q_s = Q_d$ equilibrium condition

$50 - 5P = -10 + 5P$

$60 = 10P$ and $6 = P$

Now substitute $P = 6$ in either $Q_d$ or $Q_s$ to determine equilibrium quantity

$Q_d = 50 - 5P = 50 - 5(6) = 20$

or
\[ Q_s = -10 + 5P = -10 + 5(6) = 20 \]

(Answer to the Last Word) How many organ transplants were done in Canada in the latest year for which statistics are available? What is the current overall number of candidates waiting for an organ transplant? (For the answer, visit the London Health Science Centre Web site, http://www.lhsc.on.ca/transplant/overview.htm.) Do you favour the establishment of a legal market for transplant organs? Why or why not?

More than 4,000 Canadians are waiting for an organ transplant to save or improve their lives. In 2007, only 2,188 transplants were performed, so many patients remain on the waiting list. Answers to the other questions will vary.

Chapter 4 end of chapter key

4-1 Explain why the choice between 1, 2, 3, 4, 5, 6, 7, and 8 “units” or 1000, 2000, 3000, 4000, 5000, 6000, 7000, and 8000 movie tickets, makes no difference in determining elasticity in Table 4-1. Price elasticity of demand is determined by comparing the percentage change in price and the percentage change in quantity demanded. The percentage change in quantity will remain the same regardless of whether the difference is between 1 unit and 2 units or 1000 units and 2000 units.

4-2 (Key Question) Graph the accompanying demand data and then use the midpoints formula for Ed to determine price elasticity of demand for each of the four possible $1 price changes. What can you conclude about the relationship between the slope of a curve and its elasticity? Explain in a
non-technical way why demand is elastic in the northwest segment of the demand curve and inelastic in the southeast segment.

<table>
<thead>
<tr>
<th>Product price</th>
<th>Quantity demanded</th>
</tr>
</thead>
<tbody>
<tr>
<td>$5</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>1</td>
<td>5</td>
</tr>
</tbody>
</table>

See the graph accompanying the answer to 4-4. Elasticities, top to bottom: 3; 1.4; .714; .333. Slope does not measure elasticity. This demand curve has a constant slope of -1 (= -1/1), but elasticity declines as we move down the curve. When the initial price is high and initial quantity is low, a unit change in price is a low percentage while a unit change in quantity is a high percentage change. The percentage change in quantity exceeds the percentage change in price, making demand elastic. When the initial price is low and initial quantity is high, a unit change in price is a high percentage change while a unit change in quantity is a low percentage change. The percentage change in quantity is less than the percentage change in price, making demand inelastic.

4-3 The following data shows the relationship between price and quantity demanded at four different prices for a product:

\[ \begin{align*} 
P &= $11, \quad Q_d = 16 \\
P &= $9, \quad Q_d = 24 \\
P &= $7, \quad Q_d = 32 \\
P &= $5, \quad Q_d = 40 
\end{align*} \]

Using the midpoints formula, what is the price elasticity of demand between: (a) $11 and $9; (b) $9 and $7; (c) $7 and $5?

(a) 2.0; (b) 1.14; (c) 0.67

4-4 (Key Question) Calculate total-revenue data from the demand schedule in question 2. Graph total revenue below your demand curve. Generalize on the relationship between price elasticity and total revenue.
See the graph. Total revenue data, top to bottom: $5; $8; $9; $8; $5. When demand is elastic, price and total revenue move in the opposite direction. When demand is inelastic, price and total revenue move in the same direction.

4-5  (Key Question) How would the following changes in price affect total revenue. That is, would total revenue increase, decline, or remain unchanged?
   a. Price falls and demand is inelastic.
   b. Price rises and demand is elastic.
   c. Price rises and supply is elastic.
   d. Price rises and supply is inelastic.
   e. Price rises and demand is inelastic.
   f. Price falls and demand is elastic.
   g. Price falls and demand is of unit elasticity.
Total revenue would increase in (c), (d), (e), and (f); decrease in (a) and (b); and remain the same in (g).

4-6 The president of the Micro Brewing Corporation asks you, as the company economist, to forecast changes in consumer beer purchases associated with a proposed price change. You conduct a survey and find that if the price of a six-pack increases from $5.50 to $7.50, the quantity demanded will decrease from 2,200 units to 1,800 units a month. Should the Micro Brewing Corporation raise its price? Explain the economic basis for this recommendation to the president.
Yes, the corporation should increase the price of a six-pack. Over the price range considered, the price elasticity of demand coefficient is 0.65, or inelastic, using the midpoints formula. An increase in price when demand is inelastic will increase total revenue. This increase in total revenue also can be shown by multiplication. With a price of $5.50 times a quantity of 2,200 per month, the total revenue was $12,100. With the higher price of $7.50 times a lower quantity of 1,800, the total revenue is $13,500. Thus, there is a gain of $1,400 in total revenue from raising the price.

4-7 The following is a straight-line demand curve that confronts a single firm.

<table>
<thead>
<tr>
<th>Price</th>
<th>Quantity Demanded</th>
<th>(3)</th>
<th>(4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>$6</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>6</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(a) In column 3, compute total revenue. In column 4, compute the coefficient for the price elasticity of demand at each price using the midpoints formula.

(b) Describe the character of elasticity across the prices based on the total revenue test and the elasticity coefficient.

(c) Does a straight-line demand curve have constant elasticity?

(d) Of what practical significance is your answer to (c)?
(a) See the above table for the answers.

(b) Total revenue declines when price drops from $3 to $2, and the elasticity coefficient also becomes less than 1 at that price change. Demand is elastic in the range of prices between $6 and $4, and inelastic below $3. A drop in price from $4 to $3 illustrates unitary elasticity.

(c) The clear answer is “no” based on the answers in the table. Although the slope of a linear demand curve is, by definition, constant, elasticity varies because it measures percentage changes.

(d) The significance is twofold. (1) One cannot tell elasticity by looking at a demand curve because the elasticity changes over the range of the curve. (2) The elasticity of demand for any product will depend on the level of its initial price and quantity, not just on the change in price. Therefore, the demand for a product may be very elastic in one price range (generally the higher price ranges) and very inelastic in another (lower) price range.

(Key Question) What are the major determinants of price elasticity of demand? Use these determinants and your own reasoning in judging whether demand for each of the following products is elastic or inelastic:

(a) bottled water, (b) tooth paste; (c) Crest toothpaste; (d) ketchup, (e) diamond bracelets; (f) Microsoft Windows operating system.
Substitutability, proportion of income; luxury versus necessity, and time. Elastic: (a), (c), (e). Inelastic: (b), (d), and (f).

4-9 What effect would a rule stating that university students must live in university dormitories have on the price elasticity of demand for dormitory space? What impact might this in turn have on room rates?

The ruling would make the price elasticity of demand more inelastic than if there were no such rule, assuming that there is not another equivalent university nearby to which students could transfer. Although universities are non-profit organizations, the rule would certainly allow them to raise rates without worrying so much about students moving out to live elsewhere.

4-10 In November 1998 Vincent van Gogh’s self-portrait sold at auction for $71.5 million. Portray this sale in a demand and supply diagram and comment on the elasticity of supply. Comedian George Carlin once mused, “If a painting can be forged well enough to fool some experts, why is the original so valuable?” Provide an answer.

The supply is perfectly inelastic—vertical—at a quantity of 1 unit. The $71.5 million price is determined where the downward sloping demand curve intersected this supply curve.

If more than one picture where available (all but one having to be a copy), the demand would likely decrease enormously.

4-11 (Key Question) What is the formula for measuring the price elasticity of supply? Suppose the price of apples goes up from $20 to $22 a box. In direct response, Goldsboro Farms supplies 1200 boxes of apples instead of 1000 boxes. Compute the coefficient of price elasticity (midpoints approach) for Goldsboro’s supply. Is it supply elastic, or is it inelastic?

\[ E_s = \frac{\text{percentage change in quantity supplied}}{\text{percentage change in price}} \]

Using the midpoint formula, 
\[ E_s = 1.91 \quad (= \frac{(200/[(1000+1200)/2] / 2/[(20+22)/2]}) \]

Supply is price elastic \((E_s>1)\).

4-12 Explain the perspective that tougher enforcement of drug laws for cocaine or other drug laws may actually increase the crime rate. Use the concepts of demand, supply, and elasticity in your explanation.

Tougher enforcement of drug laws reduces the supply of cocaine and other illegal drugs, thus driving up the street price. The demand for cocaine and other drugs, however, appears to be highly inelastic. The increased price will increase total revenues and profits for sellers, but at the same time it will increase total spending by drug users. To support this increased spending, drug users are likely to commit more crimes. Thus, the increased enforcement of drug laws may have the secondary effect of increasing money-producing crimes such as robbery, burglary, shoplifting, and fraud.

4-13 A computer company is considering lowering the price of its laptop computer to promote sales. However, it worries that this will reduce desktop computer sales. It finds the cross product of demand to be 1.5. Are its concerns legitimate? Explain.

Yes. A cross elasticity of demand of 1.5 indicates that there is a positive relationship between the sales of desktop computers and the change in price of laptop computers, implying that they are substitutes. This means that when the price of laptop computers falls, sales for desktop computers also fall as consumers switch over and buy laptop computers. Thus, the computer company will have to consider how much it’s willing to let desktop computer sales drop to increase sales of laptop computers, and if that would be profitable.
4-14  **(Key Question)** Suppose the cross elasticity of demand for products A and B is +3.6 and for products C and D it is -5.4. What can you conclude about how products A and B are related? Products C and D?

A and B are substitutes; C and D are complements.

4-15 Use the information in the table below to identify the type of cross elasticity relationship between products X and Y in each of the following five cases, A to E.

<table>
<thead>
<tr>
<th>Cases</th>
<th>Percent change in price of Y</th>
<th>Percent change in quantity demanded of X</th>
<th>Cross elasticity type</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>5</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>9</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>5</td>
<td>-5</td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>3</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>E</td>
<td>-2</td>
<td>10</td>
<td></td>
</tr>
</tbody>
</table>

4-16  **(Key Question)** The income elasticities of demand for movies, dental services, and clothing have been estimated to be +3.4, +1.0, and +0.5 respectively. Interpret these coefficients. What does it mean if the income elasticity coefficient is negative?

All are normal goods—income and quantity demanded move in the same direction. These coefficients reveal that a 1 percent increase in income will increase the quantity of movies demanded by 3.4 percent, of dental services by 1.0 percent, and of clothing by 0.5 percent. A negative coefficient indicates an inferior good—income and quantity demanded move in the opposite direction.

4-17 Research has found that an increase in the price of beer would reduce the amount of marijuana consumed. Is cross elasticity between the two products positive or negative? Are these products substitutes or complements? What might be the logic behind this relationship?

The cross elasticity of the two products is negative. The products appear to be complementary. As one drinks beer, one also smokes marijuana.

4-18  **(Key Question)** What is the incidence of a tax when demand is highly inelastic? Elastic? What effect does the elasticity have on the incidence of a tax?

The incidence of a tax is likely to be primarily on consumers when demand is highly inelastic and primarily on producers when demand is elastic. The more elastic the supply, the greater the incidence of an excise tax on consumers and less on producers.
Refer to Table 4.5. If the six people listed in the table are the only consumers in the market and the equilibrium price is $11 (not the $8 shown), how much consumer surplus will the market generate?

The total consumer surplus will be $3 ($2 for Bob, $1 for Barb, $0 for Bill, and Bart, Brent, and Jenny will not purchase the good at a price of $11).

Refer to Table 4.6. If the six people listed in the table are the only producers in the market and the equilibrium price is $6 (not the $8 shown), how much producer surplus will the market generate?

The total producer surplus will be $6 ($3 for Carlos, $2 for Courtney, $1 for Chuck, $0 for Cindy, and Craig and Chad will not sell at a price of $6).

Draw a supply and demand graph and identify the areas of consumer and producer surplus. Given the demand curve, what impact will an increase in supply have on the amount of consumer surplus shown in your diagram? Explain why.

The graph will look like Figure 4-11 in the chapter. An increase in supply will lower the price and increase the amount of consumer surplus for a given demand curve. Any individual that was receiving consumer surplus before the change in supply will realize an increase in consumer surplus as the price falls and the difference between their maximum willingness to pay and the market price widens.

(Key Question) Use the ideas of consumer surplus and producer surplus to explain why economists say competitive markets are efficient. Why are below- or above-equilibrium levels of output inefficient, according to these two sets of ideas?

When the consumers’ utility exceeds the price paid, consumer surplus is generated. Likewise, when producers receive a price greater than marginal cost, producer surplus is created. By producing up to the point where MB = MC, the maximum potential consumer surplus and producer surplus is generated. Producing less than the equilibrium level means that potential surplus is left unrealized. Overproduction subtracts from the surplus because society values the use of the additional resources in other pursuits more than it values them in consumption of that good.

(Answer to The Last Word) What is the purpose of charging different groups of customers different prices? Supplement the three broad examples in the Last Word with two additional examples of your own. Hint: Think of price discounts based on group characteristic or time of purchase.

The primary purpose for charging different prices is to increase revenue and, in turn, profits. Other examples include student and senior citizen discounts (group characteristics based on age or activity), and movies and golf courses (discounts for consumption during “off-peak” times in order to spread out consumption and increase revenue).