CHAPTER 9 | Consumer Choice and Behavioral Economics

Chapter Summary and Learning Objectives

9.1 Utility and Consumer Decision Making (pages 280–288)
Define utility and explain how consumers choose goods and services to maximize their utility. Utility is the enjoyment or satisfaction that people receive from consuming goods and services. The goal of a consumer is to spend available income so as to maximize utility. Marginal utility is the change in total utility a person receives from consuming one additional unit of a good or service. The law of diminishing marginal utility states that consumers receive diminishing additional satisfaction as they consume more of a good or service during a given period of time. The budget constraint is the amount of income consumers have available to spend on goods and services. To maximize utility, consumers should make sure they spend their income so that the last dollar spent on each product gives them the same marginal utility. The income effect is the change in the quantity demanded of a good that results from the effect of a change in the price on consumer purchasing power. The substitution effect is the change in the quantity demanded of a good that results from a change in price making the good more or less expensive relative to other goods, holding constant the effect of the price change on consumer purchasing power.

9.2 Where Demand Curves Come From (pages 288–291)
Use the concept of utility to explain the law of demand. When the price of a good declines, the ratio of the marginal utility to price rises. This leads consumers to buy more of that good. As a result, whenever the price of a product falls, the quantity demanded increases. We saw in Chapter 1 that this is known as the law of demand. The market demand curve can be constructed from the individual demand curves for all the consumers in the market.

9.3 Social Influences on Decision Making (pages 291–296)
Explain how social influences can affect consumption choices. Social factors can have an effect on consumption. For example, the amount of utility people receive from consuming a good often depends on how many other people they know who also consume the good. There is a network externality in the consumption of a product if the usefulness of the product increases with the number of consumers who use it. There is also evidence that people like to be treated fairly and that they usually attempt to treat others fairly, even if doing so makes them worse off financially. This result has been demonstrated in laboratory experiments, such as the ultimatum game. When firms set prices, they take into account consumers’ preference for fairness. For example, hardware stores often do not increase the price of snow shovels to take advantage of a temporary increase in demand following a snowstorm.

9.4 Behavioral Economics: Do People Make Their Choices Rationally? (pages 296–300)
Describe the behavioral economics approach to understanding decision making. Behavioral economics is the study of situations in which people act in ways that are not economically rational. Opportunity cost is the highest-valued alternative that must be given up to engage in an activity. People would improve their decision making if they took into account nonmonetary opportunity costs. People sometimes ignore nonmonetary opportunity costs because of the endowment effect—the tendency of people to be unwilling to sell something they already own even if they are offered a price that is greater than the price they would be willing to pay to buy the good if they didn’t already own it. People would also improve their decision making if they ignored sunk costs. A sunk cost is a cost that has already been...
paid and cannot be recovered. Finally, people would improve their decision making if they were more realistic about their future behavior.

Appendix: Using Indifference Curves and Budget Lines to Understand Consumer Behavior (pages 309–323)

Use indifference curves and budget lines to understand consumer behavior.

Chapter Review

Chapter Opener: Can Oprah Get You to Buy a Kindle? (page 279)

In October 2008, Oprah Winfrey announced on her show that her new “favorite thing” was Amazon’s e-reader, the Kindle. Immediately, sales of the Kindle rose dramatically. What is it about Oprah’s endorsement that led to such growth in sales of the Kindle? Firms often hire celebrities to endorse their products with the expectation that the endorsements will increase their sales. In this chapter, we will examine how consumers make choices about their purchases.

9.1 Utility and Consumer Decision Making (pages 280–288)

Learning Objective: Define utility and explain how consumers choose goods and services to maximize their utility.

Utility is the enjoyment or satisfaction people receive from consuming goods and services. Economists assume consumers spend their limited budgets on the bundle of goods and services that provides them with the most utility, although utility cannot be measured exactly. If we assume that utility can be measured, then a certain number of utils (units of utility or satisfaction) are associated with each unit of a product.

Marginal utility ($MU$) is the change in total utility a person receives from consuming one additional unit of a good or service. The law of diminishing marginal utility states that consumers experience less additional satisfaction as they consume more of a good or service during a given period of time.

Study Hint

Remember that diminishing marginal utility does not imply that increasing consumption reduces utility. Utility still rises even if marginal utility is falling.

Because consumers have limited income, they try to receive the most utility they can as they spend their income. A budget constraint refers to the limited amount of income available to consumers to spend on goods and services. The model of consumer behavior can be used to determine the optimal amounts of goods a consumer will purchase given (a) knowledge of the marginal utilities ($MU$) of the goods, (b) the prices of the goods, and (c) the consumer’s budget constraint. This model applies a key economic principle you learned about in Chapter 1: optimal decisions are made at the margin.
The following information is taken from Table 9-2 on page 283 in the textbook. It is assumed that the price of pizza is $2 per slice, the price of a cup of Coke is $1, and the consumer has $10 to spend on pizza and Coke.

<table>
<thead>
<tr>
<th>Slices of pizza</th>
<th>MU per dollar (pizza)</th>
<th>Cups of Coke</th>
<th>MU per dollar (Coke)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>10</td>
<td>1</td>
<td>20</td>
</tr>
<tr>
<td>2</td>
<td>8</td>
<td>2</td>
<td>15</td>
</tr>
<tr>
<td>3</td>
<td>5</td>
<td>3</td>
<td>10</td>
</tr>
<tr>
<td>4</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>5</td>
<td>1</td>
<td>5</td>
<td>3</td>
</tr>
</tbody>
</table>

The consumer maximizes utility by first buying the good for which the MU per dollar is higher. Because the first cup of Coke has a higher MU per dollar (20) than the MU per dollar from the first slice of pizza (10), the consumer will first spend $1 on a cup of Coke. Because of the law of diminishing marginal utility, the MU of Coke and pizza declines as more of each is consumed. The consumer will compare the MU per dollar of the next unit of each good in deciding how to spend his income. The consumer will maximize his utility when:

1. Marginal utility per dollar is equal for each good consumed, and
2. Total spending on all goods equals the income available.

The consumer’s optimal consumption is 3 slices of pizza (at $2 each, spending $6 on pizza) and 4 Cokes (at $1 each, spending $4 on Coke). Total spending is equal to the consumer’s budget, $10. Marginal utility per dollar is 5 for both pizza and Coke at this equilibrium.

The rule of equal marginal utility per dollar can be used to analyze a consumer’s response to a price change. Using the previous example, if the price of pizza were to fall to $1.50, then there would be a substitution and income effect on the quantity of pizza demanded.

<table>
<thead>
<tr>
<th>Slices of pizza</th>
<th>MU per dollar (pizza)</th>
<th>Cups of Coke</th>
<th>MU per dollar (Coke)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>13.3</td>
<td>1</td>
<td>20</td>
</tr>
<tr>
<td>2</td>
<td>10.7</td>
<td>2</td>
<td>15</td>
</tr>
<tr>
<td>3</td>
<td>6.7</td>
<td>3</td>
<td>10</td>
</tr>
<tr>
<td>4</td>
<td>4</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>5</td>
<td>1.3</td>
<td>5</td>
<td>3</td>
</tr>
</tbody>
</table>

The decrease in the price of pizza has raised the MU per dollar of pizza. Previously, the consumer’s $10 budget was used to buy 3 slices of pizza and 4 cups of Coke. At the lower price of pizza, the same combination of goods costs only $8.50. This increase in purchasing power is the income effect of the price change. And the consumer will now purchase 4 slices of pizza but will still buy 4 Cokes as this is the consumption bundle where the entire budget is spent and the marginal utility per dollar of the last unit consumed is the same for both goods.

The **income effect** is the change in the quantity demanded of a good that results from a change in price caused by the altered consumer purchasing power, holding all other factors constant. If pizza is a normal good, then the income effect of a decrease in price will lead to an increase in the quantity demanded of pizza. If pizza is an inferior good, then the income effect of a decrease in price will lead to a decrease in the quantity demanded. The **substitution effect** is the change in quantity demanded of a good that results from a change in price that makes the good more or less expensive relative to other goods, holding constant the effect of the price change on consumer purchasing power.
Study Hint
The assumption that we can measure utility exactly is unrealistic. We can’t strap a consumer into a chair and measure how many utils she receives from eating a slice of pizza. But it is realistic to assume a consumer can determine whether he or she prefers a certain amount of one product to an amount of another, or that he or she is indifferent between consuming two different products. Economists do not believe in “cardinal utility”—utility measured in utils. However, economists do believe in “ordinal utility”—that consumers can rank products, or combinations of products, based on their preferences.

Study Hint
You can memorize the rule that utility is maximized when marginal utility per dollar is equal across all goods, but it should make sense intuitively as well. Think about this simple example: You like both candy bars and ice cream cones. Ice cream cones cost three times as much as candy bars, and you would like an ice cream cone twice as much as you would like a candy bar. On one hand, you might be tempted to say that, because the candy bar is cheaper, that you should buy a candy bar. On the other hand, you might be tempted to say that, because you would like an ice cream cone more, that you should buy an ice cream cone. The reality is that you need to balance your relative desire for ice cream cones and candy bars with their relative prices. If an ice cream cone costs three times as much but you only like it twice as much as a candy bar, then the relative cost of that ice cream cone isn’t worth the benefit you would receive. Rather, you should buy the candy bar. Mathematically, the $MU_{\text{ice cream}} = 2 \times MU_{\text{candy bar}}$ and $P_{\text{ice cream}} = 3 \times P_{\text{candy bar}}$ so that the marginal utility per dollar spent on ice cream is only two-thirds of the marginal utility per dollar spent on a candy bar. Spending the money on the candy bar will increase utility more than spending the money on the ice cream cone.

Where Demand Curves Come From (pages 288–291)
Learning Objective: Use the concept of utility to explain the law of demand.

The substitution and income effects of price changes explain why demand curves for normal goods are downward sloping. As price decreases, the good becomes attractive relative to available substitutes, so the quantity demanded of the good will rise. This same price decrease causes an increase in the consumer’s purchasing power, which causes an increase in the quantity demanded of normal goods. Although the substitution and income effects of price changes for inferior goods have opposite effects on quantity demanded, the income effect is typically quite small. So, as the price decreases, the quantity demanded will increase for nearly all goods. Economists have statistically estimated millions of demand curves using real-world data. In nearly every case, the demand curve slopes downward. The law of demand is based on real-world evidence, not economic theory alone.

Extra Solved Problem 9-2
Deriving Lee’s Demand Curve for Ice Cream
Supports Learning Objective 9.2: Use the concept of utility to explain the law of demand.

The following table represents Lee’s marginal utility per dollar for ice cream cones and cans of Lime Fizz as derived in Step 4 of Solved Problem 9-1 in the textbook. The optimal level of consumption, given Lee’s $7 budget constraint and the price of $2 per cone and $1 per can of Lime Fizz, is 1 ice cream cone and 5 cans of Lime Fizz.
### a. Assume that the price per can of Lime Fizz remains $1.00. What is the optimal level of consumption if the price of an ice cream cone falls to $1.50? What is the optimal level of consumption if the price per cone falls to $1.00? (Hint: Continue to purchase units with the highest marginal utilities per dollar.)

### b. Use the optimal consumption bundles for each of the three prices of ice cream cone to derive Lee’s demand curve for ice cream cones.

#### SOLVING THE PROBLEM

**Step 1:** Review the chapter material.  
This problem is about optimal consumption bundles and how to derive a demand curve, so you may want to review the section “Where Demand Curves Come From,” which begins on page 288 in the textbook.

**Step 2:** Calculate the marginal utility per dollar of spending for each of the two prices proposed in part (a).  
Because only the price of ice cream cones is changing we can focus on the marginal utility of ice cream cones. See the table below for the results of the calculations:

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Ice Cream Cones $1.50 each</th>
<th>Ice Cream Cones $1.00 each</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MU</td>
<td>MU/P</td>
</tr>
<tr>
<td>1</td>
<td>30</td>
<td>15</td>
</tr>
<tr>
<td>2</td>
<td>25</td>
<td>12.5</td>
</tr>
<tr>
<td>3</td>
<td>20</td>
<td>10</td>
</tr>
<tr>
<td>4</td>
<td>15</td>
<td>7.5</td>
</tr>
<tr>
<td>5</td>
<td>10</td>
<td>5</td>
</tr>
<tr>
<td>6</td>
<td>5</td>
<td>2.5</td>
</tr>
</tbody>
</table>

**Step 3:** Determine the optimal consumption bundle for Lee given his $7 budget for each of the new possible prices of ice cream cones.  
At a price of $1.50 per ice cream cone, Lee will consume 2 ice cream cones and 4 cans of Lime Fizz as this is the point where the marginal utilities per dollar are closest and still within the $7.00 budget. Similarly, when the price is $1.00 per cone, Lee will consume 3 ice cream cones and 4 cans of Lime Fizz.
Step 4: Use the optimal bundles to generate Lee’s demand curve for ice cream cones.

At a price of $2.00, Lee will consume 1 ice cream cone. At $1.50 per cone, Lee will consume 2 cones and at $1 per cone, he will consume 3 cones.

![Demand Curve](image)

9.3 Social Influences on Decision Making (pages 291–296)

Learning Objective: Explain how social influences can affect consumption choices.

Consumer decisions appear to be influenced by the actions and perceptions of other consumers. Some people obtain utility from consuming goods that others consume. Firms use celebrity endorsements to sell products because consumers often wish to be identified with products used by celebrities. Celebrity endorsements can be particularly effective when consumers believe celebrities are knowledgeable about the products they endorse. For example, consumers know that Tiger Woods is knowledgeable about golf clubs and therefore trust his endorsement.

Consumer decisions can be affected by network externalities, a situation in which the usefulness of a product increases with the number of consumers who use it. For example, you will not find a fax machine useful if no one else owns one. Consumers’ willingness to buy new technologies, such as Blu-ray DVD players, is enhanced when they know many others have bought them, because this will ensure these technologies will be available in the future and that complementary products—such as DVDs in the Blu-ray format—will be widely available.

Recent studies of consumer behavior indicate consumers think about fairness when they make decisions, which means that consumers may decrease their well-being financially for the sake of fairness. For example, some restaurant diners may leave a good tip even though they do not expect to visit that restaurant again. Even economic experiments, like the Ultimatum Game, show that fairness often plays a role in making decisions.

Firms realize that consumers value fairness. Tickets for Broadway plays, concerts, and sporting contests are often priced below their equilibrium levels. These decisions appear to be a response to consumers’ concerns that the equilibrium prices would be unfairly high.
Prior to the 1970s, owners of foreign-made automobiles often had difficulty locating parts for their cars and mechanics who could repair them. One would usually need hard-to-find metric wrenches to do even simple repair work. The rapid increase in oil and gasoline prices beginning in 1973 caused a surge in demand for the smaller, more fuel-efficient automobiles offered by Japanese and German automakers. By the late twentieth century, foreign manufacturers had gained significant market share in the United States. The availability of parts, mechanics, and tools was no longer an issue for buyers of domestic or foreign automobiles. This is an example of the importance of network externalities.

Extra Solved Problem 9-3
Supports Learning Objective 9.3: Explain how social influences can affect consumption choices.

In 2009, Olympic hero Michael Phelps and singer Chris Brown gave advertisers another lesson in the risks of paying big money to celebrities to endorse their products. Soon after a photograph of Phelps smoking marijuana was printed in a British tabloid, Kellogg canceled its contract with the swimmer. Brown shocked music fans after he allegedly battered singing star and girlfriend Rihanna. Brown had earlier appeared in ads for Doublemint gum. The best celebrity endorsement deals for firms, of course, feature those who are well-known both for their achievements in the world of sports (Peyton Manning, Michael Jordan) and entertainment (Jerry Seinfeld, Beyoncé) as well as for their ability to avoid scandal. But another important factor is the public’s belief in the credibility of the celebrity endorser. One of the best examples of this is star pitchman and former heavyweight boxing champion George Foreman. Foreman has appeared in ads for Meineke Mufflers and has endorsed his own line of clothing, but his greatest success has been from sales of The George Foreman “Lean Mean Grilling Machine.” Salton Inc., the manufacturer of the Grilling Machine, paid Foreman over $130 million to endorse its product over a ten-year period. An important part of Foreman’s success is his amiable persona, in contrast with the sullen image he had in his early boxing years. The public also trusts Foreman, especially when it comes to food. “He has a well-chronicled history of enjoying food—lots of it,” says Rich Kenah, director of marketing for Global Athletics and Marketing firm in Boston. “So he is credible on the subject…”

Foreman tries all products—gathering approvals from his wife and children—before agreeing to endorse them. John Bellamy, CEO of Knockout Group Inc., says Foreman went so far as to put an ethics clause in Knockout’s contract prohibiting it from selling the company to anyone involved in alcohol, tobacco, pornography, or gambling. “The most important thing to him is image,” Bellamy says.


a. Why do consumers buy products endorsed by George Foreman?

b. Contrast Foreman’s success with the endorsement failures of celebrities such as Michael Phelps and Chris Brown.

SOLVING THE PROBLEM:
Step 1: Review the chapter material.
This problem is about celebrity endorsements that influence the choices consumers make, so you may want to review the section “Social Influences on Decision Making,” which begins on page 291 in the textbook.
Step 2: Why do consumers buy products endorsed by George Foreman?
Part of Foreman’s appeal stems from his personality. Many consumers know and like Foreman and want to own products he endorses because they know other people who own these products. Consumers may also believe Foreman is knowledgeable about the products he endorses, such as the “Lean Mean Grilling Machine” and his line of men’s clothing.

Step 3: Contrast Foreman’s success with the endorsement failures of celebrities such as Michael Phelps and Chris Brown.
Phelps and Brown received adverse publicity for behavior that made companies unwilling to continue using them in their advertising campaigns. In contrast, Foreman carefully selects the products he endorses and does not have a history of controversial behavior.

9.4 Behavioral Economics: Do People Make Their Choices Rationally? (pages 296–300)
Learning Objective: Describe the behavioral economics approach to understanding decision making.

Some economists have questioned whether consumers make decisions rationally. Consumers sometimes make poor choices. Behavioral economics studies situations in which people make choices that do not appear to be economically rational. Among the most important reasons for poor choices are: failure to account for nonmonetary opportunity costs, failure to ignore sunk costs, and being unrealistic about future behavior.

Study Hint
Sunk costs should be ignored not only by consumers but by government officials and even baseball executives. Before the 2002 baseball season, Allard Baird, the general manager of the Kansas City Royals, decided to release pitcher José Rosado. Writing about this decision, Rany Jazayerdi wrote: “[I]t’s the first piece of evidence…that Baird understands…sunk costs. Rosado was paid $3.5 million to make five starts in 2000…$3.25 million again in 2001 to do absolutely nothing. He’s already guaranteed $533,000 this year…it must be awfully tempting to keep him on the roster…in hope that, after so much time and so much money, their investment might finally pay some dividends…Baird cut Rosado because he compared Rosado to the other [pitching] options…and came to the…conclusion that the only thing Rosado had on [other pitchers] is service time and income.”

Appendix
Using Indifference Curves and Budget Lines to Understand Consumer Behavior (pages 309–323)

Learning Objective: Use indifferent curves and budget lines to understand consumer behavior.

Consumer Preferences

Rather than assume utility is measured in utils, it is more realistic to assume that consumers rank different combinations of goods and services by how much utility they provide. If a consumer is presented with two alternative consumption bundles (A and B), one can assume she will be able to decide on one of the following:

1. the consumer prefers A to B, or
2. the consumer prefers B to A, or
3. the consumer is indifferent between A and B because she receives equal utility from A and B.

Economists assume that the consumer’s preferences are transitive. This means that if a consumer prefers A to B and B to C, then she must prefer A to C. Given the assumptions made, we can draw a map of a consumer’s preferences using indifference curves. An indifference curve is a curve that shows the combinations of consumption bundles that give the consumer the same utility. Indifference curves assume that consumption bundles consist of various amounts of only two goods. Each possible combination of two goods—for example, cans of Coca-Cola and slices of pizza—has an indifference curve passing through it. A consumer is indifferent among all the consumption bundles that are on the same indifference curve.

In a graph of indifference curves, the further to the right a curve is the greater the utility it represents. Along an indifference curve, the slope indicates the rate at which a consumer is willing to trade off one good for another, keeping total utility constant. This rate is called the marginal rate of substitution (MRS). The MRS decreases as we move down the indifference curve. This decrease in the MRS means the indifference curves are bowed in or convex.

Indifference curves do not cross. If two indifference curves (I₁ and I₂) crossed, they would share a common point (point X). (See Figure 9A-2 on page 311). Assume that Y is a point on I₂ so that the consumer would be indifferent between points X and Y. Assume that point Y lies on the portion of I₂ that is above I₁. Z is another point on I₁ so that the consumer is indifferent between X and Z. Because of the transitivity assumption, the consumer should be indifferent between points Z and Y, but Y represents more of both Coke and pizza. The violation of the transitivity assumption proves that indifference curves cannot cross.

Study Hint

Be sure you understand Figure 9A-1 on page 310 and Figure 9A-2 on page 311 and the description of these graphs in the textbook. Notice that the indifference curves do not bend backward, or become positively sloped. This means that receiving more Coke and pizza always increases utility. If indifference curves were positively sloped, this would mean that receiving more of one good (for example, pizza) would lower consumer utility and require more of the other good to maintain utility at the same level. (Positively sloped indifference curves are sometimes used to model economic “bads” such as pollution and risk.)
The Budget Constraint

A consumer’s budget constraint is the amount of income the consumer has to spend on goods and services. Knowing a consumer’s income and the prices of two goods he or she can buy allows us to draw a budget line on a graph with the amount of either good measured on the vertical and horizontal axes of the graph. The vertical intercept of the budget line is the maximum amount of a good (for example, cans of Coke) that can be bought with the consumer’s income (for example, $10) and the price of the good (for example, $1). The horizontal intercept of the budget line is the maximum of the other good (for example, slices of pizza) that can be bought with the consumer’s income.

The slope of the budget constraint is constant and is equal to the ratio of the price of pizza (the good measured on the horizontal axis) to the price of Coke (the good measured along the vertical axis) multiplied by \(-1\).

Study Hint

Budget lines are similar to the production possibilities frontiers introduced in chapter 2, but they identify possible consumption choices rather than production options. Figure 9A-3 on page 312 illustrates a budget line for Dave, a representative consumer. Points on the budget line represent combinations of two goods that are affordable and use up all available income. Points inside the budget line represent affordable combinations of the two goods that leave some income unspent, and points above the budget line represent unaffordable consumption bundles.

Choosing the Optimal Consumption of Pizza and Coke

To maximize utility, a consumer needs to be on the highest indifference curve, given the consumer’s budget constraint. The combination of goods that will maximize utility subject to a consumer’s budget constraint is at the tangency of the budget line with an indifference curve. If the price of one of the goods changes, then the budget line will change. For example, when the price of pizza decreases to $1, more consumption bundles can be purchased than were previously possible. The change in the budget line from a price decrease results in a new combination of goods that will maximize utility.

By changing the price of one of the goods and determining the amount of the good that will be purchased after the price change, one can derive the demand curve for the good. Indifference curves and budget constraints can be used to analyze the income and substitution effects from a price change. Assume that a consumer is maximizing utility at the tangency of a budget line and indifference curve \(I_1\). Assume a change in the price of pizza from $2 to $1. The budget line changes to reflect the price change and the lines’ new slope. The consumer maximizes utility at the tangency of the new budget line and indifference curve \(I_2\) as in Figure 9A-6.

When the price of a good changes, the slope of the budget line also changes, and there will be a new tangency between the new budget line and an indifference curve. For example, when the price of a good measured on the x axis falls, the budget line rotates outward. The consumer will maximize utility where the new flatter budget line will be tangent to a new indifference curve. The law of demand predicts that a decrease in the price of a good will result in an increase in the quantity demanded.

Study Hint

It is much easier to understand how the optimal combination of goods is determined and how price changes change the optimal combination with graphs rather than with words alone. Be sure you understand the graphs in Figures 9A-4 through 9A-6.
Drawing a line parallel to the new budget line (that is, with the new line’s slope) tangent to the $I_1$ illustrates the substitution effect of the price change. The change in consumption from the tangency of a line parallel to the new budget line and $I_1$ to the tangency of the new budget line and $I_2$ illustrates the income effect of the change in price. Increases in income shift the budget line outward and enable consumers to reach higher indifference curves.

**The Slope of the Indifference Curve, the Slope of the Budget Line, and the Rule of Equal Marginal Utility Per Dollar Spent**

At the point of optimal consumption, the $MRS$ is equal to the ratio of the price of the product on the horizontal axis to the price of the product on the vertical axis. The slope of the indifference curve is the rate at which a consumer is willing to trade off one good for the other. The slope of the budget line is the rate at which a consumer is able to trade off one good for the other. Only at the point of optimal consumption is the rate at which a consumer is willing to trade off one good for the other equal to the rate which she can trade off one good for the other.

Indifference curves and budget lines can be used to explain the rule of equal marginal utility per dollar. When a consumer moves downward along an indifference curve, more of one good (for example, pizza) and less of another good (for example, Coke) is consumed but utility is constant. Moving along an indifference curve results in a loss in utility equal to the change in the quantity of Coke multiplied by the marginal utility of Coke:

$$- \text{Change in the quantity of Coke} \times MU_{Coke}$$

and a gain in utility equal to the change in the quantity of pizza multiplied by the marginal utility of pizza:

$$\text{Change in the quantity of pizza} \times MU_{Pizza}.$$  

The loss in utility from consuming less Coke equals the gain in utility from consuming more pizza because the consumer remains on the same indifference curve. The change in utility can be written:

$$- (\text{Change in the quantity of Coke} \times MU_{Coke}) = (\text{Change in the quantity of pizza} \times MU_{Pizza}).$$

This can be rewritten:

$$(- \text{Change in the quantity of Coke})/(\text{Change in the quantity of pizza}) = (MU_{Pizza}/MU_{Coke}) = MRS.$$  

Because the slope of the indifference curve ($MRS$) equals the slope of the budget line at the point of optimal consumption then:

$$MU_{Pizza}/P_{Pizza} = MU_{Coke}/P_{Coke}$$  

Rewriting this equation yields marginal utility per dollar:

$$\frac{MU_{pizza}}{P_{pizza}} = \frac{MU_{Coke}}{P_{Coke}}.$$
Key Terms

Behavioral economics The study of situations in which people make choices that do not appear to be economically rational.

Budget constraint The limited amount of income available to consumers to spend on goods and services.

Endowment effect The tendency of people to be unwilling to sell a good they already own even if they are offered a price that is greater than the price they would be willing to pay to buy the good if they didn’t already own it.

Income effect The change in the quantity demanded of a good that results from the effect of a change in price on consumer purchasing power, holding all other factors constant.

Law of diminishing marginal utility The principle that consumers experience diminishing additional satisfaction as they consume more of a good or service during a given period of time.

Marginal utility (MU) The change in total utility a person receives from consuming one additional unit of a good or service.

Network externality A situation in which the usefulness of a product increases with the number of consumers who use it.

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

Substitution effect The change in the quantity demanded of a good that results from a change in price making the good more or less expensive relative to other goods, holding constant the effect of the price change on consumer purchasing power.

Sunk cost A cost that has already been paid and cannot be recovered.

Utility The enjoyment or satisfaction people receive from consuming goods and services.

Key Terms—Appendix

Indifference curve A curve that shows the combinations of consumption bundles that give the consumer the same utility.

Marginal rate of substitution (MRS) The rate at which a consumer would be willing to trade off one good for another.

Self-Test

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

Multiple-Choice Questions

1. If increasing your consumption of pizza from 3 to 4 slices increases your utility, which of the following must be true?
   a. The marginal utility of the 4th slice of pizza is equal to the total utility of 4 slices of pizza.
   b. The marginal utility of the 4th slice of pizza is greater than the marginal utility of the 3rd slice of pizza.
   c. The marginal utility of the 4th slice of pizza is positive.
   d. The marginal utility of the 3rd slice of pizza is negative.
2. If marginal utility is negative, what must be true about total utility?
   a. Total utility increases with additional consumption.
   b. Total utility decreases with additional consumption.
   c. Total utility remains constant regardless of the number of units consumed.
   d. Total utility equals zero.

3. Which of the following statements concerning total utility and marginal utility is correct?
   a. Marginal utility is usually larger than total utility.
   b. Total utility is the sum of marginal utilities.
   c. Marginal utility is the sum of total utility.
   d. Marginal utility is maximized when total utility is zero.

4. According to the law of diminishing marginal utility, as the consumption of a particular good increases,
   a. total utility increases by more and more.
   b. marginal utility increases.
   c. total utility decreases.
   d. marginal utility decreases.

5. Refer to the table below. Total utility derived from consuming three ice cream cones equals

<table>
<thead>
<tr>
<th>Ice Cream Cones</th>
<th>Total Utility</th>
<th>Marginal Utility</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>10</td>
<td>?</td>
</tr>
<tr>
<td>2</td>
<td>18</td>
<td>?</td>
</tr>
<tr>
<td>3</td>
<td>?</td>
<td>6</td>
</tr>
<tr>
<td>4</td>
<td>28</td>
<td>?</td>
</tr>
<tr>
<td>5</td>
<td>?</td>
<td>2</td>
</tr>
</tbody>
</table>

   a. 34.
   b. 6.
   c. 22.
   d. 24.

6. Refer to the table below. The marginal utility from consuming the second ice cream cone equals

<table>
<thead>
<tr>
<th>Ice Cream Cones</th>
<th>Total Utility</th>
<th>Marginal Utility</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>10</td>
<td>?</td>
</tr>
<tr>
<td>2</td>
<td>18</td>
<td>?</td>
</tr>
<tr>
<td>3</td>
<td>?</td>
<td>6</td>
</tr>
<tr>
<td>4</td>
<td>28</td>
<td>?</td>
</tr>
<tr>
<td>5</td>
<td>?</td>
<td>2</td>
</tr>
</tbody>
</table>

   a. 10.
   b. 9.
   c. 8.
   d. 18.
7. Refer to the table below. The total utility from consuming 5 ice cream cones is equal to

<table>
<thead>
<tr>
<th>Ice Cream Cones</th>
<th>Total Utility</th>
<th>Marginal Utility</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>10</td>
<td>?</td>
</tr>
<tr>
<td>2</td>
<td>18</td>
<td>?</td>
</tr>
<tr>
<td>3</td>
<td>?</td>
<td>6</td>
</tr>
<tr>
<td>4</td>
<td>28</td>
<td>?</td>
</tr>
<tr>
<td>5</td>
<td>?</td>
<td>2</td>
</tr>
</tbody>
</table>

a. 28.
b. 29.
c. 30.
d. 2.

8. Refer to the graph below. Marginal utility is

- greater at points u and v than at points w and x.
- greater at points w and x than at points u and v.
- the same at points u and v as at points w and x.
- greatest at point y.
9. Refer to the graph below. From the information in the graph, we can deduce that the marginal utility curve would be

- a. downward sloping.
- b. upward sloping.
- c. horizontal.
- d. vertical.

10. What is a budget constraint?
- a. The limited amount of income available to consumers to spend on goods and services.
- b. The amount of income that yields equal marginal utility per dollar spent.
- c. The amount of utility that a consumer receives from spending a limited amount of income on goods and services.
- d. The amount of money necessary to purchase a given combination of goods.

11. According to economists, decisions to increase an activity, such as consumption, are based on
- a. an evaluation of the incremental implications of that decision, that is, an evaluation of what happens at the margin.
- b. an evaluation of the totality of the consequences of our actions, both past and present.
- c. the maximization of opportunity cost.
- d. the maximization of social welfare.

12. Refer to the inequality below. The marginal utility per dollar spent on good X is less than the marginal utility per dollar spent on good Y. According to the rule of equal marginal utility per dollar spent, what can a consumer do to increase total utility from consumption of goods X and Y?

\[
\frac{\text{Marginal utility of good X}}{\text{Price of good X}} < \frac{\text{Marginal utility of good Y}}{\text{Price of good Y}}
\]

- a. increase the consumption of good X
- b. increase the consumption of good Y
- c. increase the consumption of both goods
- d. decrease the consumption of both goods
13. A consumer maximizes total utility from a limited amount of income when
   a. choosing more of one good and less of another increases utility.
   b. choosing more of one good and less of another no longer increases utility.
   c. marginal utility is maximized.
   d. marginal utility per dollar spent on each good is highest.

14. Suppose you have a fixed amount of income to spend on two goods, X and Y. The price of good X is $P_x = 10$ and the price of good Y is $P_y = 5$. The marginal utility of X is $MU_x = 60$ utils and the marginal utility of Y is $MU_y = 15$ utils. How should consumption of X and Y change, if at all, to increase utility?
   a. Consumption of good X should increase, and consumption of good Y should decrease.
   b. Consumption of good X should decrease, and consumption of good Y should increase.
   c. The current combination of goods maximizes total utility; consumption should remain the same.
   d. The consumption of goods X and Y should both increase.

15. Refer to the table below. As stated in the first row, the income of the consumer (I) equals $20. The price of good X ($P_x$) equals $4.00 and the price of good Y ($P_y$) equals $2.00. Total utility derived from consuming X and Y is listed. What is the marginal utility per dollar spent on the 5th unit of good X?

<table>
<thead>
<tr>
<th>X</th>
<th>Total Utility</th>
<th>$MU_x$</th>
<th>$MU_x / P_x$</th>
<th>Y</th>
<th>Total Utility</th>
<th>$MU_y$</th>
<th>$MU_y / P_y$</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>-</td>
<td>-</td>
<td>0</td>
<td>0</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>1</td>
<td>40</td>
<td>10</td>
<td>2.5</td>
<td>1</td>
<td>35</td>
<td>17.5</td>
<td>17.5</td>
</tr>
<tr>
<td>2</td>
<td>65</td>
<td>16.25</td>
<td>4.075</td>
<td>2</td>
<td>55</td>
<td>27.5</td>
<td>13.75</td>
</tr>
<tr>
<td>3</td>
<td>85</td>
<td>21.25</td>
<td>5.3125</td>
<td>3</td>
<td>70</td>
<td>35</td>
<td>17.5</td>
</tr>
<tr>
<td>4</td>
<td>100</td>
<td>25</td>
<td>6.25</td>
<td>4</td>
<td>80</td>
<td>40</td>
<td>20</td>
</tr>
<tr>
<td>5</td>
<td>108</td>
<td>27</td>
<td>6.75</td>
<td>5</td>
<td>84</td>
<td>42</td>
<td>21</td>
</tr>
<tr>
<td>6</td>
<td>114</td>
<td>29</td>
<td>5.75</td>
<td>6</td>
<td>85</td>
<td>42.5</td>
<td>21.25</td>
</tr>
</tbody>
</table>

   a. 8
   b. 4
   c. 2
   d. 1.5
16. Refer to the table below. As stated in the first row, the income of the consumer (I) equals $20. The price of good X \((P_x)\) equals $4.00 and the price of good Y \((P_y)\) equals $2.00. Total utility derived from consuming X and Y is listed. What combination of goods X and Y will maximize utility subject to the consumer’s budget constraint?

<table>
<thead>
<tr>
<th>X</th>
<th>Total Utility</th>
<th>(MU_x)</th>
<th>(MU_x / P_x)</th>
<th>Y</th>
<th>Total Utility</th>
<th>(MU_y)</th>
<th>(MU_y / P_y)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>-</td>
<td></td>
<td>0</td>
<td>0</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>40</td>
<td>1</td>
<td>35</td>
<td>2</td>
<td>55</td>
<td>2</td>
<td>55</td>
</tr>
<tr>
<td>2</td>
<td>65</td>
<td>2</td>
<td>30</td>
<td>3</td>
<td>70</td>
<td>3</td>
<td>35</td>
</tr>
<tr>
<td>3</td>
<td>85</td>
<td>3</td>
<td>28</td>
<td>4</td>
<td>80</td>
<td>4</td>
<td>40</td>
</tr>
<tr>
<td>4</td>
<td>100</td>
<td>5</td>
<td>25</td>
<td>5</td>
<td>84</td>
<td>5</td>
<td>42</td>
</tr>
<tr>
<td>5</td>
<td>108</td>
<td>6</td>
<td>17</td>
<td>6</td>
<td>85</td>
<td>6</td>
<td>42</td>
</tr>
</tbody>
</table>

a. 6 units of X and 6 units of Y
b. 5 units of X and 0 units of Y
c. 3 units of X and 4 units of Y
d. 4 units of X and 3 units of Y

17. Refer to the table below. As stated in the first row, the income of the consumer (I) equals $20. The price of good X \((P_x)\) equals $3.00 and the price of good Y \((P_y)\) equals $2.00. Total utility derived from consuming X and Y is listed. What combination of goods X and Y will maximize utility subject to the consumer’s budget constraint?

<table>
<thead>
<tr>
<th>X</th>
<th>Total Utility</th>
<th>(MU_x)</th>
<th>(MU_x / P_x)</th>
<th>Y</th>
<th>Total Utility</th>
<th>(MU_y)</th>
<th>(MU_y / P_y)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>-</td>
<td></td>
<td>0</td>
<td>0</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>40</td>
<td>1</td>
<td>35</td>
<td>2</td>
<td>55</td>
<td>2</td>
<td>55</td>
</tr>
<tr>
<td>2</td>
<td>65</td>
<td>2</td>
<td>30</td>
<td>3</td>
<td>70</td>
<td>3</td>
<td>35</td>
</tr>
<tr>
<td>3</td>
<td>85</td>
<td>3</td>
<td>28</td>
<td>4</td>
<td>80</td>
<td>4</td>
<td>40</td>
</tr>
<tr>
<td>4</td>
<td>100</td>
<td>5</td>
<td>25</td>
<td>5</td>
<td>84</td>
<td>5</td>
<td>42</td>
</tr>
<tr>
<td>5</td>
<td>108</td>
<td>6</td>
<td>17</td>
<td>6</td>
<td>85</td>
<td>6</td>
<td>42</td>
</tr>
</tbody>
</table>

a. 6 units of X and 6 units of Y
b. 6 units of X and 1 unit of Y
c. 4 units of X and 3 units of Y
d. 4 units of X and 4 units of Y

18. Fill in the blank. The substitution effect is the change in the quantity demanded of a good that results from ______________, holding constant the effect of the price change on consumer purchasing power.

a. a change in the price of a substitute for the good
b. a change in price making the good more or less expensive relative to other goods
c. an increase in the usefulness of a product as the number of consumers who use it increases
d. the tendency of people to be unwilling to sell something they own

19. Fill in the blank. The income effect is the change in the quantity demanded of a good that results from
__________________, holding all other factors constant.
   a. the effect of a change in price on consumer purchasing power
   b. a change in price, making the good more or less expensive relative to other goods
   c. an increase in the usefulness of a product as the number of consumers who use it increases
   d. the tendency of people to be unwilling to sell something they own

20. How do the income and substitution effects work when the price of a normal good decreases?
   a. Both the income effect and the substitution effect cause an increase in the quantity demanded of
      the good.
   b. Both the income effect and the substitution effect cause a decrease in the quantity demanded of
      the good.
   c. The income effect causes an increase in the quantity demanded of the good, and the substitution
      effect causes a decrease in the quantity demanded of the good.
   d. The income effect causes a decrease in the quantity demanded of the good, and the substitution
      effect causes an increase in the quantity demanded of the good.

21. How do the income and substitution effects work when the price of an inferior good decreases?
   a. Both the income effect and the substitution effect cause an increase in the quantity demanded of
      the good.
   b. Both the income effect and the substitution effect cause a decrease in the quantity demanded of
      the good.
   c. The income effect causes an increase in the quantity demanded and the substitution effect causes
      a decrease in the quantity demanded.
   d. The income effect causes a decrease in the quantity demanded and the substitution effect causes
      an increase in the quantity demanded.

22. If the income effect of a price change for an inferior good is larger than the substitution effect, the
    demand curve will be
   a. downward sloping.
   b. upward sloping.
   c. horizontal.
   d. vertical.
23. Refer to the graph below. The graph shows your weekly demand for pizza. How was this demand curve constructed?

![Demand Curve Graph]

a. by computing your optimal consumption of pizza at the various prices shown, all else the same  
b. by computing your consumption of pizza when the price of pizza remains constant  
c. by computing your consumption of pizza when both the price of pizza and the number of slices you consume per week remain constant  
d. by computing your consumption of pizza at various prices, regardless of utility gained

24. What are the characteristics of Giffen goods?
   a. Giffen goods have downward-sloping demand curves.  
   b. Giffen goods are normal, not inferior goods.  
   c. Giffen goods are inferior goods for which the income effect is greater than the substitution effect when price changes.  
   d. All of the above are characteristics of Giffen goods.

25. Which of the following factors best explains why consumers might prefer to go to a restaurant that was similar to another restaurant in terms of décor and food choices but had fewer customers?
   a. the presence of network externalities  
   b. the idea that some people receive utility from goods they believe are popular  
   c. income and substitution effects  
   d. switching costs

26. Whenever consumption takes place publicly, what does your decision to buy a product depend on?
   a. The decision depends only on the characteristics of the product.  
   b. The decision depends only on how many other people are buying the product.  
   c. The decision depends both on the characteristics of the product and on how many other people are buying the product.  
   d. The decision depends on factors other than the characteristics of the product and on how many people are buying it.
27. What happens when network externalities are present?
   a. The usefulness of telecommunications equipment rises.
   b. The usefulness of networks diminishes with the number of consumers who enter them.
   c. The usefulness of a product increases with the number of consumers who use it.
   d. The usefulness of a product decreases as the number of products rises.

28. What happens when a product is path dependent?
   a. The technology used to produce the product has a specific growth path.
   b. The product can sell for a higher price when it is new and there are no similar products consumers can buy than when it is older and consumers can choose to buy substitutes for the product.
   c. The cost of switching to a product with a better technology gives the product with the initial technology an advantage.
   d. The path that a product follows depends on the firm that uses the best technology to produce it.

29. What are the potential effects of path dependence?
   a. market failure
   b. a loss of efficiency if the government chooses to intervene in markets where there is path dependence
   c. a reduction in switching costs
   d. All of the above are potential results of path dependence.

30. In considering consumers’ attitudes toward fairness, which of the following have economists found to be true?
   a. People are interested mainly in making themselves as well off as possible.
   b. People attempt to treat others fairly, even if doing so makes them worse off financially.
   c. People attempt to treat others fairly but only if doing so makes them better off financially.
   d. People usually ignore fairness when making spending decisions.

31. Many people donate to charity and leave tips to servers in restaurants even when they will never visit the restaurant again. Economists consider this type of behavior to be
   a. irrational, because these actions make people worse off financially.
   b. rational, because it shows that people value fairness even when this behavior makes people worse off financially.
   c. rational only if other people observe this behavior.
   d. All of the above are consistent with the general view of fairness.

32. In the ultimatum game, if neither the allocator nor the recipient cared about fairness, what would be the optimal distribution of $20.00?
   a. $19.99 for the allocator and $0.01 for the recipient
   b. $10.00 for the allocator and $10.00 for the recipient
   c. $19.99 for the recipient and $0.01 for the allocator
   d. $20.00 for the allocator and nothing for the recipient

33. In the ultimatum game, when the allocator and the recipient care about fairness, how is the distribution of $20.00 affected?
   a. Allocators receive everything and recipients receive nothing.
   b. Recipients usually reject offers of less than a 10 percent share.
   c. Allocators usually offer recipients a very small share.
   d. Allocators and recipients always end up sharing the $20.00 equally.
34. Refer to the graph below which shows the demand and supply of tickets for a Broadway play. At what price is there a shortage of tickets?

![Graph of Demand and Supply](image)

a. at $75  
b. at $125  
c. at $145  
d. at all three prices

35. Refer to the graph below which shows the demand and supply of tickets for a Broadway play. When the play’s producers take fairness into account, which of the following would most likely occur?

![Graph of Demand and Supply](image)

a. The market price will equal the equilibrium of $125.  
b. Producers will charge $75 for a ticket even though the result would be a shortage.  
c. Producers will charge $145 for a ticket in anticipation of stronger demand.  
d. Producers will raise ticket prices gradually as demand strengthens over time.

36. Fill in the blanks. Which of the following has been found by researchers in surveys of consumers? Most people consider it __________ for firms to raise their prices following an increase in costs __________ to raise prices following an increase in demand.

a. fair; and fair  
b. fair; but unfair  
c. unfair; but fair  
d. unfair; and unfair
37. Fill in the blanks. Researchers have found that sometimes firms will give up some profits in the ________ to keep their customers happy and increase their profits in the ________.
   a. short run; long run
   b. long run; short run
   c. sale of some goods; sale of other goods
   d. early stages of product development; mature market

38. Based the textbook’s description of Alan Krueger’s study, which of the following statements best describes the policy the National Football League (NFL) uses to set the prices of Super Bowl tickets?
   a. The NFL attempts to set ticket prices at their equilibrium levels.
   b. The NFL sets prices at less than equilibrium levels to allow corporate sponsors and teams to resell tickets at higher prices.
   c. The NFL sets prices at greater than equilibrium levels to discourage ticket scalping.
   d. The NFL sets prices at less than equilibrium levels to avoid alienating football fans.

39. What do economists call the study of situations in which people act in ways that do not appear to be economically rational?
   a. normative economics
   b. rational economics
   c. behavioral economics
   d. the economics of fairness

40. Which of the following mistakes do consumers commonly commit when making decisions?
   a. They take into account monetary costs but ignore nonmonetary opportunity costs.
   b. They fail to ignore sunk costs.
   c. They are unrealistic about their future behavior.
   d. All of the above are mistakes consumers commonly commit when making decisions.

41. According to the endowment effect, people are unwilling to sell a good they already own in which of the following situations?
   a. if they are offered a price greater than the price they would pay if they did not already own the good
   b. if they are offered a price lower than the price they would have to pay to replace the good
   c. if they can’t replace the good
   d. if the good was a gift that had great sentimental value

42. Which of the following reasons do economists use to explain why people are overweight?
   a. People undervalue the utility to be received in the future.
   b. People overvalue the utility from current choices.
   c. People’s preferences are not consistent over time.
   d. All of the above explain why people are overweight.
Short Answer Questions

1. Is it possible for a normal good to have an upward-sloping demand curve? Explain briefly.

______________________________________________________________________________
______________________________________________________________________________
______________________________________________________________________________
______________________________________________________________________________
______________________________________________________________________________
______________________________________________________________________________

2. A Congressional representative explained his support for a spending project in his district by arguing “The bridge that is being built has cost the taxpayers of the United States $15 million. If we don’t spend an additional $20 million to finish the bridge, the initial $15 million will be wasted. We owe it to the taxpayers to finish this project.” Explain the decision-making mistake the representative made in this statement.

______________________________________________________________________________
______________________________________________________________________________
______________________________________________________________________________
______________________________________________________________________________
______________________________________________________________________________

3. In Table 9-2 (page 283) in the textbook, you have a budget of $10 to spend on pizza and Coke, and the price of pizza is $2 per slice while the price of Coke is $1.00 per cup. You would maximize your utility by consuming 3 slices of pizza and 4 cups of Coke. What quantities of Coke and pizza would you consume if your budget increased to $13? What does your answer tell you about whether Coke and pizza are normal or inferior goods?

______________________________________________________________________________
______________________________________________________________________________
______________________________________________________________________________
______________________________________________________________________________
4. Some consumers argued that VHS video recorders used technology that was inferior to the technology used by Sony Betamax recorders. Nevertheless, VHS technology dominated the market for video recorders, and by the end of the twentieth century, Betamax recorders were so rare that their owners found it nearly impossible to purchase movies taped in Betamax format. Is this an example of market failure?

5. Approximately 20 percent of U.S. adults smoke cigarettes despite the documented health risks associated with smoking. Explain how the prevalence of smoking can be cited as an example of irrational decision making.

True/False Questions

T F 1. If total utility increases when you consume more of a good, then marginal utility must also be increasing as consumption rises.

T F 2. Marginal utility is the total utility a person receives from consuming one additional unit of a good or service.

T F 3. One of the conditions for maximizing utility is that total spending on goods must be equal to the amount available to be spent.

T F 4. For an inferior good, a price decrease increases a consumer’s purchasing power and causes the quantity demanded to increase.

T F 5. Gary Becker and Kevin Murphy are among the economists who believe that social factors such as culture, customs, and religion do not explain the choices consumers make.

T F 6. Economists use the phrase “network externalities” to describe the role technology plays in explaining why consumers buy products that other consumers are already buying.

T F 7. Switching costs can explain why consumers buy products that have inferior technologies.

T F 8. A Giffen good has an upward-sloping demand curve.

T F 9. When the price of a normal good decreases, the substitution effect causes the quantity demanded to increase. When the price of an inferior good decreases, the substitution effect causes the quantity demanded to decrease.

T F 10. Economists believe that it is possible to measure utility in units called “utils.”

T F 11. When economists state “optimal decisions are made at the margin” they mean that most
decisions people make involve doing a little more of one thing or a little more of an alternative.

T  F  12.  Firms pay celebrities to endorse their products because they believe this will increase the demand for these products.

T  F  13.  Firms will sometimes not raise their prices, even when there is a large increase in demand for their products, because they fear consumers will consider the price increases unfair.

T  F  14.  Consumers often commit the mistake of ignoring sunk costs when they make decisions.

T  F  15.  The endowment effect is used to describe the mistake a consumer makes when he accounts for the monetary costs of his decisions but ignores the nonmonetary opportunity costs.

Answers to the Self-Test

Multiple-Choice Questions

<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>c</td>
<td>If utility increases from increased consumption, marginal utility is positive.</td>
</tr>
<tr>
<td>2</td>
<td>b</td>
<td>Figure 9-1 on page 282 in the textbook shows this clearly.</td>
</tr>
<tr>
<td>3</td>
<td>b</td>
<td>The table in Figure 9-1 on page 282 in the textbook confirms this fact.</td>
</tr>
<tr>
<td>4</td>
<td>d</td>
<td>According to the law of diminishing marginal utility, consumers experience diminishing additional satisfaction as they consume more of a good or service during a given period of time.</td>
</tr>
<tr>
<td>5</td>
<td>d</td>
<td>Total utility is the sum of marginal utilities. Therefore, total utility = 18 + 6 = 24.</td>
</tr>
<tr>
<td>6</td>
<td>c</td>
<td>Marginal utility is the additional utility caused by the consumption of one additional ice cream cone, so 18 − 10 = 8.</td>
</tr>
<tr>
<td>7</td>
<td>c</td>
<td>The marginal utility of the 5th ice cream cone is 2. Adding that to total utility from 4 ice cream cones yields 28 + 2 = 30.</td>
</tr>
<tr>
<td>8</td>
<td>a</td>
<td>As total utility increases, marginal utility decreases.</td>
</tr>
<tr>
<td>9</td>
<td>a</td>
<td>As total utility increases, marginal utility decreases, so the marginal utility curve would be downward sloping.</td>
</tr>
<tr>
<td>10</td>
<td>a</td>
<td>This is the definition of a budget constraint. See page 281 in the textbook.</td>
</tr>
<tr>
<td>11</td>
<td>a</td>
<td>Optimal decisions are made at the margin.</td>
</tr>
<tr>
<td>12</td>
<td>b</td>
<td>Increasing the consumption of good Y causes the marginal utility of good Y to decrease, thus lowering the numerator of that fraction and bringing both fractions into equality.</td>
</tr>
<tr>
<td>13</td>
<td>b</td>
<td>When a consumer maximizes utility subject to the budget constraint, the marginal utility of the last dollar spent on each good is the same.</td>
</tr>
<tr>
<td>14</td>
<td>a</td>
<td>Apply the utility maximizing rule. Because the marginal utility per dollar spent on X (60/10) is greater than the marginal utility per dollar spent on Y (15/5), the quantity of X consumed should increase. As the quantity consumed of good X increases, the $MU_x$ decreases, lowering the numerator and bringing both fractions closer to equality. At the same time, the quantity consumed of Y should decrease. This will increase the $MU_y$, making both fractions equal.</td>
</tr>
<tr>
<td>15</td>
<td>c</td>
<td>The marginal utility of the 5th unit of good X is 8, and the price of X is $4, so the marginal utility per dollar spent on X is 2.</td>
</tr>
<tr>
<td>16</td>
<td>c</td>
<td>The marginal utility per dollar spent on the third unit of X (20/4 = 5) equals the marginal utility per dollar spent on the fourth unit of Y (10/2 = 5).</td>
</tr>
<tr>
<td>17</td>
<td>d</td>
<td>The marginal utility per dollar spent on the fourth unit of X (15/3 = 5) equals the marginal utility per dollar spent on the fourth unit of Y (10/2), and the consumer spends all of her income: $12 on X (4 units × $3 = $12) and $8 on Y (4 units × $2 = $8).</td>
</tr>
</tbody>
</table>
18 b This is the definition of the substitution effect.
19 a This is the definition of the income effect.
20 a The lower price increases purchasing power and lowers the opportunity cost of consuming the good.
21 d The income effect for an inferior good moves quantity demanded in the opposite direction from the substitution effect. A decrease in price increases purchasing power, which reduces the quantity demanded of the inferior good, while the lower price increases the quantity demanded of the inferior good.
22 b When the price of an inferior good falls, the income and substitution effects work in opposite directions: The income effect causes consumers to decrease the quantity of the good they demand, whereas the substitution effect causes consumers to increase the quantity of the good they demand. It is possible, then, that consumers might actually buy less of a good when the price falls. If this happened, then the demand curve would be upward sloping.
23 a A consumer responds optimally to the fall in the price of a product by consuming more of that product. When the price of pizza falls from $2 per slice to $1.50, the optimal quantity of slices consumed rises from 3 to 4. We assume that tastes and preferences, income, the price of related goods, and price expectations remain constant. When we graph this result, we have the consumer’s demand curve.
24 c For a demand curve to be upward sloping, the good would have to be an inferior good, and the income effect would have to be larger than the substitution effect. Goods that have both of these characteristics are called Giffen goods.
25 b Although economists have traditionally believed social influences on consumer choice are unimportant, some consumers appear to receive utility from consuming goods that are popular with other consumers.
26 c Whenever consumption takes place publicly, many consumers will base their purchasing decisions on what other consumers buy. Examples include eating in restaurants, attending sporting events, and wearing clothes or jewelry. In all these cases, the decision to buy a product will depend partly on the characteristics of the product and partly on how many other people are buying the product.
27 c There are network externalities in the consumption of a product if the usefulness of the product increases with the number of consumers who use it. For example, if you owned the only telephone in the world, it would not be very useful.
28 c Once a product becomes established, consumers may find it too costly to switch to a new product that contains a better technology. The selection of products may be path dependent. That means that because of switching costs, the technology that was first available may have advantages over better technologies that were developed later.
29 a Some economists have argued that because of path dependence and switching costs, network externalities can result in market failures.
30 b There is a great deal of evidence that people like to be treated fairly and that they usually attempt to treat others fairly, even if doing so makes them worse off financially. Tipping servers in restaurants is an example.
31 b There are many other examples where people willingly part with money when they are not required to do so and when they receive nothing material in return. The most obvious example is making donations to charity.
32 a If neither the allocator nor the recipient cared about fairness, optimal play in the ultimatum game is straightforward: The allocator should propose a division of the money in which the allocator receives $19.99 and the recipient receives $0.01. The allocator has maximized his or her gain. The recipient should accept the division, because the alternative is to reject the division and receive nothing at all.
When the ultimatum game experiment is carried out, both allocators and recipients act as if fairness is important. Allocators usually offer recipients at least a 40 percent share of the money, and recipients almost always reject offers of less than a 10 percent share.

At this price, the quantity demanded is greater than the quantity supplied.
The theater could raise the price, but a concern for fairness will lead them to keep the price of tickets at $75, even though the result is a shortage of tickets.
Most people consider it fair for firms to raise their prices following an increase in costs but unfair to raise prices following an increase in demand.
Kahneman, Knetsch, and Thaler have concluded that firms may sometimes not raise their prices when quantity demanded for their products is greater than the quantity supplied out of fear that in the long run they will end up losing customers who believe the price increases were unfair (see page 295).
When asked whether it would “be fair for the NFL to raise the [price of tickets] to $1,500 if that is still less than the amount most people are willing to pay for tickets,” 92 percent of the fans surveyed answered “no.” Even 83 percent of the fans who had paid more than $1,500 for their tickets answered “no.” Krueger concluded that whatever the NFL might gain in the short run from raising ticket prices, it would more than lose in the long run from alienating football fans.
Consumers commonly commit the following three mistakes when making decisions: They take into account monetary costs but ignore nonmonetary opportunity costs. They fail to ignore sunk costs. They are overly optimistic about their future behavior. See page 296 in the textbook.
The endowment effect is the tendency of people to be unwilling to sell something they already own even if they are offered a price that is greater than the price they would be willing to pay to buy the good if they didn’t already own it.
Because people are unrealistic about their future behavior, they underestimate the costs of choices—like overeating or smoking—that they make today. One way they could avoid this problem is to be realistic about their future behavior.

Short Answer Responses

1. No. Assume that the price of a normal good (apples) increased. The substitution effect from this price change would cause the quantity of apples demanded to decrease. Because apples are a normal good, the income effect would cause the quantity demanded to decrease also. If apples were an inferior good, then the income effect would cause quantity demanded to increase. Apples would have an upward-sloping demand curve only if (a) they were an inferior good and (b) the income effect of the price increase was greater than the substitution effect.

2. The representative fails to recognize that the $15 million spent on bridge construction is a sunk cost that should be ignored when deciding whether the project merits additional spending so that the bridge can be finished. The representative should ignore the money that has already been spent and explain why the additional expenditure of $20 million is justified.

3. You should consume the quantity of pizza and Coke that makes the marginal utility per dollar equal and spends your entire budget. If the budget increases to $13, you would want to consume 4 slices of pizza and 5 cups of Coke to maximize your utility. Because the increase in income resulted in an increase in the quantity demanded of both Coke and pizza, the goods must both be normal goods.
4. Some economists argue that because of switching costs and path dependence, network externalities can result in market failure. In their view, the triumph of VHS technology can be seen as market failure. But other economists, such as Stephen Margolis and Stan Leibowitz, argue that network externalities do not lock consumers into using inferior technology and that the evidence that Betamax technology was truly superior is unconvincing. This is an area where there is no consensus opinion among mainstream economists. (See page 293 in the textbook.)

5. This is an example of people being unrealistic about their future behavior. Those who are addicted to nicotine have difficulty quitting because of the withdrawal effects, including nervousness, irritability, and weight gain. As a result, the decision to quit smoking is put off into the future even though the withdrawal effects will not be avoided. Many adults who smoke might like to quit in the long run, but their short-run decisions are inconsistent with their long-run goals.

True/False Answers

1. F Total utility increases, even if marginal utility (the change in total utility from consuming one more unit) decreases.
2. F Marginal utility is the increase in total utility a person receives from consuming one additional unit of a good or service.
3. T To maximize utility we must spend our total budget.
4. F This describes the income effect for a normal good, not an inferior good.
5. F These economists believe that the mentioned factors do influence decision making.
6. T The product becomes more useful as more consumers purchase and use the product.
7. F Switching costs can explain why consumers continue to use a previously purchased product that presently contains inferior technology.
8. T For Giffen goods, as the price increases so does the quantity demanded. Giffen goods are inferior goods that have an income effect that is stronger than the substitution effect.
9. F If the price of either a normal good or an inferior good decreases, the substitution effect will cause quantity demanded to increase. It is the direction of the income effect that is different across normal and inferior goods.
10. F At one time, some economists believed that this might be possible.
11. T Marginal decision making involves small, incremental changes.
12. T Consumers may buy products endorsed by celebrities to be fashionable or to feel closer to the celebrities.
13. T See the section entitled “Does Fairness Matter?” that begins on page 293.
14. F In fact, consumers should ignore sunk costs when they make decisions, but they often don’t.
15. F The endowment effect is the tendency of people to be unwilling to sell a good they already own even if they are offered a price that is greater than the price they would be willing to pay to buy the good if they didn’t already own it.