

Why Is a Demand Curve Downward Sloping?

To most people, the law of demand is obvious: Consumers buy more at a lower price and less at a higher price. Economics goes beyond describing the combined demand of all consumers in a market. To explain why a demand curve is downward sloping, or negatively sloped, economists focus on the demand curve of a single consumer.

The total utility of a quantity of goods and services to a consumer can be represented by the maximum amount of money he or she is willing to give in exchange for them. The marginal utility of a good or service to a consumer (measured in money terms) is the maximum amount of money he or she is willing to pay for one more unit of the good or service. With these definitions, we can now state a simple idea about consumer tastes: The more of a good a consumer has, the less will be the marginal utility of an additional unit.

Part A

Figure 11.1 presents data on Dolores' evaluation of different quantities of polo shirts and different quantities of steak.

1. Use the data to compute the marginal utility of each polo shirt and each steak. The numbers in the figure represent the amount of dollars Dolores is willing to pay for the polo shirts and steaks.



Figure 11.1
Marginal Utility of Polo Shirts and Steaks

Number of Polo Shirts	Total Utility	Marginal Utility	Number of Steaks	Total Utility	Marginal Utility
0	0		0	0	
1	60	60	1	20	20
2	100	40	2	36	16
3	130		3	51	
4	150		4	65	
5	165		5	78	
6	175		6	90	

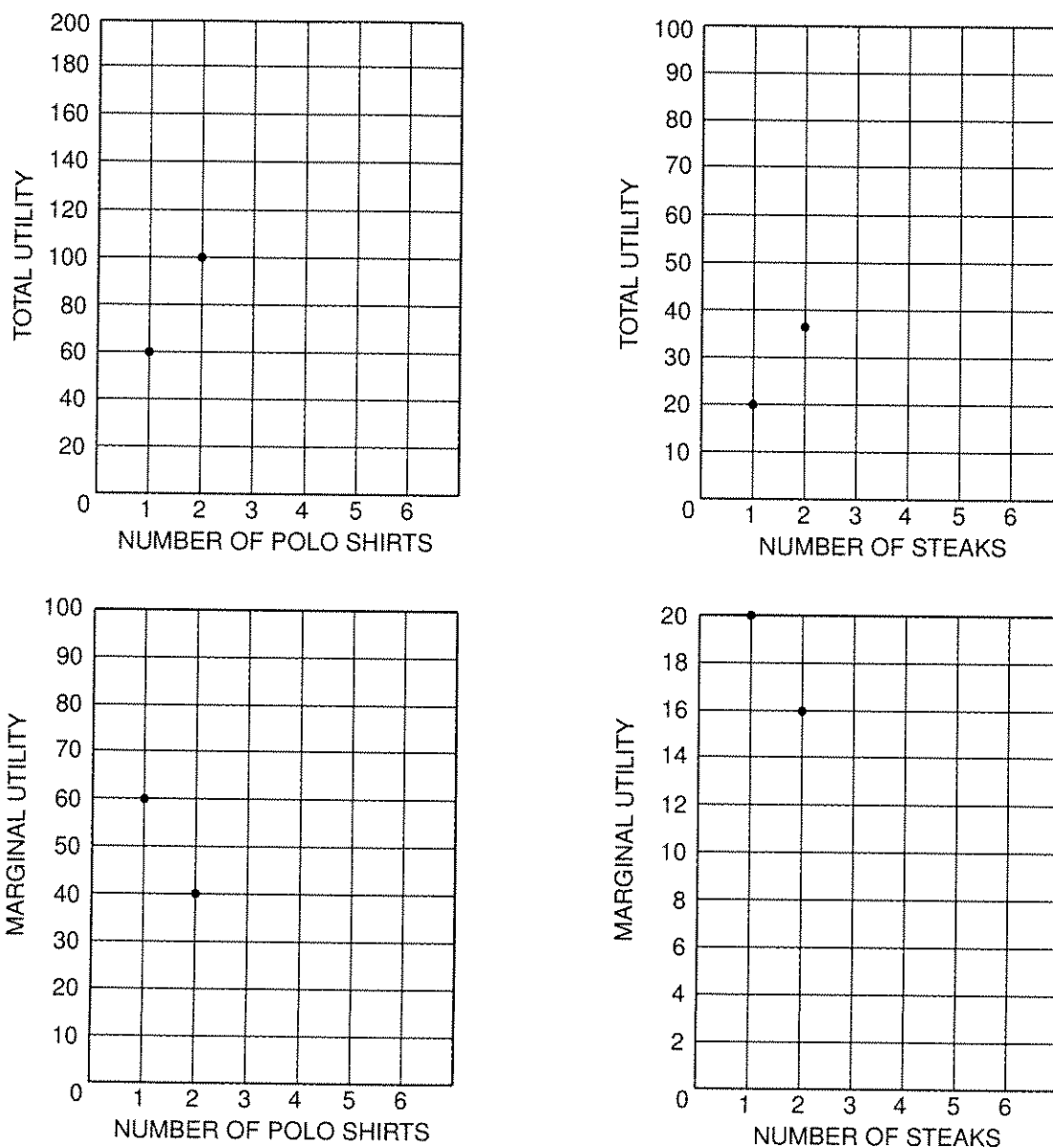
2. Using Figure 11.2 (on the next page), plot Dolores' total utility and marginal utility for polo shirts and steaks. Each graph has two points to get you started.

Adapted from Craig Swan, *Study Guide for Baumol and Blinder Economics: Principles and Policy*, 6th ed. (Fort Worth: Harcourt Brace & Co., 1994), pp. 100 to 102.



Figure 11.2

Total and Marginal Utility of Polo Shirts and Steaks



3. Looking at the chart and graphs, you can conclude:

(A) Total utility is always (*increasing / decreasing*).

(B) Marginal utility initially (*increases / decreases*) and eventually (*increases / decreases*).

You have demonstrated the law of *diminishing marginal utility*.

Part B

If Dolores has a given budget and must choose between polo shirts and steaks, she will make her choice so that the marginal utility per dollar spent of each good is the same. Using the data in Figure 11.1 and assuming that the price of both goods is \$30, let's see what happens if Dolores spends her entire budget of \$150 dollars and buys five polo shirts and no steaks. Her marginal utility from the last polo shirt is 15 and from the first steak is 20. So if she buys only four polo shirts and one steak, she loses a utility of 15 on the polo shirt but gains utility of 20 on the steak. Dolores is better off.

Suppose Dolores spends her \$150 and buys four polo shirts and one steak. Her marginal utility on the last polo shirt is 20 and on the steak is also 20. She will not want to switch. To buy the next steak gives her an increase in utility of 16, but she would have to give up a polo shirt, which would reduce her utility by 20. Conversely, to buy an additional polo shirt would increase her utility by 15, but she would lose 20 from giving up the steak. Dolores should not change her purchases.

If the prices of the two goods differ, then Dolores will adjust her consumption until the marginal utilities of the two goods, *per dollar spent*, are equal. Or, stated in another way,

$$\frac{MU_x}{P_x} = \frac{MU_y}{P_y}$$

4. Use the information in Figure 11.3 to analyze Frank's choice between gasoline and food.

Frank has an income of \$130, the price of gasoline is \$10 per gallon and the price of food is \$20.

Complete the table.



Figure 11.3

Gasoline	MU_g	MU_g / P_g	Food	MU_f	MU_f / P_f
1	60	6.0	1	115	5.75
2	55		2	105	
3	51		3	98	
4	48		4	94	
5	47		5	92	
6	46		6	90	

- (A) Does the combination $G = 1$ and $F = 6$ satisfy the income constraint? _____

Can Frank purchase this combination of goods with his income? _____

- (B) Is this the utility maximizing combination of goods? _____

- (C) In which direction would Frank like to reallocate his purchases?

- (D) What is Frank's utility maximizing combination of goods, subject to the income constraint of \$130?

Part C

Assume you go into a store to buy a bottle of water. The bottle of water costs you \$1. You would have been willing to pay \$2. The difference between what you paid and what you would have been willing to pay is *consumer surplus*.

We can calculate Dolores' consumer surplus from buying steak by looking at her demand curve. Look at her marginal utility curve for steak: At three steaks, Dolores is willing to pay \$15 for one more; at four steaks, she is willing to pay \$14. Dolores will buy steak until the point where the price is equal to the marginal utility of the last steak. Dolores will pay the same price for each of the steaks she buys. Thus, if the price of steak is \$14, she will buy four steaks; the marginal utility of the fourth steak is \$14. Dolores would have been willing to pay more for the earlier steaks. She has gotten a bargain buying four steaks at \$14 apiece for a total of \$56. She would have been willing to pay \$20 for the first, \$16 for the second, \$15 for the third, and \$14 for the fourth, for a total of \$65. The consumer surplus is the difference between what she was willing to pay (\$65) and what she paid (\$56). Her consumer surplus is \$9.

Consider the following information on Joel's total utility for CD purchases, and then underline the correct answer for each question that follows.



Figure 11.4
Total Utility of CDs

Number of CDs	Total Utility
1	\$ 25
2	\$ 45
3	\$ 63
4	\$ 78
5	\$ 90
6	\$100
7	\$106
8	\$110

5. What marginal utility is associated with the purchase of the third CD?
(A) \$18 (B) \$21 (C) \$45 (D) \$63
6. What is Joel's consumer surplus if he purchases three CDs at \$11 apiece?
(A) \$30 (B) \$33 (C) \$63 (D) \$96
7. What would happen to Joel's consumer surplus if he purchased an additional CD at \$11?
(A) Consumer surplus declines by \$11.
(B) Consumer surplus increases by \$11.
(C) Consumer surplus increases by \$15.
(D) Consumer surplus increases by \$4.
8. How many CDs should Joel buy when they cost \$11 apiece?
(A) 0 (B) 3 (C) 5 (D) 7

9. What is Joel's consumer surplus at the optimal number of CD purchases?
(A) \$35 (B) \$55 (C) \$79 (D) \$100
10. If CDs go on sale and their price drops to \$8, how many CDs do you expect Joel to buy?
(A) 5 (B) 6 (C) 7 (D) 8
11. Why is consumer surplus important?

Part D

Income and Substitution Effects

Another way of explaining the downward sloping demand curve is through the *income* and *substitution effects*.

Income effect: When the price of a good falls, consumers experience an increase in purchasing power. When the price of a good increases, consumers experience a decrease in purchasing power.

Substitution effect: When the price of a good changes, consumers will substitute toward the now relatively less-expensive good.

You go to your favorite burger place. The price of a burger has increased, but the price of the chicken sandwich stays the same. Over the course of a week, you generally buy both burgers and chicken sandwiches.

12. How will the increase in the price of a burger affect the purchase of burgers? Explain.
13. Describe how the substitution effect changes your purchases.
14. Describe how the income effect changes your purchases.