

CHAPTER 1: The Challenge of Economics

SOLUTIONS MANUAL

LEARNING OBJECTIVES

After reading this chapter, you should be able to:

LO1-1 Explain the meaning of scarcity.

LO1-2 Define “opportunity cost.”

LO1-3 Recite society’s three core economic questions.

LO1-4 Discuss how market and command economies differ.

LO1-5 Describe the nature of market and government failures.

LO1-6 POLICY PERSPECTIVES Apply the concept of opportunity cost to health care.

QUESTIONS FOR DISCUSSION

1. As rich as America is, how can our resources possibly be “scarce”? **LO1**

Answer: Many believe that America has become rich because of the abundance of our natural resources. Others believe our democratic political system and our market-driven economic system play significant roles in our relative financial success. Regardless, as rich as America is, we still want more. The concept of scarcity, in the case of America, is the lack of enough resources to satisfy all American consumer desires. Therefore, resources are scarce in America because the desire for these resources is greater than the amount we possess.

2. What opportunity costs did you incur in reading this chapter? **LO2**

Answer: There are many other things you could have done with your time instead of reading this chapter. The most desired activity you gave up is the opportunity cost.

3. How would you answer the question in the News Wire “Future Living Standards”? Why? **LO3**

Answer: There was a spike of anxiety in 2008–2009 regarding the ability of the U.S. economy to crank out more goods continuously. Today, many Americans still worry about the resiliency of our economic system and our many resource limitations. The general definition of economics—the study of how best to allocate scarce resources among competing uses—allows for the potential of brilliant minds to help the economy continue to grow. Additional resources, new technologies, insightful entrepreneurial strategies, and great minds working on economic development provide tremendous hope for future growth in our economy and the associated increase in our standard of living.

4. How can India’s army be larger than North Korea’s when India spends only 2.4 percent of its output on the military and North Korea spends 20 percent? **LO1**

Answer: India produces far more output each year than North Korea. As a result, even though India’s overall spending on the military is higher, the size of its economy makes its military spending a smaller portion of its overall economic activity. India’s larger population, larger land area, natural resources, education system (human capital) focused on technology, and the structure of its economy

allow it to focus more of its production on capital goods, as well as on consumer goods and services, which, in turn, enable it to maintain a large army while maintaining a focus on economic growth.

5. In a purely private market economy, how is the FOR WHOM question answered? Is that optimal?

LO3

Answer: *FOR WHOM is one of the three basic economic questions. The other two questions determine how large of an economic pie to bake (WHAT) and how we will bake it (HOW). This FOR WHOM question deals with how to slice the pie. Should some get larger or smaller slices than others? The focus is on how an economy's output is distributed across members of society.*

In a purely private market economy, those who are willing and able to purchase a slice of pie will receive the slice. Markets are efficient; however, neither markets nor governments always have the right answers. There are certainly times (market failure) when the market generates suboptimal economic outcomes.

6. Why doesn't North Korea reduce its military and put more resources into food production (News Wire "Opportunity Cost")? What is the optimal mix of "guns" and "butter" for a nation? **LO3**

Answer: *North Korea doesn't reduce its military and put more resources into food production because the North Korean government believes that a large military establishment is essential to its well-being and security.*

The optimal mix of "guns" and "butter" depends on cultural and social values. Some economies let private individuals determine this mix in the private market, while others, like North Korea, rely on the government answering it.

7. Why would anyone object to giving unemployed workers an extra \$400 a week, as President Biden proposed in early 2021? **LO3**

Answer: *On one hand, providing payments to unemployed workers will help them purchase necessary goods and services. On the other hand, economics tells us that all choices come with opportunity costs. The extra money given to unemployed workers could have instead been used for other purposes. In addition, given the standard assumptions about market participant reactions, we would expect that those receiving the benefits may reconsider their choices between work and leisure. Since their reward for not working is not higher, they could be expected to work less. This decision entails trade-offs that might make some object to this policy.*

8. What kind of knowledge must central planners possess to manage an economy efficiently? **LO4**

Answer: *A central planner will make all the decisions for an economy including what goods are produced, at what prices they are sold, and who gets to have them. For example, a central planner places workers at a bread factory, tells them how much bread to bake, and specifies who is allowed to eat this bread. The WHAT, HOW, and FOR WHOM outcomes are all directed by the central government (planner).*

A central planner would need to be omniscient in order to manage an economy efficiently. They would need to know the desires of consumers, consumers' ability to pay, productivity of inputs (such as capital and labor), and technological capabilities. It is simply unreasonable to believe that a central planner could ever have such vast and comprehensive knowledge. Despite this, some

economies feel that the negatives of central planning are still preferable to more market-driven outcomes, which is why some economies rely heavily on governmental central planners.

9. **POLICY PERSPECTIVES** Why can't we produce at point X_2 in Figure 1.6? Will we ever get there? **L05**

Answer: X_2 is beyond the resources available for production because it is outside of the curve. The only way to get there would be to increase the resources available or to improve the technology of the economy so that production is more efficient.

10. **POLICY PERSPECTIVES** To get from X_1 to X_2 in Figure 1.6, per President Biden's proposals, entails a reduction in the output of "other goods." How do higher taxes help that transition? **L02**

Answer: President Biden's goal was to expand the health care industry and to increase access to health care for Americans and to get everyone vaccinated against COVID-19. However, producing more health care means that other goods or services would need to be given up; there is an opportunity cost involved. Higher taxes on "other goods" would decrease the quantity consumed of those other goods. These tax dollars could then be used to purchase and distribute more health care.

PROBLEMS

1. Iceland has no military. **L02**

- So, at what point in Figure 1.1 is Iceland producing?
- If Iceland instead decided to produce M_1 of military goods, how much consumer output would it have to give up?

Answer:

- Point A
- $C_{\text{MAX}} - C_1$

Feedback:

- If the country currently has no military, then the only output will be consumer goods (point A).
- If the country is now producing M_1 military goods, it can now produce C_1 consumer goods (equal to the combination of C_1 consumer goods and M_1 military goods at point B). To do so, the country would reduce the production of consumption goods by the amount $(C_{\text{MAX}} - C_1)$.

2. What percentage of total U.S. output consisted of military goods: **L02**

- in 1944? (Figure 1.3)
- in 2020? (Figure 1.3)

Answer:

- 39.0%
- 3.4%

Feedback: According to the figure, the percentage of total U.S. output consisting of military goods was approximately:

- 39.0% in 1944.
- 3.4% in 2020.

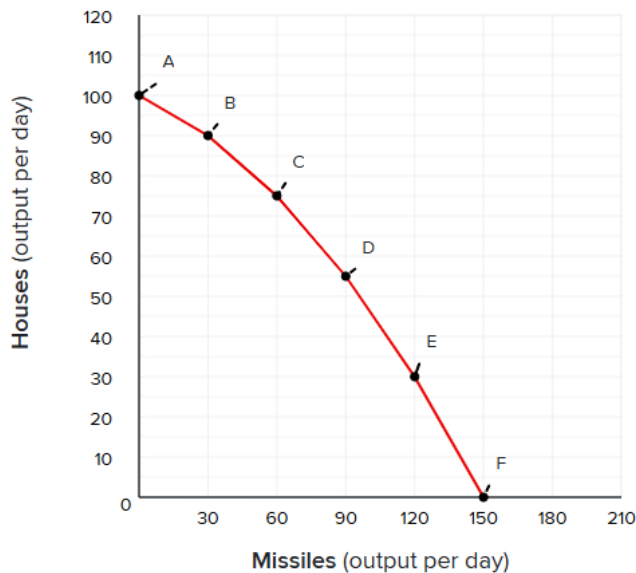
3. Use Table 1.1 to answer the following:

- a. Draw a production possibilities curve that labels combinations A–F based on the data provided in the table.
- b. Calculate the opportunity cost of increasing missile production **L02**
 - i. from 60 to 90.
 - ii. from 90 to 120.

Answer:

- a. See the graph for an illustration of the production possibilities curve.

Production Possibilities Frontier



- b.
 - i. Increasing missile production from 60 to 90 means an opportunity cost of 20 houses.
 - ii. Increasing missile production from 90 to 120 means an opportunity cost of 25 houses.

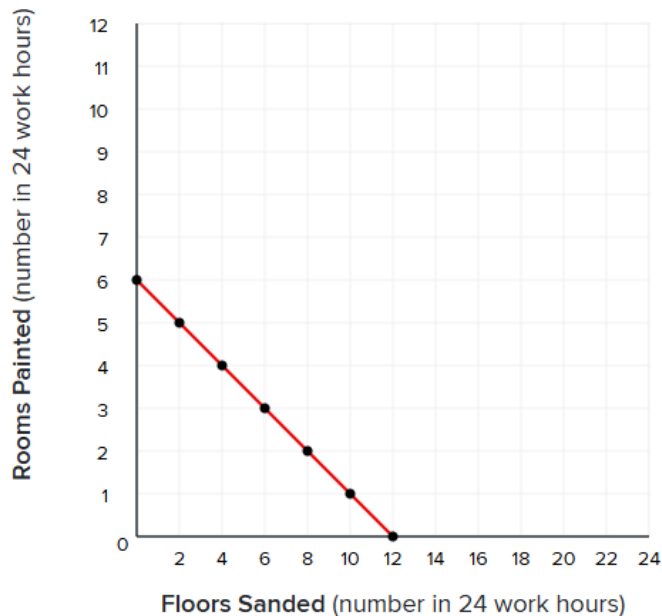
Feedback:

- a. A production possibilities curve describes the various combinations of final goods and services that could be produced in a given time period with available resources and technology. Point A, for example, is an output combination of 0 missiles and 100 houses plotted on the vertical axis (0,100). Point F, on the other hand, is an output combination of 150 missiles and 0 houses plotted on the horizontal axis (150,0).
- b.
 - i. The opportunity cost of increasing the production of missiles is the loss of production of houses. Increasing missile production from 60 to 90 results in a loss of 20 houses ($= 75 - 55$).
 - ii. Increasing missile production from 90 to 120 results in a loss of 25 houses ($= 55 - 30$).
4. Assume that it takes four hours of labor time to paint a room and two hours to sand a floor. If 24 hours were spent painting: **L01**
 - a. How many rooms could be painted?
 - b. If a decision were made to sand two floors, how many painted rooms would have to be given up?
 - c. Illustrate with a production possibilities curve.

Answer:

- a. 6 rooms
- b. 1 room
- c. See the graph for an illustration of the production possibilities curve.

Production Possibilities Curve



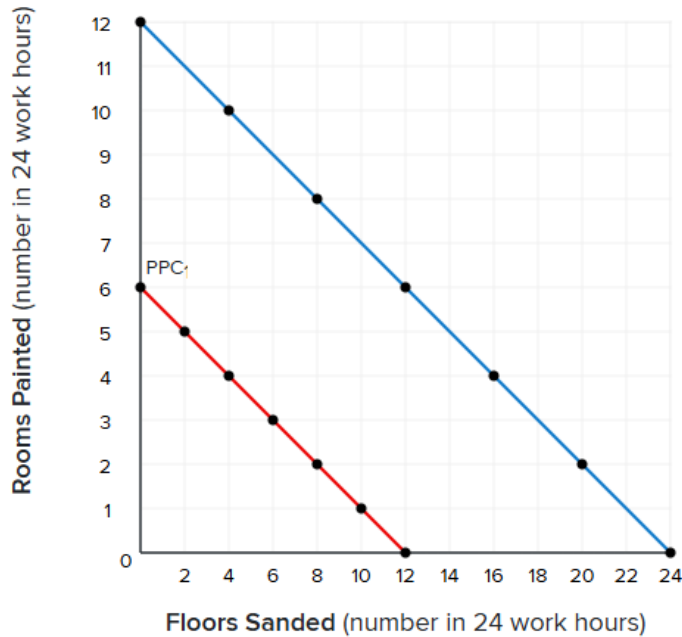
Feedback:

- a. If 24 hours were spent painting rooms and a worker can paint a room in four hours, then this worker can paint six rooms ($= 24 \text{ hours} \div 4 \text{ hours per room}$).
 - b. Because it takes two hours to sand a floor, it would take a worker four hours to sand two floors. Therefore, the worker must give up painting one room, which also takes four hours to complete.
 - c. The various production possibilities are plotted with “Rooms Painted” on the vertical axis and “Floors Sanded” on the horizontal axis. Thus, if a worker spends all of their time painting rooms, six rooms can be painted (0 floors sanded and six rooms painted). On the other hand, if a worker spends all of their time sanding floors, 12 floors can be sanded (12 floors sanded and 0 rooms painted). The alternative production possibilities points in between those two extremes are (two floors sanded and five rooms painted), (four floors sanded and four rooms painted), (six floors sanded and three rooms painted), (eight floors sanded and two rooms painted), and (10 floors sanded and one room painted).
5. Assume that it takes four hours of labor time to paint a room and two hours to sand a floor. If two workers each spend 24 hours painting: **LO2**
- a. How many rooms could be painted?
 - b. If a decision were made to only sand floors, how many floors could be sanded?
 - c. Illustrate with a production possibilities curve.

Answer:

- a. 12 rooms
- b. 24 floors
- c. See the graph for an illustration of the production possibilities curve.

Production Possibilities Curve



Feedback:

- a. If two workers each spend 24 hours painting rooms and they can paint a room in four hours, then these workers can paint 12 rooms ($= [24 \text{ hours} \times 2 \text{ workers}] \div 4 \text{ hours per room}$).
 - b. If two workers each spend 24 hours sanding floors and they can sand a floor in two hours, then these workers can sand 24 floors ($= [24 \text{ hours} \times 2 \text{ workers}] \div 2 \text{ hours per floor}$).
 - c. The various production possibilities are plotted with “Rooms Painted” on the vertical axis and “Floors Sanded” on the horizontal axis. Since there are two workers, the production possibilities have doubled. If both workers spend all of their time painting rooms, 12 rooms can be painted (0 floors sanded and 12 rooms painted). On the other hand, if both workers spend all of their time sanding floors, 24 floors can be sanded (24 floors sanded and 0 rooms painted). Some of the alternative production possibilities points in between those two extremes are: four floors sanded and 10 rooms painted; eight floors sanded and eight rooms painted; 12 floors sanded and six rooms painted; 16 floors sanded and four rooms painted; and 20 floors sanded and two rooms painted.
6. According to the figure below, **L02**
- a. At which point(s) is this society producing some of each type of output but producing inefficiently?
 - b. At which point(s) is this society producing the most output possible with the available resources and technology?
 - c. At which point(s) is the output combination unattainable with available resources and technology?
 - d. Show the change that would occur if the resources of this society increased. Label this curve PPC_2 .

Answer:

- a. Point Y
- b. Points A, B, and C
- c. Point X
- d. If the resources of this society increased, the PPC would shift outward.

Feedback:

- a. On the graph, points of possible production that lie inside the production possibilities curve represent possible output combinations wherein resources are not used efficiently. This is because a production possibilities curve represents the upper limit of productive capacity with current resources and technology, thereby representing efficient outcomes. On the graph, only point Y fits this description.
 - b. On the graph, the production possibilities curve represents the upper limit of productive ability when using resources efficiently. This means that points A, B, and C represent the most output possible with available resources and technology.
 - c. On the graph, the production possibilities curve represents the upper limit of productive ability when using resources effectively. Points above (or outside of) the line that represent higher levels of production are therefore currently unattainable with current resources and technology. Point X fits this description on the graph.
 - d. If this society's population increases dramatically, technology advances, the stock of capital increases, or any combination of an increase in resources occurs, then the economy's production possibilities will increase. This increase in resources would shift the PPC outward, resulting in economic growth. Resources increasing means that the PPC will shift outward, resulting in economic growth.
7. North Korea has a population of 26 million people, of whom 1.47 million are in the military. South Korea has an army of 569,000 out of a population of 52 million. What percentage of the population is in the military in: **LO1**
- a. North Korea?
 - b. South Korea?

Answer:

- a. 5.65%
- b. 1.09%

Feedback:

- a. In North Korea, 5.65 percent of the population is in the military. Percentage of population in the military = $(\text{military} \div \text{population}) \times 100 = (1.47 \text{ million} \div 26 \text{ million}) \times 100 = 5.65\%$.
 - b. In South Korea, 1.09 percent of the population is in the military. Percentage of population in the military = $(\text{military} \div \text{population}) \times 100 = (0.569 \text{ million} \div 52 \text{ million}) \times 100 = 1.09\%$.
8. The table below describes the production possibilities confronting an economy. Using that information: **LO3**
- a. Calculate the opportunity costs of building hospitals.
 - b. Draw the production possibilities curve.
 - c. Why can't more of both outputs be produced?
 - d. Which point on the curve is the most desired one?

Potential	Homeless
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Output Combinations	Shelters	Hospitals
<i>A</i>	20	0
<i>B</i>	17	1
<i>C</i>	13	2
<i>D</i>	7	3
<i>E</i>	0	4

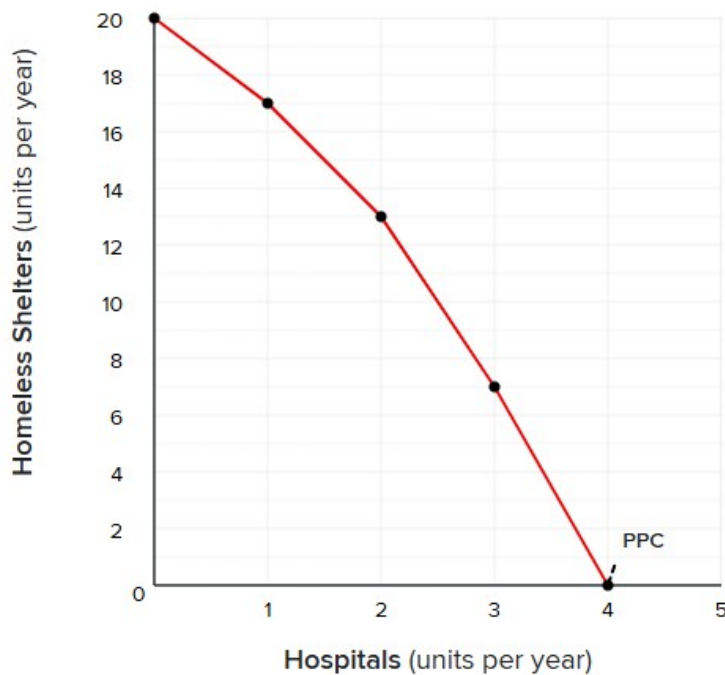
Answer:

a.

Potential Output Combinations	Homeless Shelters	Hospitals	Opportunity Cost of One More Hospital
<i>A</i>	20	0	—
<i>B</i>	17	1	3 Homeless shelters
<i>C</i>	13	2	4 Homeless shelters
<i>D</i>	7	3	6 Homeless shelters
<i>E</i>	0	4	7 Homeless shelters

b. See the graph for an illustration of the production possibilities curve.

Production Possibilities Curve



c. Our resources are limited and are therefore not capable of producing everything we want.

d. It depends on the value judgments of society.

Feedback:

- a. **Calculating Opportunity Costs.** Opportunity cost is the most desired goods and services that are forgone in order to obtain something else. In this economy, the opportunity cost of building more hospitals is giving up building homeless shelters.
 - The opportunity cost of producing the first hospital is a reduction in the production of homeless shelters from 20 to 17, or 3 homeless shelters.
 - The opportunity cost of producing the second hospital is a reduction in the production of homeless shelters from 17 to 13, or 4 homeless shelters.
 - The opportunity cost of producing the third hospital is a reduction in the production of homeless shelters from 13 to 7, or 6 homeless shelters.
 - The opportunity cost of producing the fourth hospital is a reduction in the production of homeless shelters from 7 to 0, or 7 homeless shelters.
 - b. **Graphing the Production Possibilities Curve.** A production possibilities curve describes the various combinations of final goods or services that could be produced in a given time period with available resources and technology. For example, one combination of output is 20 homeless shelters and 0 hospitals, a second combination of output is 17 homeless shelters and 1 hospital, and so on.
 - c. Because all resources are scarce and therefore limited, we are not capable of producing more of both products. Although we might want more of both (or more of everything perhaps), we are not capable of producing everything that we want.
 - d. This answer depends on the value judgments of a society. The most desired combination will vary based on the particular wants and needs of that particular society.
9. In 2022, the dollar value of total output was roughly \$40 billion in North Korea and \$1,600 billion in South Korea. South Korea devoted 2.7 percent of its output to defense, and North Korea devoted 20.0 percent of its output to defense. **LO3**
- a. How much does North Korea spend on its military (in dollars)?
 - b. Which nation spends more (in dollars)?

Answer:

- a. \$8.0 billion
- b. South Korea

Feedback:

- a. North Korea spent approximately \$8.0 billion on its military.
 $\$40 \text{ billion} \times 20.0\% = \$40 \text{ billion} \times 0.20 = \$8.0 \text{ billion}.$
 South Korea spent approximately \$43.2 billion on its military.
 $\$1,600 \text{ billion} \times 2.7\% = \$1,600 \text{ billion} \times 0.027 = \$43.2 \text{ billion}.$
- b. South Korea spent more on its defense (in dollars) than North Korea.

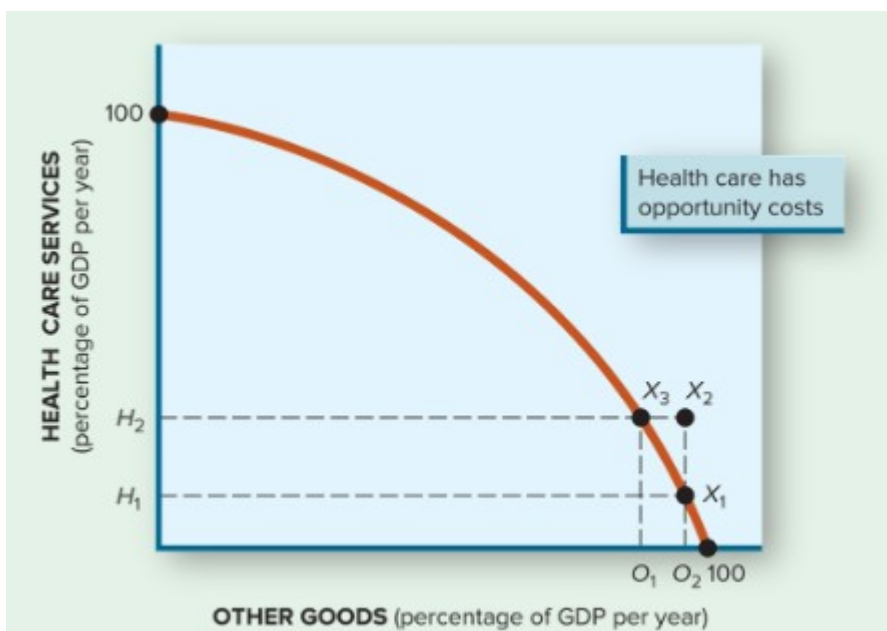
10. According to the News Wire “Opportunity Cost,” what is the opportunity cost of a single missile test in terms of corn for each of North Korea’s 26 million people? **LO4**

Answer: 0.19 tons of corn per person

Feedback: According to the article, the \$1.3 billion spent on the missile test is equivalent to acquiring 5 million tons of corn. This amounts to 0.19 tons of corn per person (= 5 million tons of corn ÷ 26 million people).

11. **POLICY PERSPECTIVES** In Figure 1.7, **LO6**

- If as much health care as possible is provided, how many other goods will be provided?
- What is the opportunity cost of increasing health care from H_1 to H_2 ?



Answer:

- 0 units of other goods
- $O_2 - O_1$

Feedback:

- If a society uses all of its resources to produce health care, there are no resources remaining to produce other goods.
- When health care production increases from H_1 to H_2 (point X_1 to point X_3), the production of other goods decreases from O_2 to O_1 . Continuing to produce O_2 (at a point like X_2) would be impossible as some units used to produce other goods would need to be converted to produce health care goods. The difference between O_2 and O_1 is the lost percentage of GDP devoted to producing non-health care goods.

12. **POLICY PERSPECTIVES** Suppose the following data reflect the production possibilities for providing health care and education: **LO6**

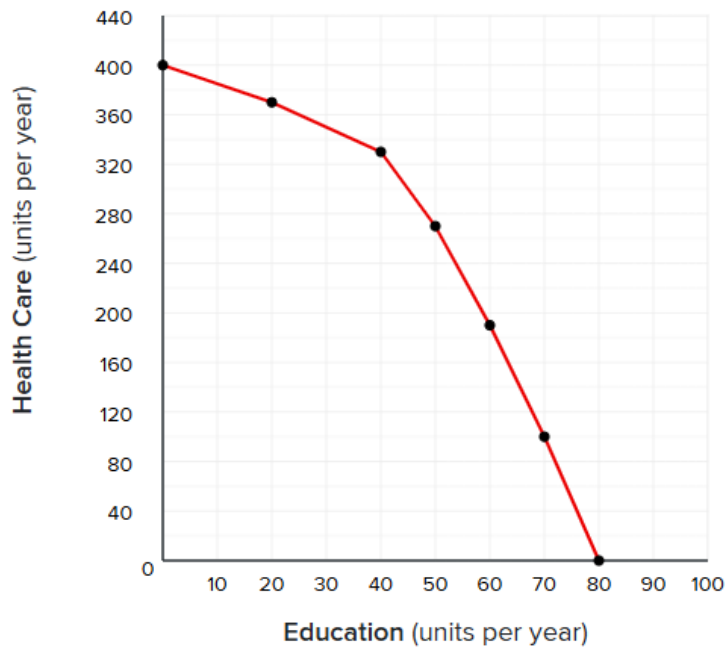
	Units per Year						
Health care	400	370	330	270	190	100	0
Education	0	20	40	50	60	70	80

- Graph the production possibilities curve.
- If maximum health care is provided, how much education will be provided?
- What is the opportunity cost of increasing health care from 190 to 270 units?

Answer:

- See the graph on the next page for an illustration of the production possibilities curve.

Production Possibilities Curve



- b. 0 units of education
- c. 10 units of education

Feedback:

- a. A production possibilities curve describes the various combinations of final goods or services that could be produced in a given time period with available resources and technology. For example, one combination of output is 400 units of health care and 0 units of education, a second combination of output is 370 units of health care and 20 units of education, and so on.
- b. If all resources are used to produce health care, there will be no resources available to produce education.
- c. Increasing health care from 190 units to 270 units results in an opportunity cost of 10 units of education (= 60 units of education – 50 units of education).