

Scarcity, Opportunity Cost, and Production Possibilities Curves

The primary economic problem facing all individuals, families, businesses, and nations is the scarcity of resources: There simply are not enough resources to satisfy the unlimited wants for goods and services. Scarcity necessitates choice. Consuming or producing more of one thing means consuming or producing less of something else. The opportunity cost of using scarce resources for one thing instead of something else is often represented in graphical form as a *production possibilities curve* (PPC). A nation's PPC shows how many units of two goods or services the nation can produce in one year if it uses its resources fully and efficiently. This activity uses the PPC to illustrate how scarcity requires choices and the opportunity cost of those choices.

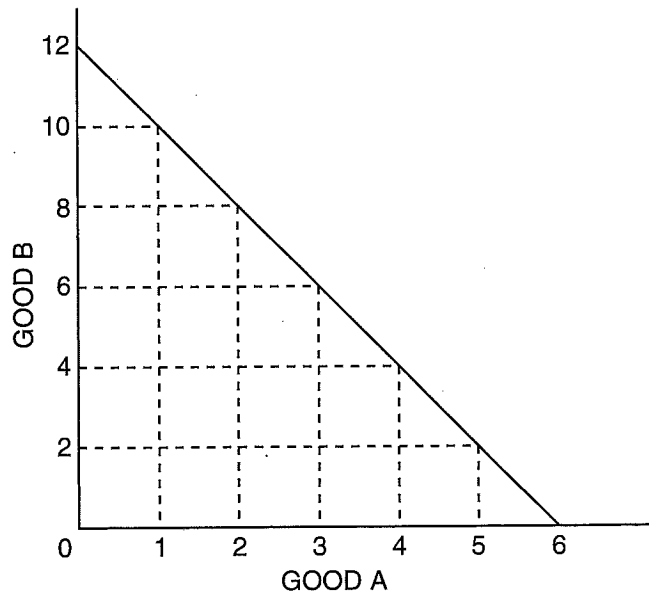
Part A: Basic Production Possibilities Curves

Figure 1-2.1 shows a basic PPC for the production of Goods A and B. Use Figure 1-2.1 to answer the questions that follow.



Figure 1-2.1

A Linear Production Possibilities Curve



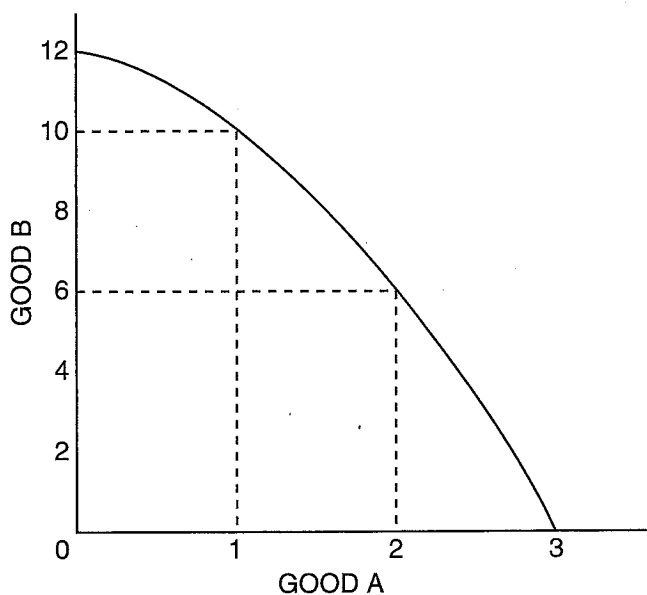
1. Assume the economy represented by Figure 1-2.1 is presently producing 12 units of Good B and 0 units of Good A:
 - (A) The opportunity cost of increasing production of Good A from 0 units to 1 unit is the loss of _____ unit(s) of Good B.
 - (B) The opportunity cost of increasing production of Good A from 1 unit to 2 units is the loss of _____ unit(s) of Good B.
 - (C) The opportunity cost of increasing production of Good A from 2 units to 3 units is the loss of _____ unit(s) of Good B.
 - (D) This is an example of (*constant / increasing / decreasing / zero*) opportunity cost per unit for Good A.

Figure 1-2.2 contains a typical PPC often used by economists. This PPC is concave to the origin; it gets steeper as the country moves out along its horizontal axis. Use Figure 1-2.2 to answer the questions that follow.



Figure 1-2.2

A Concave Production Possibilities Curve



2. If the economy represented in Figure 1-2.2 is presently producing 12 units of Good B and 0 units of Good A:
- (A) The opportunity cost of increasing production of Good A from 0 units to 1 unit is the loss of _____ unit(s) of Good B.
 - (B) The opportunity cost of increasing production of Good A from 1 unit to 2 units is the loss of _____ unit(s) of Good B.
 - (C) The opportunity cost of increasing production of Good A from 2 units to 3 units is the loss of _____ unit(s) of Good B.
 - (D) This is an example of (*constant / increasing / decreasing / zero*) opportunity cost per unit for Good A.

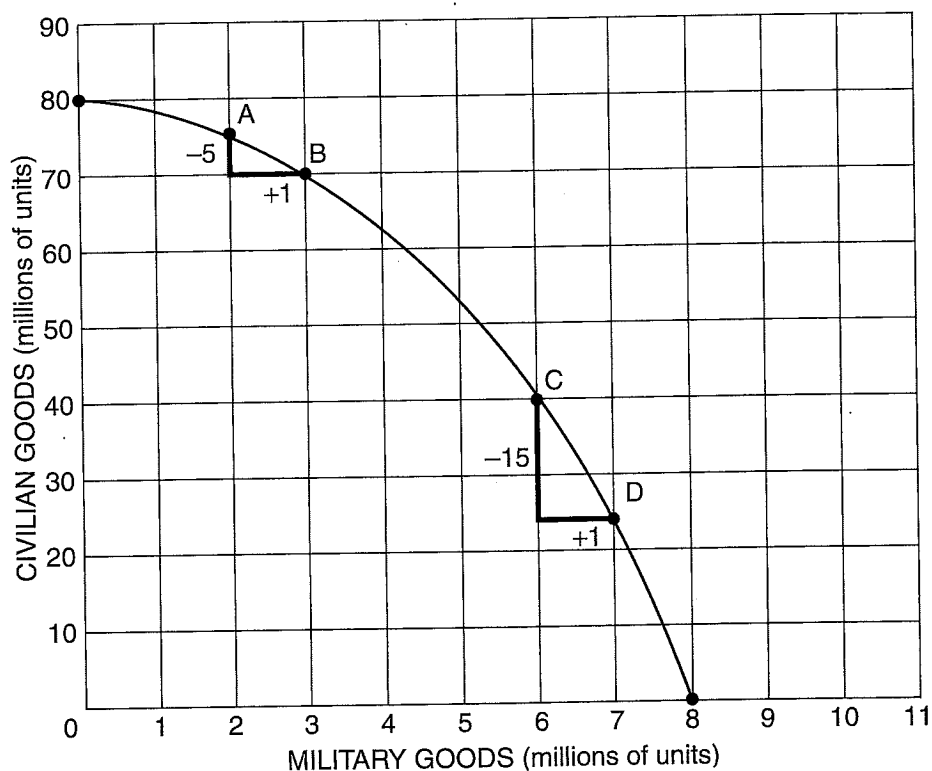
Part B: Understanding the Shape of a Concave PPC

The “law of increasing opportunity cost” explains why the typical PPC is concave to the origin (bowed outward). Figure 1-2.3 shows the PPC for the country of Costica. The country currently operates at point A and produces 75 million units of civilian goods and 2 million units of military goods. If the country decides to increase its military provision to 3 million units, it must give up only 5 million units in civilian goods because certain factories are easily converted from civilian production to military production. However, if Costica decides it must continue to increase its military production, the opportunity cost of doing so increases because now it is more difficult to convert other factories to military production. Resources are not equally well suited to the production of all goods. The opportunity cost of increasing military output from 6 million units to 7 million units (point C to point D) has increased to 15 million units in civilian goods. This increasing opportunity cost is reflected in the steeper slope of the PPC as the country produces more military goods and fewer civilian goods.



Figure 1-2.3

Showing the Law of Increasing Opportunity Cost



Part C: Drawing Various PPCs

Use the following axes to draw the type of curve that illustrates the label above each graph.



Figure 1-2.4
Production Possibilities Curve 1:
Increasing Opportunity Cost per Unit
of Good B

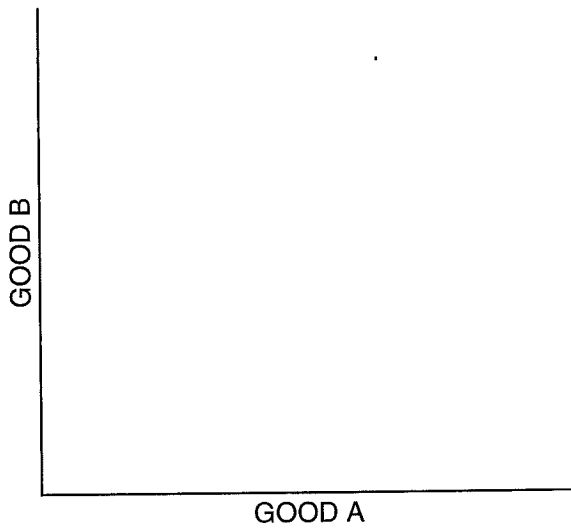


Figure 1-2.5
Production Possibilities Curve 2:
Zero Opportunity Cost per Unit of
Good B

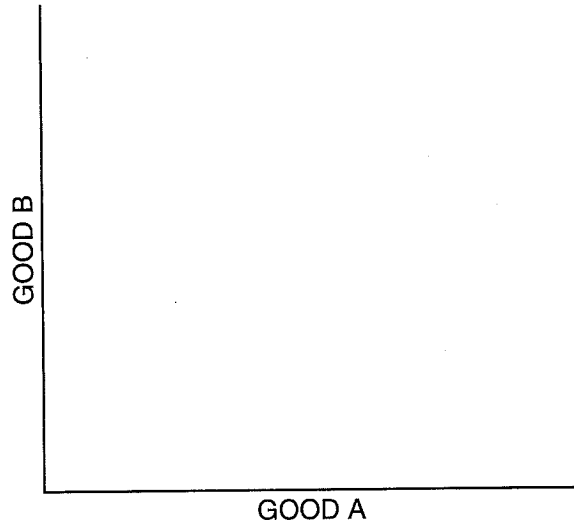
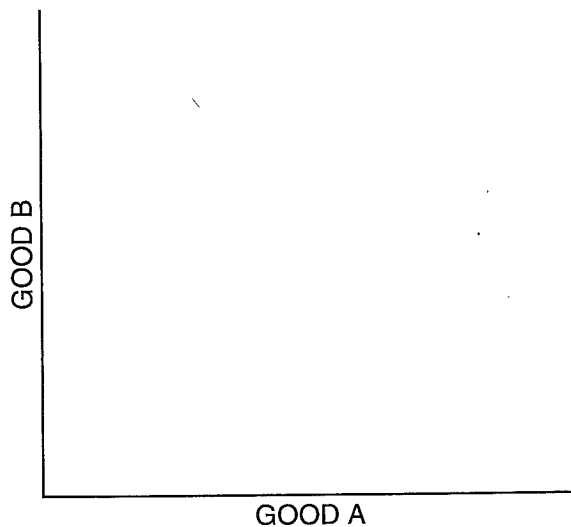


Figure 1-2.6
Production Possibilities Curve 3:
Constant Opportunity Cost per Unit
of Good B

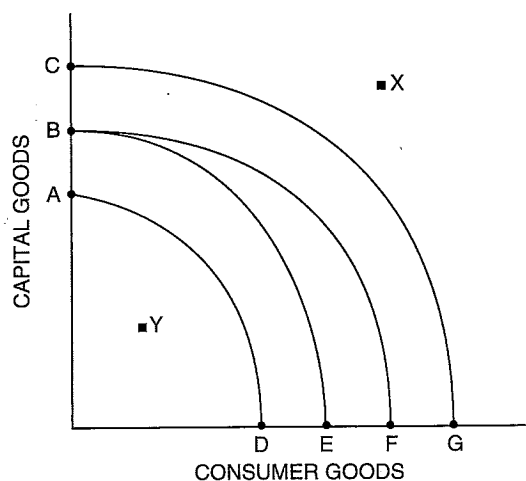


Part D: Economic Growth

Over time, most countries see an increase in their ability to produce goods and services. This “economic growth” is shown as an outward shift of the PPC and results from a variety of factors, including improved technology, better education, and the discovery of new resources. Use Figure 1-2.7 to answer the next five questions. Each question starts with Curve BE as a country’s PPC.



Figure 1-2.7

Production Possibilities Curve: Capital Goods and Consumer Goods

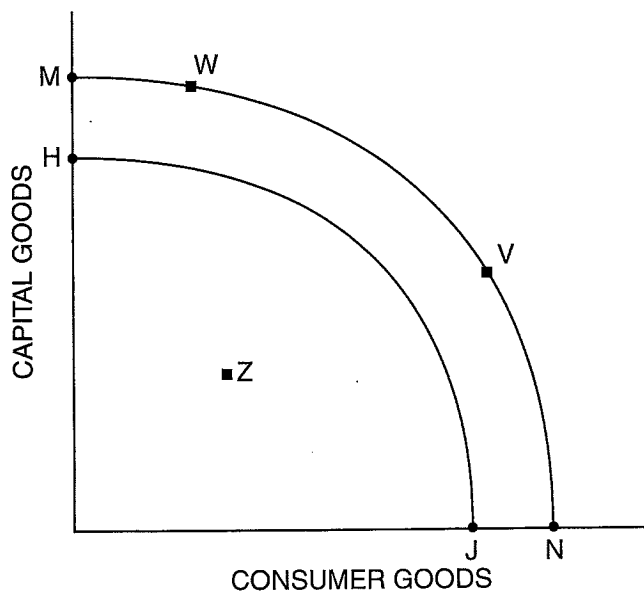
- Suppose there is a major technological breakthrough in the consumer-goods industry, and the new technology is widely adopted. Which curve in the diagram would represent the new PPC? (Indicate the curve you choose with two letters.) _____
- Suppose a new government comes into power and forbids the use of automated machinery and modern production techniques in all industries. Which curve in the diagram would represent the new PPC? (Indicate the curve you choose with two letters.) _____
- Suppose massive new sources of oil and coal are found within the economy, and there are major technological innovations in both industries. Which curve in the diagram would represent the new PPC? (Indicate the curve you choose with two letters.) _____
- If BE represents a country’s current PPC, what can you say about a point like X? (Write a brief statement.)
- If BE represents a country’s current PPC, what can you say about a point like Y? (Write a brief statement.)

Use Figure 1-2.8 to answer the next three questions.



Figure 1-2.8

Production Possibilities Curve: Economic Growth



8. What change could cause the PPC to shift from the original curve (HJ) to the new curve (MN)?

9. Under what conditions might an economy be operating at Point Z?

10. Why might a government implement a policy to move the economy from Point V to Point W?

PPC Module 3**Multiple Choice**

Identify the choice that best completes the statement or answers the question.

- _____ 1. If an economy has used up all opportunities to make someone better off (without making someone else worse off) then it has achieved _____.
- A. equity
 - B. opportunity cost
 - C. marginal optimality
 - D. efficiency
 - E. full employment.
- _____ 2. "It is better to produce corn in Kansas because of the fertile soil rather than in the desert of Death Valley, California". This statement best represents the economic concept of:
- A. resources are scarce.
 - B. markets move toward equilibrium.
 - C. resources should be used as efficiently as possible to achieve society's goals.
 - D. markets usually lead to efficiency.
 - E. overall spending sometimes gets out of line with the economy's productive capacity.
- _____ 3. Which of the following principles underlie the interaction of individual choices?
- A. Resources are scarce.
 - B. Marginal analysis is used for "how much" decisions.
 - C. Resources should be used as efficiently as possible to achieve society's goals.
 - D. People usually exploit opportunities to make themselves better off.
 - E. Government policies can change spending.
- _____ 4. Economists say an economy is efficient when:
- A. the problem of scarcity is eliminated.
 - B. output is distributed equitably.
 - C. all opportunities to make some people better off without making other people worse off have been taken.
 - D. all opportunities to make some people worse off without making other people better off have been taken.
 - E. resources are unlimited.
- _____ 5. Economists believe that resources should be used as efficiently as possible to:
- A. achieve society's goals.
 - B. eliminate scarcity.
 - C. reduce inequity.
 - D. maximize profits.
 - E. increase technological growth.

- _____ 6. The trade-off between equity and efficiency occurs because:
- the efficient allocation of resources is bad for business and industry.
 - allocating resources fairly may cause inefficiency.
 - to ensure equity everyone must pay more tax.
 - efficiency is politically unpopular.
 - equity is politically unpopular.
- _____ 7. Economists define an efficient use of resources as a situation where:
- all persons are guaranteed a fair share of the economic resources.
 - all persons can be made better off, without making anyone worse off.
 - all persons receive an equal share of the resources.
 - all persons are made worse off when one person is made better off.
 - one person can be made better off, but only by making another person worse off.
- _____ 8. An economy has achieved _____ if it _____ pass up any opportunities to make some people better off without making others worse off.
- efficiency; does not
 - equity; does
 - efficiency; does
 - equity; does not
 - specialization; does not

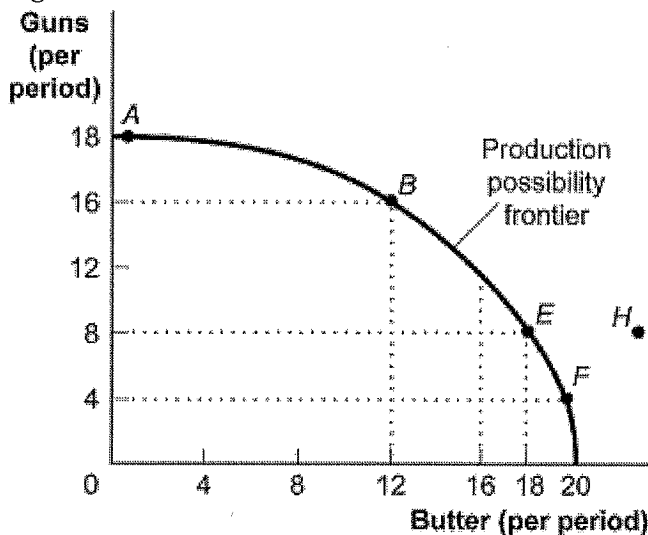
Alternatives	<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>	<i>E</i>	<i>F</i>
Consumer goods per period	0	1	2	3	4	5
Capital goods per period	30	28	24	18	10	0

Table 3-1: Production Possibilities Schedule I

- _____ 9. Based on **Table 3-1**, if the economy produces 2 units of consumer goods per period, it also can produce at most _____ units of capital goods per period.
- 30
 - 28
 - 24
 - 18
 - 26
- _____ 10. Based on **Table 3-1**, if the economy produces 10 units of capital goods per period, it also can produce at most _____ units of consumer goods per period.
- 5
 - 4
 - 3
 - 2
 - 1

- _____ 11. Based on **Table 3-1**, the opportunity cost of producing the fourth unit of consumer goods is _____ units of capital goods.
- 2
 - 4
 - 6
 - 8
 - 10

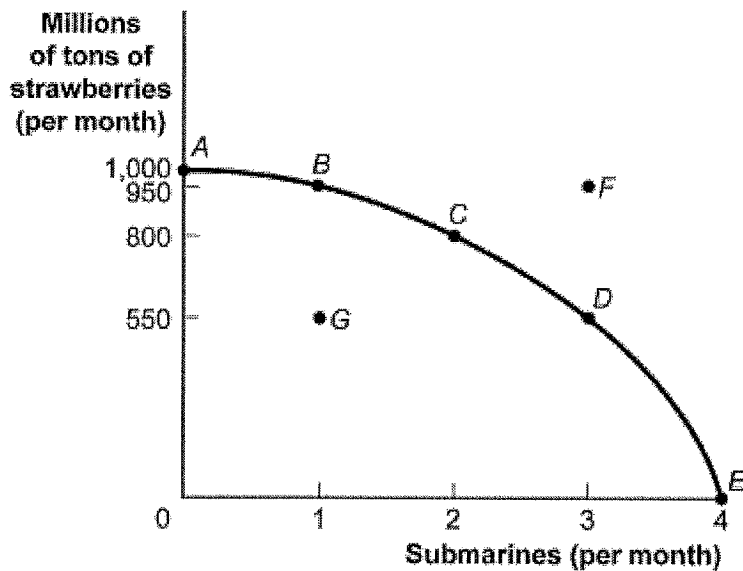
Figure 3-1: Guns and Butter



- _____ 12. Based on the “**Guns and Butter**” **Figure 3-1**, points *A*, *B*, *E*, and *F*:
- indicate combinations of guns and butter that society can produce using all of its factors efficiently.
 - show that the opportunity cost of more guns increases, but that of more butter decreases.
 - indicate that society wants butter more than it wants guns.
 - indicate constant costs for guns and increasing costs for butter.
 - indicate that society is experiencing many idle resources.
- _____ 13. Based on the “**Guns and Butter**” **Figure 3-1**, this production possibility curve is:
- bowed out from the origin because of increasing opportunity costs.
 - bowed in toward the origin because of increasing opportunity costs.
 - bowed in toward the origin because of constant opportunity costs.
 - linear because of constant opportunity costs.
 - bowed out from the origin because of constant opportunity costs.
- _____ 14. Based on the “**Guns and Butter**” **Figure 3-1**, If the economy were operating at point *B*, producing 16 units of guns and 12 units of butter per period, a decision to move to point *E* and produce 18 units of butter:
- indicates you can have more butter and guns simultaneously.
 - makes it clear that this economy experiences decreasing opportunity costs.
 - involves a loss of 8 units of guns per period.
 - involves a loss of 4 units of guns per period.
 - is impossible because all economic resources are currently being employed.

- _____ 15. Based on the “Guns and Butter” Figure 3-1, the combination of guns and butter at point *H*:
- A. can be attained, but would cost too much.
 - B. is unattainable due to excessive government gun regulation.
 - C. has no meaning since it does not relate to the preferences of consumers.
 - D. is attainable but would increase unemployment.
 - E. cannot be attained, given the level of technology and the factors of production available.
- _____ 16. Based on the “Guns and Butter” Figure 3-1, if the economy were producing 8 units of guns and 12 units of butter per period:
- A. this is a possible choice, but would involve unemployment and/or inefficiency.
 - B. the notion of increasing opportunity cost is invalidated.
 - C. the economy is still efficient but has made a decision not to buy as much as it could.
 - D. something must be done to reduce the amount of employment.
 - E. the economy would be able to increase gun production, but only if butter production was decreased.
- _____ 17. If the production possibility curve were a straight line sloping down from left to right, this would suggest that:
- A. more of both goods could be produced moving along the curve.
 - B. the two products must have the same price.
 - C. the opportunity costs of the products are constant.
 - D. there are no opportunity costs.
 - E. the opportunity cost of the product on the X-axis is increasing.

Figure 3-2: Strawberries and Submarines



- _____ 18. Use the “**Strawberries and Submarines**” Figure 3-2. Suppose the economy is operating at point G. This implies that:
- the economy can move to a point such as C only if it improves its technology.
 - the economy is experiencing unemployment and/or an inefficient allocation of resources.
 - the economy lacks the resources to achieve a combination such as C.
 - people in this economy don't really like strawberries and submarines.
 - the economy can move to point B, but must sacrifice submarine production to do so.
- _____ 19. Use the “**Strawberries and Submarines**” Figure 3-2. Suppose the economy is operating at point C. Moving to point E would require that the economy:
- reduce employment and allow some resources to be idle.
 - eliminate its production of strawberries.
 - reduce its production of submarines.
 - improve its technology or increase the quantity of economic resources.
 - convert resources currently in submarine production to strawberry production.
- _____ 20. If an economy is producing a level of output that is on its production possibility curve, the economy has:
- idle resources.
 - idle resources but is using resources efficiently.
 - no idle resources but is using resources inefficiently.
 - no idle resources and is using resources efficiently.
 - zero opportunity cost for increasing the production of one good.
- _____ 21. Suppose the state of Texoma decides to produce only two goods—oil and football helmets. According to the production possibility curve, as oil production increases, the production of football helmets will:
- increase.
 - not change.
 - increase at a decreasing rate.
 - decrease.
 - increase at an increasing rate.

- _____ 22. All points inside the production possibility curve represent:
- efficient production points.
 - inefficient production points.
 - nonfeasible production points.
 - economic growth.
 - a shortage of economic resources.
- _____ 23. The _____ illustrates the trade-offs facing an economy that produces only two goods.
- production possibility curve
 - circular-flow diagram
 - all else equal assumption
 - income distribution
 - unemployment rate

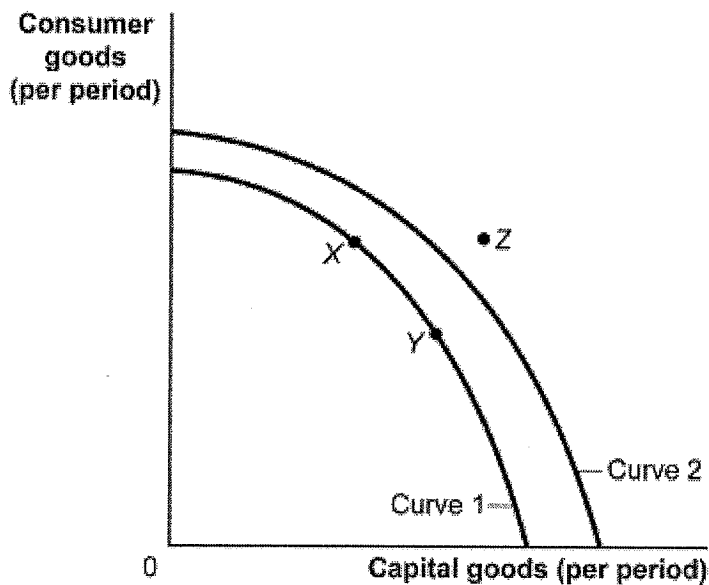
Quantity of Hours of Study Time	Quantity of Hours of Leisure Time
16	0
12	4
8	8
4	12
0	16
Table 3-3: Trade-off of Study Time and Leisure time	

- _____ 24. Use **Table 3-3**. A student sleeps 8 hours per day and divides the remaining time between study time and leisure time. The table shows the combinations of study and leisure time that can be produced in the 16 waking hours of each day. If a student decides to consume one additional hour of leisure time, how many hours of study time must be given up?
- 4
 - .25
 - 1
 - 16
 - 2
- _____ 25. Use **Table 3-3**. A student sleeps 8 hours per day and divides the remaining time between study and leisure time. Suppose this student is studying 4 hours and spending 10 hours doing leisure activities. What is true about this allocation of his scarce resources?
- This point is outside the production possibility curve.
 - This point is inside the production possibility curve.
 - This point is on the production possibility curve.
 - This point is both efficient and feasible.
 - The student could have 1 more hour of leisure time at an opportunity cost of 1 hours of studying.

- _____ 26. Use **Table 3-3**. A student sleeps 8 hours per day and divides the remaining time between study time and leisure time. The table shows the combinations of study and leisure time that can be produced in the 16 waking hours of each day. Suppose the student completes a speed-reading course that allows him to do the same amount of studying in half as many hours. Which of the following is now true of his opportunity costs?
- A. The opportunity cost of both leisure and of studying has increased.
 - B. The opportunity cost of studying has increased.
 - C. The opportunity cost of leisure has decreased.
 - D. There is no change in the opportunity costs.
 - E. The opportunity cost of leisure has increased.
- _____ 27. The U.S. production possibility curve will _____ if there is a large influx of immigrants.
- A. shift in
 - B. shift out
 - C. not change
 - D. become more concave in shape
 - E. become more linear in shape
- _____ 28. If Farmer Sam MacDonald can produce 200 pounds of cabbages and 0 pounds of potatoes or 0 pounds of cabbages and 100 pounds of potatoes and faces a linear production possibility curve for his farm, the opportunity cost of producing an additional pound of potatoes is _____ pound(s) of cabbage.
- A. 1/2
 - B. 2
 - C. 100
 - D. 200
 - E. 0
- _____ 29. If Farmer Sam MacDonald can produce 200 pounds of cabbages and 0 pounds of potatoes or 0 pounds of cabbages and 100 pounds of potatoes and faces a linear production possibility curve for his farm, the opportunity cost of producing an additional pound of cabbage is _____ pound(s) of potatoes.
- A. 1/2
 - B. 2
 - C. 100
 - D. 200
 - E. 0
- _____ 30. Efficient production exists when the economy is:
- A. operating underneath its production possibility curve.
 - B. operating on its production possibility curve.
 - C. operating outside its production possibility curve.
 - D. moving beyond its production possibility curve.
 - E. in a recession.
- _____ 31. The process through which an economy's production possibility curve is shifted outward is:
- A. comparative advantage.
 - B. economic growth.
 - C. full employment.
 - D. specialization.
 - E. free trade.

- _____ 32. Technological improvements will:
- leave the production possibility curve unchanged.
 - shift the production possibility curve inward.
 - shift the production possibility curve outward.
 - necessarily lead to increased unemployment.
 - cause a movement from a point inside the curve to a point closer to the curve.

Figure 3-10: Consumer and Capital Goods II



- _____ 33. Use the “**Consumer and Capital Goods II**” **Figure 3-10**. If the economy is operating at point *Y* and its relevant PPF is Curve 1, this means that:
- the economy is at full employment and is efficient.
 - the economy is less than fully employed.
 - the economy is not efficient.
 - economic growth is not possible in the future.
 - the economy is temporarily operating beyond its productive capacity.
- _____ 34. Use the “**Consumer and Capital Goods II**” **Figure 3-10**. The movement from Curve 1 to Curve 2 indicates:
- a growing ability of the economy to produce capital and consumer goods.
 - going from unemployment to full employment.
 - a decrease in the factors of production.
 - a shift of the PPF towards producing less goods.
 - a macroeconomic recession.
- _____ 35. Use the “**Consumer and Capital Goods II**” **Figure 3-10**. Technological improvements will likely:
- shift the production possibility curve inward to Curve 1.
 - shift the production possibility curve outward to Curve 2.
 - lead to increased unemployment.
 - leave the production possibility curve unchanged.
 - cause a movement from point *Y* to point *X*.

PPC Module 3
Answer Section

MULTIPLE CHOICE

- | | | | |
|------------------------|--------|--------|---------------|
| 1. ANS: D | PTS: 1 | DIF: E | REF: Module 3 |
| SKL: Definitional | | | |
| 2. ANS: C | PTS: 1 | DIF: M | REF: Module 3 |
| SKL: Critical Thinking | | | |
| 3. ANS: C | PTS: 1 | DIF: M | REF: Module 3 |
| SKL: Concept-Based | | | |
| 4. ANS: C | PTS: 1 | DIF: M | REF: Module 3 |
| SKL: Definitional | | | |
| 5. ANS: A | PTS: 1 | DIF: E | REF: Module 3 |
| SKL: Fact-Based | | | |
| 6. ANS: B | PTS: 1 | DIF: M | REF: Module 3 |
| SKL: Concept-Based | | | |
| 7. ANS: E | PTS: 1 | DIF: E | REF: Module 3 |
| SKL: Definitional | | | |
| 8. ANS: A | PTS: 1 | DIF: E | REF: Module 3 |
| SKL: Definitional | | | |
| 9. ANS: C | PTS: 1 | DIF: E | REF: Module 3 |
| SKL: Concept-Based | | | |
| 10. ANS: B | PTS: 1 | DIF: E | REF: Module 3 |
| SKL: Concept-Based | | | |
| 11. ANS: D | PTS: 1 | DIF: E | REF: Module 3 |
| SKL: Critical Thinking | | | |
| 12. ANS: A | PTS: 1 | DIF: M | REF: Module 3 |
| SKL: Concept-Based | | | |
| 13. ANS: A | PTS: 1 | DIF: M | REF: Module 3 |
| SKL: Concept-Based | | | |
| 14. ANS: C | PTS: 1 | DIF: M | REF: Module 3 |
| SKL: Critical Thinking | | | |
| 15. ANS: E | PTS: 1 | DIF: M | REF: Module 3 |
| SKL: Critical Thinking | | | |
| 16. ANS: A | PTS: 1 | DIF: M | REF: Module 3 |
| SKL: Critical Thinking | | | |
| 17. ANS: C | PTS: 1 | DIF: M | REF: Module 3 |
| SKL: Critical Thinking | | | |
| 18. ANS: B | PTS: 1 | DIF: M | REF: Module 3 |
| SKL: Critical Thinking | | | |
| 19. ANS: B | PTS: 1 | DIF: M | REF: Module 3 |
| SKL: Critical Thinking | | | |
| 20. ANS: D | PTS: 1 | DIF: M | REF: Module 3 |
| SKL: Fact-Based | | | |

21. ANS: D PTS: 1 DIF: E REF: Module 3
SKL: Concept-Based
22. ANS: B PTS: 1 DIF: E REF: Module 3
SKL: Fact-Based
23. ANS: A PTS: 1 DIF: E REF: Module 3
SKL: Definitional
24. ANS: C PTS: 1 DIF: E REF: Module 3
SKL: Concept-Based
25. ANS: B PTS: 1 DIF: E REF: Module 3
SKL: Concept-Based
26. ANS: E PTS: 1 DIF: D REF: Module 3
SKL: Critical Thinking
27. ANS: B PTS: 1 DIF: M REF: Module 3
SKL: Critical Thinking
28. ANS: B PTS: 1 DIF: M REF: Module 3
SKL: Analytical Thinking
29. ANS: A PTS: 1 DIF: M REF: Module 3
SKL: Analytical Thinking
30. ANS: B PTS: 1 DIF: E REF: Module 3
SKL: Concept-Based
31. ANS: B PTS: 1 DIF: E REF: Module 3
SKL: Definitional
32. ANS: C PTS: 1 DIF: M REF: Module 3
SKL: Fact-Based
33. ANS: A PTS: 1 DIF: M REF: Module 3
SKL: Concept-Based
34. ANS: A PTS: 1 DIF: M REF: Module 3
SKL: Concept-Based
35. ANS: B PTS: 1 DIF: M REF: Module 3
SKL: Concept-Based

B 6.

D 11.

E 15.

D 1.

E 7.

A 16.

C 2.

A 8.

C 17.

B 18.

C 3.

A 12.

B 19.

C 4.

C 9.

A 13.

D 20.

A 5.

B 10.

C 14.

D 21.

B 22.

E 26.

C 32.

A 23.

B 27.

B 28.

C 24.

A 29.

A 33.

B 25.

B 30.

A 34.

B 31.

B 35.