# Solutions to Problems

CHAPTER 1

1. Answers will vary, but should include the notion that each activity provides benefits in the form of satisfaction or additional income, but also takes time away from the pursuit of other activities (opportunity cost). Time spent on each activity is limited because the additional benefit of devoting an extra unit of time to any one activity falls as more time is devoted to the activity. Hence, as more and more time is spent on one activity, it will become increasingly attractive to devote the next unit of time to some other activity.

2. Answers will vary.

3. (a) normative
   (b) positive
   (c) normative

4. The average cost is $0.89 ($16.99 / 19). The marginal cost is $0.

5. (a) The state should allow the market to provide what people want. Since gambling is not mandatory, only those who want to gamble will do so. Tax revenues that arise from casino gambling are paid voluntarily.
   (b) Some argue that casino gambling is associated with criminal activity that has a cost to the community at large. In addition, gambling can be addictive, and sometimes entices those who can least afford it to participate. These concerns bear on the efficiency argument to the extent that there are costs from gambling not reflected in the price of gambling. These costs could potentially affect the community at large (e.g., more crime, the social cost of addiction) or the individual (to the extent that gambling creates unwanted addiction).
   (c) Legalized gambling has a number of fairness issues around it. First, a lot of people want the services that a gambling casinos provide. It is clearly entertainment that many people like. (If you don't like Texas Hold 'em just watch it or go away.) But many consider gambling to be bad. They think it is fair to tax "sins." A big fairness issue is that people who gamble may be addicted to it. Like many other issues of it's kind there are positives and negatives from the fairness side. First, since gamblers tend to be in low and moderate income brackets, gambling taxes and receipts would likely be regressive. That is, higher income households would pay a smaller percent of their income in taxes. Equity arguments are always the subject of disagreement.

6. (a) Tuition (which could have been spent on other things), forgone wages, study time, and so on.
   (b) All the money (gas, depreciation of the car, and so on) could have been spent on other items; time spent en route could have been used for other activities.
   (c) A better grade, no headache, perhaps admission to a better grad school, a higher-paying job. He has traded off an investment in human capital (staying in to study) for present consumption (going to the party).
   (d) The other goods and services that Annie could buy with $200.
   (e) The $1 million could have been invested in other profit-making ventures or projects, or it could have been put in the bank or loaned to someone else with interest.
   (f) From the standpoint of the store, Alex is free. From Alex's standpoint, he gives up other uses of time and wages that could be earned elsewhere.

7. Answers will vary.

8. (a) This statement is an example of the post hoc fallacy. Just because Jeremy washed his car and the next day it rained, this does not mean that washing the car caused the rain to fall.

(b) This statement is an example of the fallacy of composition, which is the erroneous belief that what is true for a part is necessarily true for the whole. Requiring all students to attend after-school tutoring would waste resources on those students who do not need tutoring, and would not be a good use of time for those students.

(c) This statement confuses correlation and causation. There is most likely a correlation between people who drive hybrid automobiles and the amount of trash they recycle, since both are environmentally friendly actions, but the act of recycling trash is not the cause of people driving hybrid automobiles.

9. (a) This is an example of a microeconomic concern since it addresses output for a specific firm in a specific industry.

(b) This is an example of a macroeconomic concern since it addresses a potential tax that would impact the entire nation.

(c) This is an example of a macroeconomic concern since it addresses the inflation rate, which impacts the whole economy.

(d) This is an example of a microeconomic concern since it addresses potential employment growth in a particular industry.

10. Carlos Slim Helu does face scarcity because resources are limited. A person's net worth does not change the fact that everyone faces scarcity. Consider one of our most important resources—time. There are only 24 hours in a day, and everyone, including Helu, must live their lives under this constraint, making decisions about how to spend this time.

CHAPTER 1 APPENDIX

1. The slopes are as follows: line 1: 5; line 2: −5; line 3: 1; line 4: −1; line 5: slope is 1 as X goes from 0 to 20, and −1 as X goes from 20 to 40; line 6: −250.

SLOPE 5

SLOPE −5

SLOPE 1

SLOPE −1

SLOPE (0−20) = 1
SLOPE (20−40) = −1
slope is 1 as x goes from 0 to 20,
and −1 as x goes from 20 to 40.

SLOPE −250
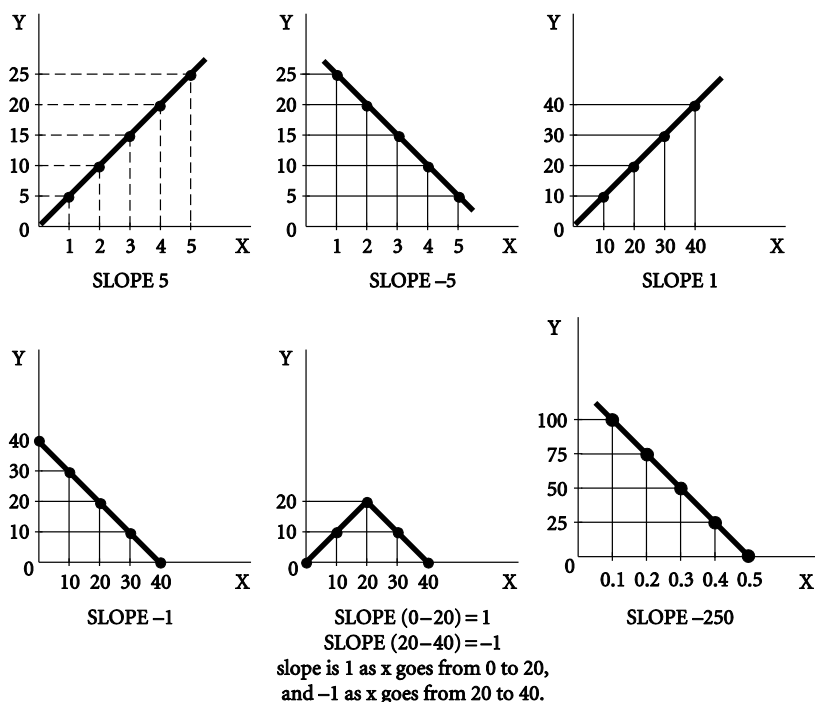
2. Answers will vary.

(a) Negative slope. As price rises, quantity of apples purchased falls.
(b) Positive (and declining) slope. As income rises, taxes rise; but the rise in taxes is less at higher incomes than at lower incomes.
(c) Negative (and declining) slope. As mortgage rates fall, home sales increase, but the increase in home sales is more at lower mortgage rates than at higher mortgage rates.
(d) Negative, then positive slope. As young children get older, they run faster, but as adults get older (beyond a certain age), they run slower.
(e) Positive slope. Greater sunshine leads to greater corn yield.
(f) Positive, then negative slope. Up to a point, more fertilizer increases corn yield, but beyond a certain point, adding more fertilizer actually decreases the yield.
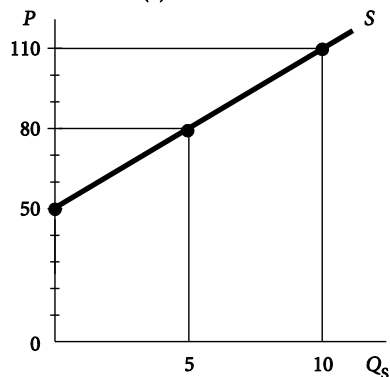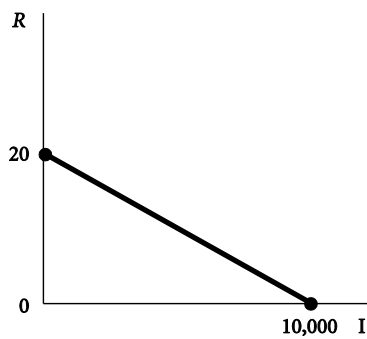
3.
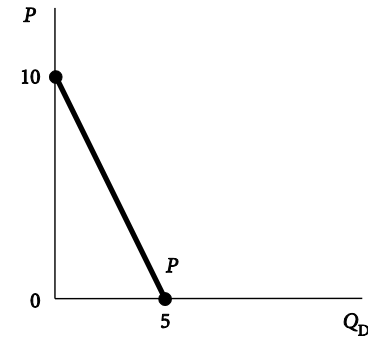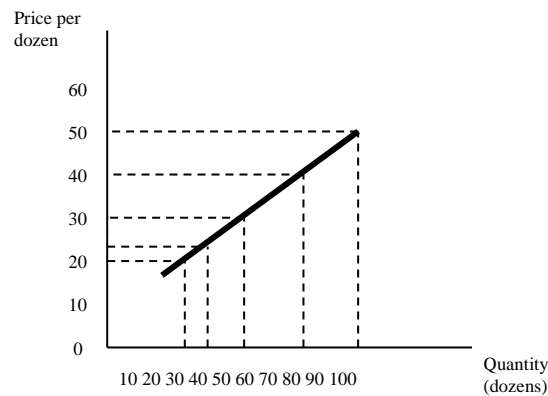

(a) SLOPE = −2
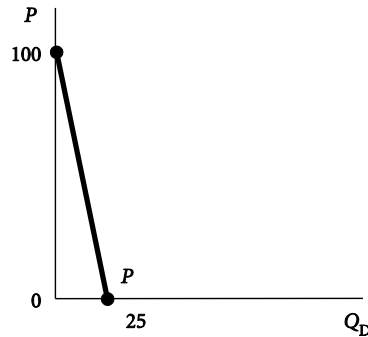
(b) SLOPE = −4

(c) SLOPE = +6

(d) SLOPE = $\frac{-1}{500}$ = −.002

4. (a) The relationship between the price of roses and the quantity of roses sold by Fiona's Flowers is a positive relationship because as the price increases, the quantity sold increases.

(b) The slope of the line is equal to 0.5.

5. At point *A*, the tangent line runs through the points (p = 34, q = 20) and (p = 24, q = 45). The slope is therefore (34 − 24) / (20 − 45) = 10 / −25 = −0.4.

At point B, the tangent line runs through the points (p = 12, q = 90) and (p = 5, q = 140). The slope is therefore (12 − 5) / (90 − 140) = 7 / −50 = −0.14.

CHAPTER 2

1. Answers will vary, but should include:
   (a) the value of alternative uses of time (studying for other classes, leisure).
   (b) the value of alternative uses of time (studying, other forms of leisure).
   (c) the value of the other goods and services that could have been purchased with the money used to purchase the car.
   (d) the value of the goods and services that taxpayers could have purchased with the additional property tax revenue.
   (e) the value of other goods and services that the governments could have purchased with the money used to purchase the space station, or the value of the goods and services that taxpayers could have purchased with the tax revenue used to finance the space station.
   (f) the foregone salary that you would have earned and the value of the alternative uses of time.

2. Disagree. To be efficient, an economy must produce what people want. This means that in addition to operating on the *ppf* (resources are fully employed, best technology is being used), the economy must be operating at the *right* point on the *ppf*.

3. Opportunity costs of building the bridge include the value of other goods and services that the government of Mallsburg could have purchased with $25 million or the value of the goods and services that taxpayers could have purchased with the tax revenue used to finance the bridge, as well as any inefficiencies created by the income tax by reducing incentives to work. In addition, the construction itself may impose costs—delays, noise, and so on—and presumably shopkeepers located near the older bridge will lose as consumers shift their business toward the main mall.

Benefits of the new bridge include reduced travel time for shoppers and commuting time for workers, increased sales tax revenues for Mallsburg, and gains for shopkeepers located in the main mall.

There may be other quality of life costs and benefits that are difficult to sort out without more information. The bridge may have environmental effects that could be positive (less pollution from idling traffic) or negative (depending on where and how the bridge is

constructed). Also, there may be effects on the look and lifestyle of the town. A bridge through the center of the town is likely to affect daily living in any number of ways.

Beyond the costs and benefits, there is always the question of distribution. Is the income tax system of Mallsburg equitable? Are the shopkeepers likely to lose more than those likely to gain? Economists would typically argue for governments to undertake projects whose costs exceed their benefits, and then address any concerns about income distribution separately. To the extent these concerns are not addressed, however, you might consider writing about the income distribution effects of the new bridge.

4. (a) For Kristen, the "cost" of a pot holder is five wristbands; for Anna, the cost of a pot holder is six wristbands. Kristen has a comparative advantage in pot holders.

(b) Anna has a comparative advantage in the production of wristbands because the opportunity cost (1/6 of a pot holder) is lower for Anna than it is for Kristen (1/5 of a pot holder).

(c)
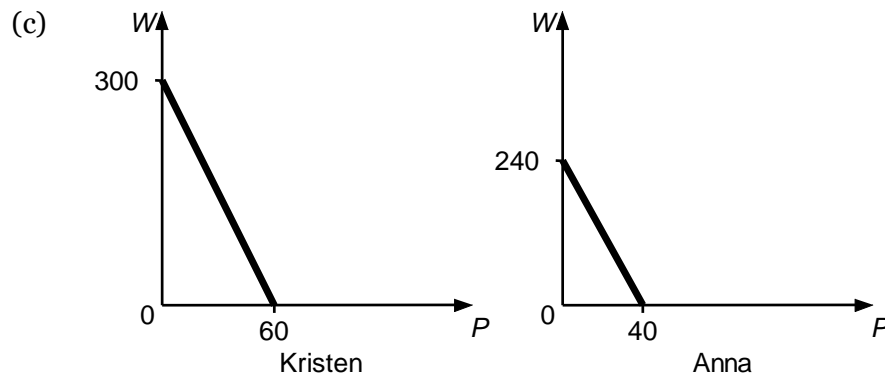
Kristen   Anna

(d) Kristen: 150 wristbands and 30 pot holders. Anna: 120 wristbands and 20 pot holders. Total wristbands = 270. Total pot holders = 50.

(e) 285 wristbands and 51 pot holders.

(f) Kristen should specialize in pot holder production and earn 60 x $5.50 = $330. Anna should specialize in wristband production and earn 240 x $1 = $240. Maximum combined revenue is $570.

5. (a) Sherice sacrifices the value of goods and services that could have been purchased with the income from work in order to obtain more leisure today. To the extent that this income will need to be replaced to finance her education, Sherice substitutes future work for present consumption (of leisure). On the other hand, if the time off improves Sherice's state of mind, she may be a more successful student, which may be pleasant in its own right, and may also provide monetary rewards (better job, better graduate school) in the future.

(b) For Frank, the opportunity costs are the alternative uses of time spent working out and the forgone pleasure of consuming foods that are not part of the diet. Presumably, the present sacrifice yields a future benefit of better health and more enjoyment of leisure activities.

(c) Time and money spent today on maintenance is an investment. By reducing resources available for consumption today, more resources will be available for Mei in the future (since repair costs will be lower and breakdowns less frequent).

(d) Jim may get to work faster, but at the risk of an accident or ticket, which could be costly. Included in the potential cost of this behavior are the monetary, criminal, or psychological penalties (remorse or direct concern about the welfare of others) that Jim will pay if others are harmed.

6. (a) Blah
Blah
(b) Blah: fruit
Figistan: timber
(c)
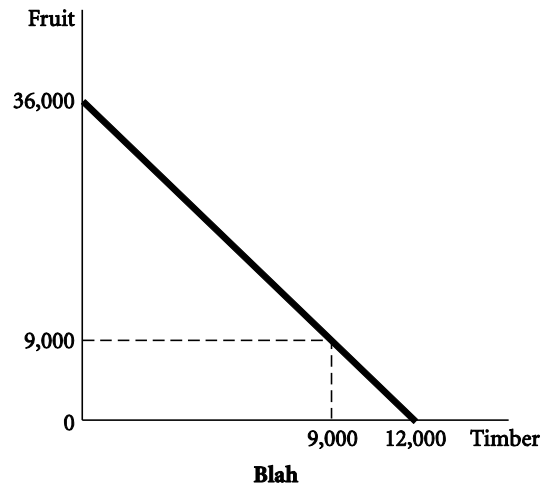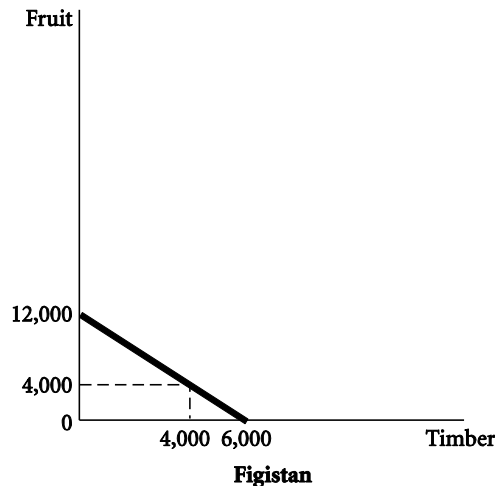
Figistan

Blah

(d) Figistan: 800 workers to timber
400 workers to fruit
Produces 4,000 of each
(800 x 5 = 4,000); (400 x 10 = 4,000)
Blah: 900 workers to timber
300 workers to fruit
Produces 9,000 of each
(900 x 10 = 9,000); (300 x 30 = 9,000)
These production points are shown on the graphs for part c.
(e) Figistan moves all labor to timber and produces 6,000 board feet.
Blah moves 450 out of timber into fruit.
450 in fruit produces 13,500 baskets (450 x 30 = 13,500).
750 in timber produces 7,500 ft (750 x 10 = 7,500).

Blah trades 4,200 baskets to Figistan for 1,800 board feet.
Blah ends up with 9,300 of each (13,500 − 4,200 = 9,300 baskets of fruit; 7,500 + 1,800 = 9,300 board feet of timber).

Figistan ends up with 4,200 of each (4,200 baskets of fruit from Blah; 6,000 − 1,800 = 4,200 board feet of timber).

Both countries move beyond their individual *ppfs*.

7. (a) The ppf curve is a straight line intersecting the Y-axis at 1,000 units of luxury goods and intersecting the X-axis at 500 units of the necessity goods. These are the limits of production if all resources are used to produce only one good.
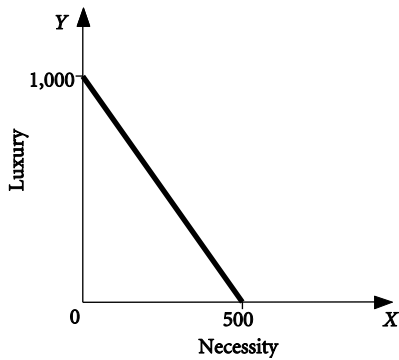
(b) Society's production could be inside the ppf as a result of (i) unemployment or underemployment of labor or (ii) inefficient production with full employment. With only one factor, the possibility of inefficient production means that workers are not using the best available technology to produce one or both goods. To move from inside the ppf to a point on the ppf, the economy would need to move to full employment or to adopt the most efficient production technology.

(c) Answers will vary, but the decision should be based on the relative value of necessities and luxuries, as well as the degree of concern that enough necessities are produced to meet the needs of the population. Although this part does not address distribution, if too few necessities are produced, some people will not have enough necessities under any distribution scheme.

(d) If left to the free market, income distribution will depend on some combination of individual effort and chance, where chance includes the possession of valuable abilities, opportunity, and inheritance. Each individual would have to find a job to earn income to command some of the economy's production.

8. (a) c, d, e
   (b) a, b, d, e, f
   (c) d, e (since they prefer meat); could also be c
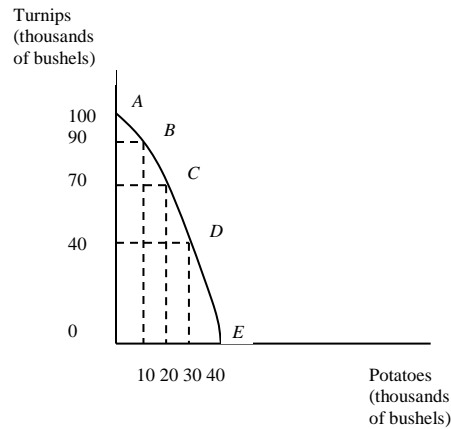   (d) e
   (e) b, c, d, e, f
   (f) b

9. (a)
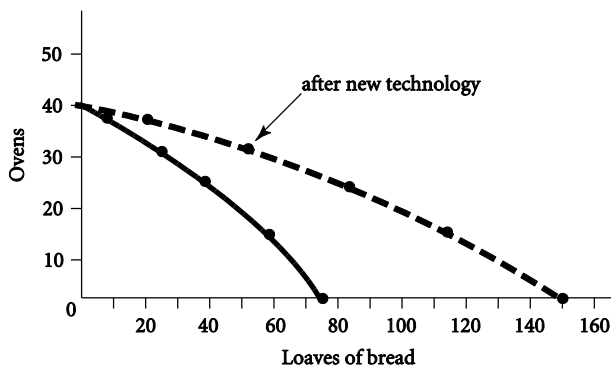
(b) Yes, increasing opportunity cost applies. The opportunity cost of the first 15 million loaves of bread is 4 ovens; of the next 15 million loaves, 6 ovens; and so on.

(c) Over time, as the number of ovens increases, the capacity to produce bread with the same quantity of other resources will also increase. Thus, the production possibilities curve will shift out horizontally to the right. The vertical intercept (maximum possible

oven production) will remain unchanged, but the horizontal intercept (maximum possible bread production) will increase.

(d) See graph in part (a) above.

(e) Before the introduction of the new technology, production of 22 ovens left enough resources to produce 45 loaves of bread. After the introduction of the new technology, production of 30 ovens leaves enough resources to produce 60 loaves of bread.

10. As stated in the *Economics in Practice* feature, producing a meal takes two basic ingredients: food and time. For individuals who work, the opportunity cost of time for preparing meals is high. For retired individuals, the opportunity cost of time shopping and preparing meals is lower. More time spent shopping for bargains will mean that retired individuals are likely to pay less for the same bundle of goods as individuals who work.

11. The key here is the opportunity cost of Dr. Falk's time. Every time Falk fills two cavities, he gives up the chance to whiten someone's teeth (since the cavities take 15 minutes and the whitening 30 minutes). But Falk earns $150 for the whitening and only nets $100 for the two cavities. Clearly, when Falk takes on cavity-filling, he has not been paying attention to the opportunity cost of his time in whitening. Falk should either raise the price of filling cavities (we will talk more about price in a later chapter), or concentrate on whitening teeth.

12. Even with winning free tickets to the Cowboys' games, you would still experience an opportunity cost each time you went to a game. This opportunity cost would be the highest-valued alternative that you must give up to attend each game.

13. A command economy is one in which the basic economic questions are answered by a central government. Through a combination of government ownership of state enterprises and central planning, the government, either directly or indirectly, sets output targets, incomes, and prices. A laissez-faire economy is one in which individual people and firms pursue their own self-interest, without any central direction or regulation. A laissez-faire economy implies a complete lack of government involvement, and the central institution through which the basic economic questions are answered is the market, where buyers and sellers interact and engage in exchange. No pure forms of either system exist in the world. In economies where the government plays a major role, individual enterprise sill exists and independent choice is still exercised, and no market economies exist without some form of government involvement and government regulation.

14. Rougarou experiences increasing opportunity costs because for every bushel of potatoes it produces, it must give up increasing amounts of turnips. When Rougarou moves from production alternative *A* to production alternative *B*, it gives up 10,000 bushels of turnips to gain 10,000 bushels of potatoes. When it moves from alternative *B* to alternative *C*, it must give up 20,000 bushels of turnips to gain 10,000 bushels of potatoes. From alternative *C* to *D*, 30,000 bushels of turnips are given up for 10,000 bushels of potatoes, and from *D* to *E*, 40,0000 bushels of turnips are given up for 10,000 bushels of potatoes. For each additional 10,000 bushels of potatoes Rougarou gains, the amount of turnips that must be given up increases. The increasing opportunity costs are shown on the graph with the concave production possibilities curve.

Turnips
(thousands
of bushels)

```
100 ┤ A
 90 ┤  B
 70 ┤      C
 40 ┤         D
  0 ┤            E
    └─────────────── Potatoes
     10 20 30 40      (thousands
                      of bushels)
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15. (a) Technological innovation allows the nation to produce more with existing resources, so the production possibilities curve would shift up and to the right.

(b) An increase in unemployed workers does not change the production possibilities curve, but rather shifts the economy to a point inside the production possibilities curve.

(c) A hurricane that destroys productive capacity in the nation will reduce the amount of production possible in the nation, and therefore shift the production possibilities curve down and to the left.

(d) As the quality of education improves, so does the productivity of workers. Education can also be thought of as adding "human capital" as an added resource. This moves the production possibilities curve up and to the right.

(e) If all employers are required to increase the amount of paid vacation they must give employees, they will not be able to utilize resources as efficiently. The production possibilities curve will not shift, but the nation's production will move to a point inside the production possibilities curve.