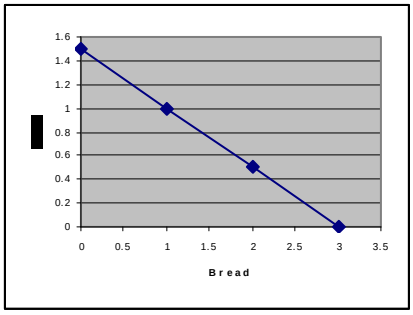
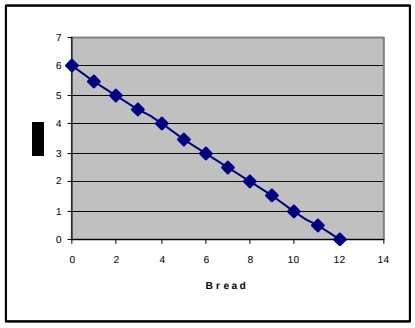
Multiple Choice:

1. Which of the following graphs correctly illustrates Madeline's set of affordable consumption bundles (from In-text exercise 5.1, p.125).

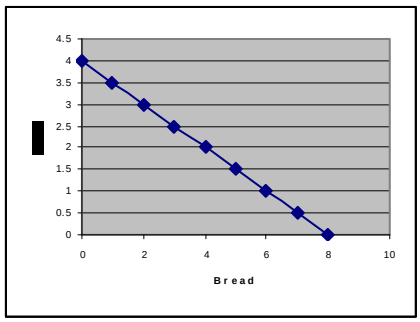
a.



b.



c.



2. Which of the following options correctly provides the slope and the vertical axis intercept for the first cases detailed in in-text exercise 5.2 (p.130)?

a. With soup graphed on the horizontal axis, the slope is -.25, and the vertical intercept is 80.

b. With soup graphed on the horizontal axis, the slope is -4, and the vertical intercept is 80.

c. With soup graphed on the horizontal axis, the slope is -4, and the vertical intercept is 20.
d. None of the above

3. Consider Worked-Out Problem 5.3 (p.140). If the price of bread increases to $3, what will happen to Madeline's utility? (Hint: use Table 5.3a, p.140, and examine the impact of the price increase on the set of Madeline's feasible options.)
a. The maximum possible utility decreases by 3.
b. The maximum possible utility increases by 3.
c. The maximum possible utility does not change.
d. The maximum possible utility decreases by 1.

4. Referring to Worked-Out Problem 5.2 (p.136): how many concert tickets will Natasha choose if the price of concert tickets increases to $25, assuming that the price of films does not change?
a. 5.5
b. 6
c. 7.5
d. 9

5. Gary's parents know that Gary's car requires a lot of engine oil. Every year, they give Gary a case of oil. They could, of course, have given Gary money, and allowed him to choose whether to purchase engine oil or some other good. The information presented in application 5.1 implies that Gary's utility might be higher if he received money instead of engine oil. Which of the following statements correctly describes the budget line impact of giving him oil instead of money?
a. The slope would not be affected by this decision, but the line would shift in.
b. The slope would be steeper.
c. Most of the budget line is the same whether you give him money or oil, but part of it is cut off if you give him oil.
d. None of the above.

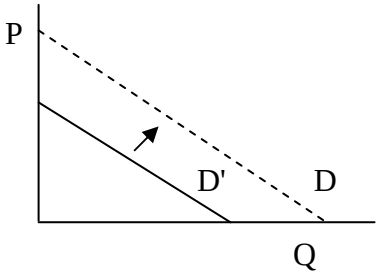
7. Refer to Application 5.3 (p.154): Why did Two Buck Chuck succeed?
a. Timing. Two Buck Chuck was introduced during a period when stock prices were increasing.
b. Timing. Two Buck Chuck is an inferior good, and it was introduced during a recession.
c. Charles Shaw is an excellent entrepreneur.
d. Both a and c.

8. Describe the relationship between a price-consumption curve and a demand curve:
a. The price-consumption curve shows the impact of price changes on the purchase of both goods, while the demand curve only shows the impact of a price change on the purchases of that one good.
b. The axes for the price-consumption graph are the quantities of the two goods, while the axes for the demand graph are price and quantity of one good

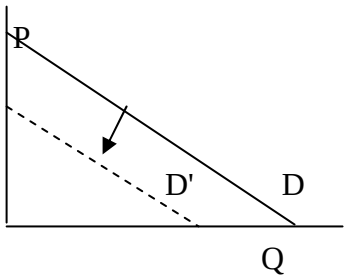
c. Answer (a) is correct, but (b) is not
d. Both (a) and (b) are correct

9. Figure 5.13 (p.146) shows biscuit demand curves for several different individuals. These demand curves have been constructed so that elasticity remains constant as you move along one demand curve (notice that the demand curves are not linear). Additional relevant information is provided in Application 5.2 (p.145). However, elasticity is different for different consumers. Which consumer has the most inelastic demand for biscuits?
a. blue
b. brown
c. yellow
d. green

10. Application 5.3 (p.154) describes an inferior good. Which of the following diagrams illustrates the impact of a recession on an inferior good?
a.



b.



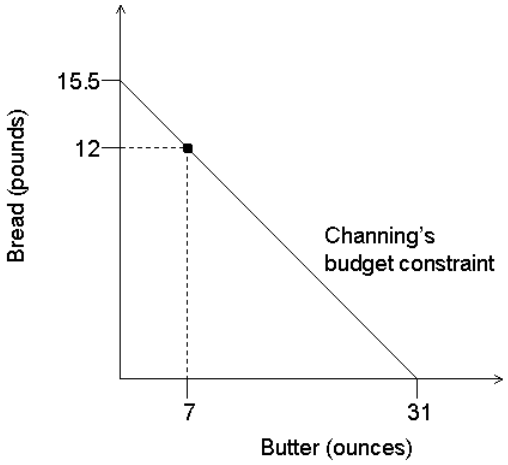
Answers to Multiple Choice Quiz

1a ,
2b,
3d,
4b,
5c
7b,
8d,
9b,
10a

Answers to End-of-Chapter 5 Questions

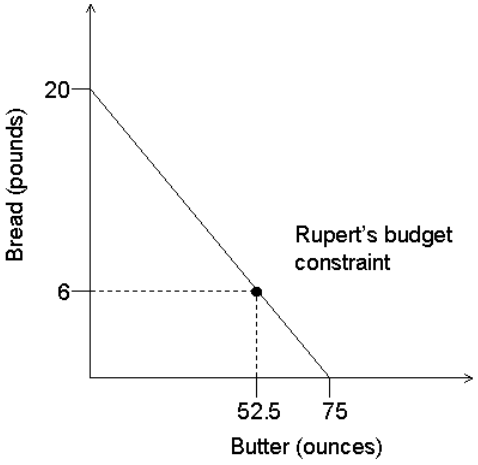
5.1
Channing's income must be \$7.75, because she spends \$6 (12×\$0.50) on bread and \$1.75 (7×\$0.25) on butter. \$6 + \$1.75 = \$7.75.

As in In-Text Exercise 5.2, the intercepts are found by dividing *M* by the price of the good on the given axis. So the bread-intercept would be \$7.75/\$0.50, or 15.5 and the butter intercept would be \$7.75/\$0.25, or 31.



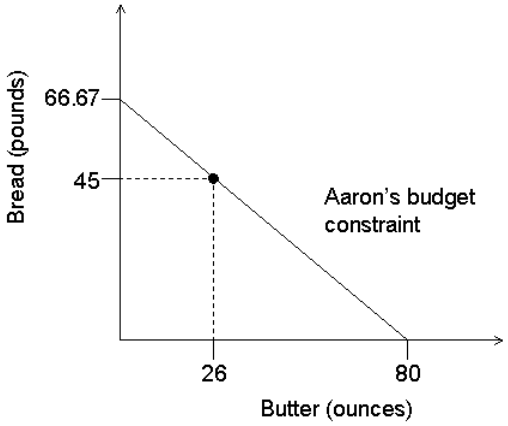
5.2
If Rupert buys six pounds of bread at a price of \$0.75 per pound, he spends 6×\$0.75, or \$4.50 on bread. That would leave him with \$10.50 of his original \$15 income left to spend on butter. If the price of butter is \$0.20 per ounce, he would buy \$10.50/\$0.20, or 52.5 ounces of butter.

As in In-Text Exercise 5.2, the intercepts are found by dividing *M* by the price of the good on the given axis. So the bread-intercept would be \$15/\$0.75, or 20 and the butter intercept would be \$15/\$0.20, or 75.



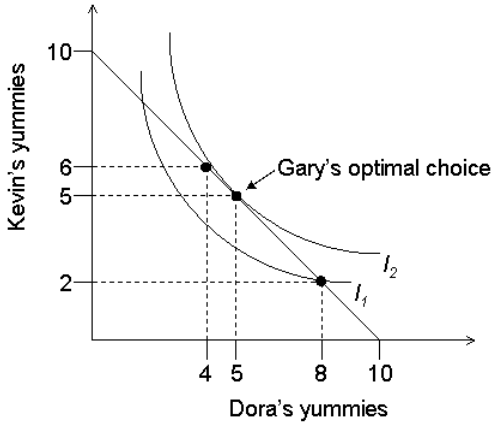
5.3
If Aaron buys 45 pounds of bread at \$0.60 per pound, then he spends 45×\$.060, or \$27 on bread. This leaves \$13 of his original \$40 income left to spend on butter. If he spends \$13 on butter and buys 26 ounces of it, then butter's price must be \$13/26, or \$0.50 per ounce. The price of butter is 50 cents an ounce.

As in In-Text Exercise 5.2, the intercepts are found by dividing *M* by the price of the good on the given axis. So the bread-intercept



would be \$40/\$0.60, or 66.67 and the butter intercept would be \$40/\$0.50, or 80.

5.4
Gary will redistribute the ten total yummies so that each child has five yummies. The best choice would still be five yummies per child, regardless of the initial distribution (as long as the total available yummies is ten).

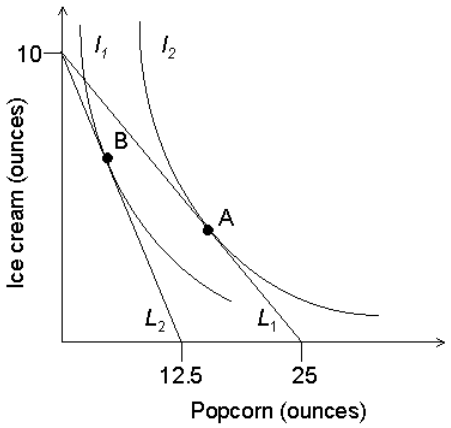


5.5
If the prices of soup and bread both double, then Oscar's budget line becomes budget line L_2. This is because his income, which used to be enough to buy a maximum of 40 ounces of bread, can now only purchase 20 ounces of bread. The same thing has happened for soup; the maximum amount of soup he can purchase is now only five pints (down from ten pints). Therefore, since he faces budget constraint L_2, he will utility maximize by choosing point *B*: eight ounces of bread and three pints of soup.

If prices were to fall by 50%, then his income is now worth 50% more with respect to each good. Instead of only being able to buy a maximum of 40 ounces of bread, Oscar is now able to buy as many as 60 ounces. Instead of being limited to only ten pints of soup maximum, Oscar can now afford as many as 15 pints of soup. This means that the budget constraint he now faces is L_3. On L_3, he maximizes his utility by choosing point *C*: 28 ounces of bread and eight pints of soup.

If his income doubled along with the prices, then nothing would change; Oscar would remain on budget line L_2. This is because his purchasing power (or his *real* income) has not changed. He remains at point *A*: 16 ounces of bread and six pints of soup.

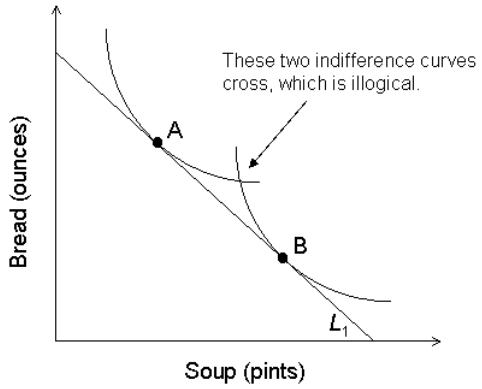
5.6
The ice cream intercept of Alan's budget constraint is equal to M/P_{IC}, or \$10/\$1, which equals 10 ounces of ice cream. The popcorn intercept of Alan's budget constraint is equal to M/P_P, or \$10/\$0.40, or 25 ounces of popcorn. He faces budget line L_1 in the drawing to the right and chooses point *A*.



If Alan's sister steals half his popcorn, then effective the price of popcorn has gone up to \$0.80 per ounce, because Alan has two buy two ounces in the market at \$0.40 each just to consume one ounce. Therefore, the popcorn intercept changes to \$10/\$0.80, or 12.5 ounces of popcorn. He now faces budget line L_2 in the drawing to the right and chooses point *B*.

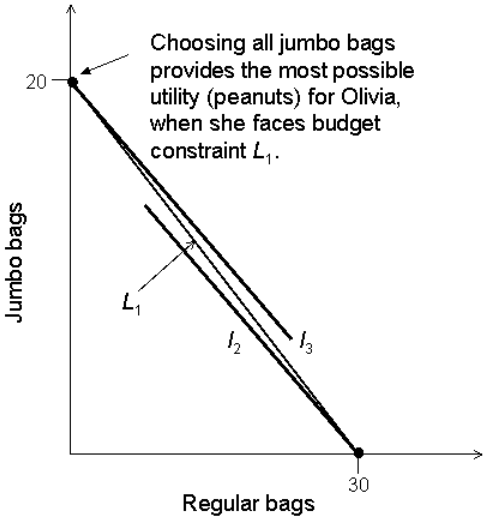
When the price of popcorn rises like this, Alan chooses less popcorn and more ice cream, and is less happy ($I_2 > I_1$) overall.

5.7
If the consumer has declining *MRS* (downward-sloping, bowed-inward indifference curves), the consumer only has one best choice. They have many choices on the same budget line but only at one will the indifference curve be tangent to the budget constraint. Drawing more than one tangent indifference curve requires drawing intersecting indifference curves, which, as explained on page 100, is illogical.



No matter how hard students try, they cannot produce a drawing where two points on the same budget constraint lie on different downward-sloping bowed-inward indifference curves that are tangent to the budget constraint at the point in question and do not somewhere cross.

5.8
Assuming that bag size does not matter to Olivia (only peanut consumption does), then the jumbo and regular bags are perfect substitutes. It takes only 0.6 jumbo bags to get the same number of peanuts in a regular bag (50 versus 30), so Olivia is always willing to trade 0.6 jumbo bags for one regular bag. In

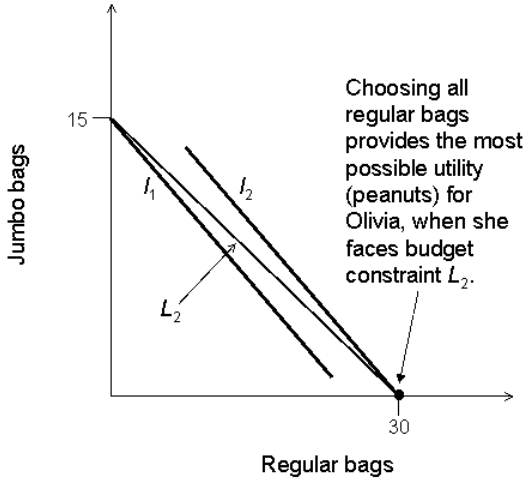


other words, she has a constant MRS_{RJ} of 0.6. This means that (if we graph regular bags on the horizontal axis), she has straight-line indifference curves with slope of –0.6.

Her budget constraint has a slope of –.667 (the slope of the budget constraint is equal to the opposite of the price ratio, $-P_R/P_J$). Since her budget constraint is everywhere steeper than her indifference curves, it means that the market always charges more for regular bags than she is willing to give up. Therefore, she will maximize her utility by purchasing only jumbo bags. She will spend her \$15 gift certificate on 20 jumbo bags of peanuts.

We could have come to this conclusion by realizing that, in a jumbo bag, peanuts are 1.5 cents apiece, while in a regular bag they are 1.667 cents apiece. Clearly, the jumbo bag is a better deal.

If the price of a jumbo bag were \$1 each, then the slope of the budget constraint ($-P_R/P_J$) falls to –0.5. In this case, her indifference curves are everywhere steeper than her budget constraint, meaning that she is willing to give up more for a regular bag of peanuts than the market requires. Therefore, she can increase her utility always by buying more regular bags. In this case, she will spend all \$15 on 30 regular bags of peanuts.



Again, the price per peanut would have given the same results. Now, the price per peanut in a jumbo bag is 2 cents apiece. This makes the 1.667 cents per peanut price of the regular bag cheaper.

5.9
If Natasha is maximizing her utility, then she is satisfying the condition that her MRS_{CF} be equal to the price ratio, P_C/P_F (which is a rearrangement of formula (6) on page 141). Since she buys twice as many film tickets as concert tickets, so $F = 2C$, or $F/C = 2$.

$$\frac{F}{C} = \frac{P_C}{P_F}$$

$$2 = \frac{P_C}{\$4}$$

$$\boldsymbol{P_C = \$8}$$

5.10
First recall from Example 5.2 that when the price of soup is \$2 per bowl, Madeline consumes two bowls of soup. From In-Text Exercise 5.3, when the price of soup is \$4 per bowl, she consumes one bowl of soup. To figure out how many bowls of soup she consumes when they cost \$6 per bowl, we need to first figure out which bundles are affordable and then figure out which is ranked highest using rankings from page 96.

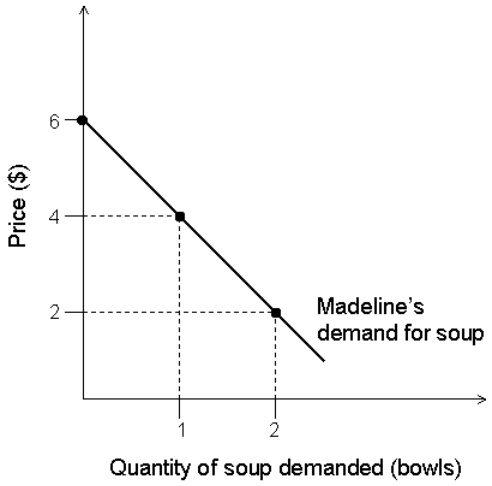
***Expenditures*, used to identify affordable bundles:**

Bread (loaves)	Soup (bowls) 0	1	2	3
3	$6	$12	$18	$24
2	4	10	16	22
1	2	8	14	20
0	0	6	12	18

***Rankings*, used to identify the optimal bundle:**

Bread (loaves)	Soup (bowls) 0	1	2	3
3	**11**	7	3	1
2	13	8	4	2
1	15	9	6	5
0	16	14	12	10

So when the price of soup is $6, Madeline will consume zero bowls of soup (she chooses to spend all $6 of her income on bread). We can plot these three points to get a picture of her demand curve:



5.11

Natasha will always maximize utility, which requires that her MRS_{CF} equal the ratio of the price of concert tickets to the price of film tickets. The price of concert tickets is $5, and her MRS_{CF} is given in the problem.

$$MRS_{CF} = \frac{P_C}{P_F}$$

$$\frac{3+F}{2C} = \frac{P_C}{P_F}$$

$$3+F = \frac{(2C)P_C}{P_F}$$

$$F = \frac{(2C)P_C}{P_F} - 3$$

We can plug this condition into the budget constraint.

$$M = P_C C + P_F F$$
$$M = P_C C + P_F\left(\frac{(2C)P_C}{P_F} - 3\right)$$
$$M = P_C C + (2C)P_C - 3P_F$$
$$M = 3P_C C - 3P_F$$
$$M + 3P_F = 3P_C C$$
$$C = \frac{M + 3P_F}{3P_C}$$

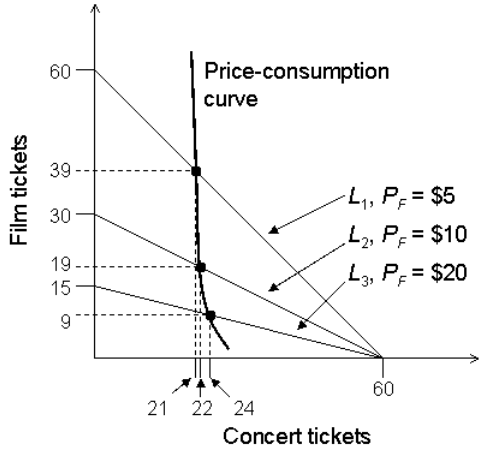
This equation can be plugged back into the first equation we got from the tangency condition.

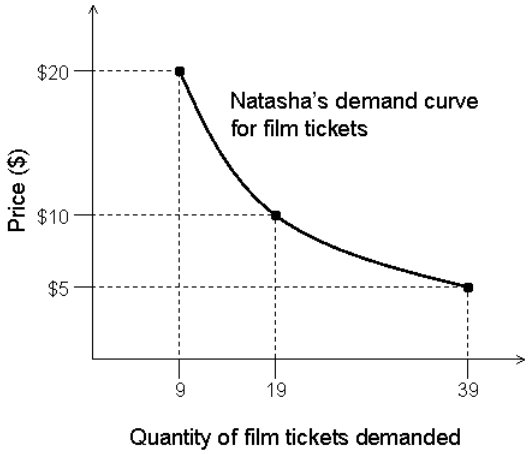
$$F = \frac{(2C)P_C}{P_F} - 3$$
$$F = \frac{2\left(\frac{M + 3P_F}{3P_C}\right)P_C}{P_F} - 3$$
$$F = \left(\frac{2M + 6P_F}{3P_C}\right)\left(\frac{P_C}{P_F}\right) - 3$$
$$F = \left(\frac{2M + 6P_F}{3P_F}\right) - 3$$

Plugging in values for M and P_C into these two equations gives us solutions for C and F:

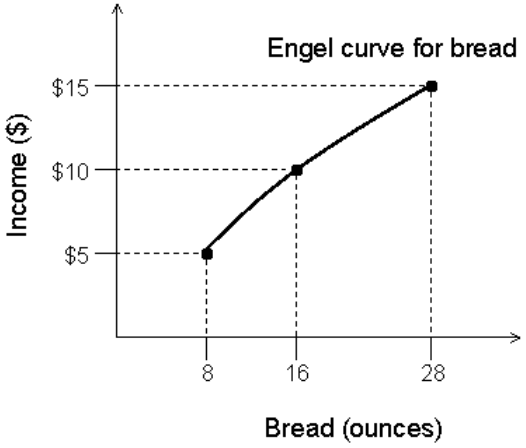
$$C = \frac{M + 3P_F}{3P_C} \qquad F = \left(\frac{2M + 6P_F}{3P_F}\right) - 3$$
$$C = \frac{300 + 3P_F}{3(5)} \qquad F = \left(\frac{2(300) + 6P_F}{3P_F}\right) - 3$$
$$C = \frac{100 + P_F}{5} \qquad F = \left(\frac{200 + 2P_F}{P_F}\right) - 3$$

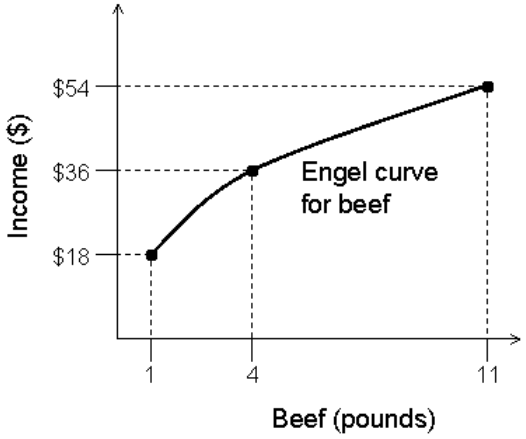
So if the price of a film ticket were \$5, Natasha will purchase 21 concert tickets and 39 film tickets. If the price of a film ticket were \$10, Natasha would purchase 22 concert tickets and 19 film tickets. If the price of a film ticket were \$20, Natasha would purchase 24 concert tickets and 9 film tickets. Given this information, we can graph her price-consumption curve and her demand curve for film tickets.





5.12

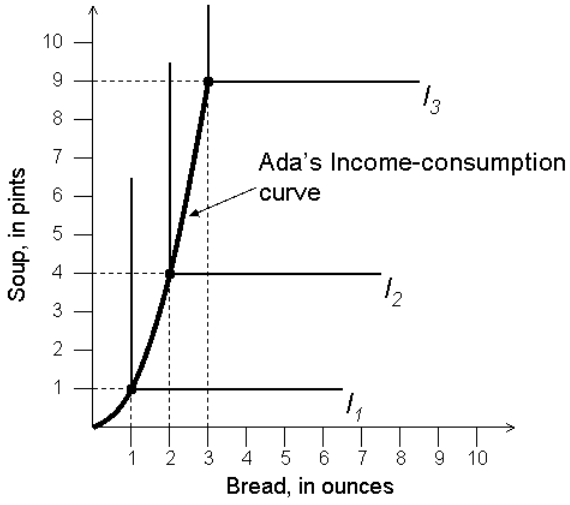




Since both goods have upward-sloping Engel curves, both goods are normal.

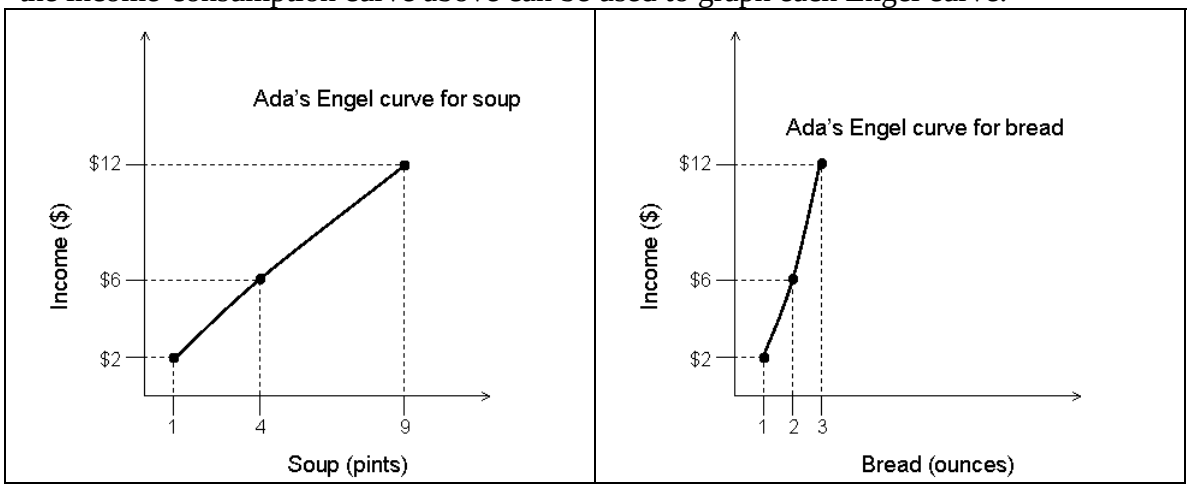
5.13

We can draw Ada's income-consumption curve without knowing about the relative prices of bread and soup because, regardless of the slope of the budget constraint, Ada will always pick a point on the corner of the right-angle indifference curves. So the income-consumption curve is the graph of the parabola $S = B^2$.



The Engel curves cannot be graphed without price information, since the rate at which Ada makes changes to the bread/soup ratio depends on the level of consumption. Let's assume that an ounce of

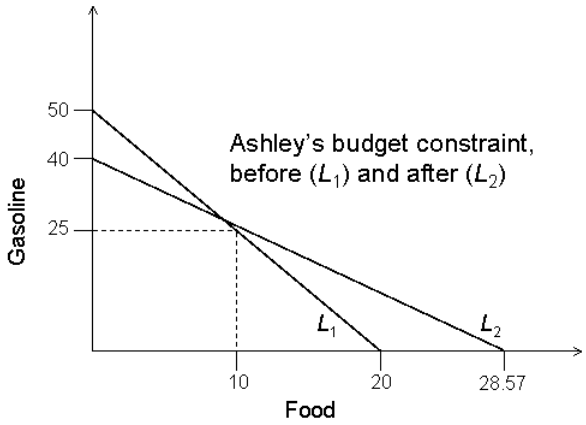
bread and a pint of soup have the same price of $1 each. Therefore, the three points on the income-consumption curve above can be used to graph each Engel curve.



5.14

Though Ashley's income has doubled, prices have risen too. The price of gasoline has more than doubled, but the price of food has less than doubled. The effect of these changes on her budget constraint (and therefore on her feasible set) is unclear. But since Ashley was purchasing 25 gallons of gasoline and 10 pounds of food before, we know that this must have been utility-maximizing for her. We can determine whether, facing the new prices, Ashley can still afford this bundle.

$$\begin{aligned} M &= P_G G + P_F F \\ &= \$5(25) + \$7(10) \\ &= \$125 + \$70 \\ &= \$195 \end{aligned}$$

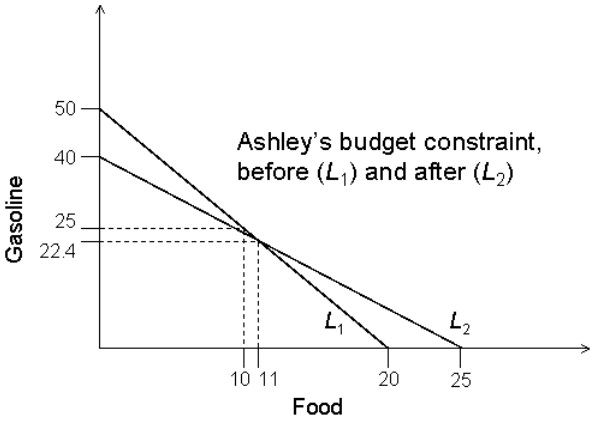


Ashley can still afford her old consumption bundle and still have $5 left over (which she could spend on gasoline or food), so she is strictly better off. She is able to reach a higher indifference curve.

5.15

In this situation, we cannot say for certain whether Ashley is better or worse off. Her initial consumption bundle (25 gallons of gasoline and ten pounds of food) is not affordable; that bundle now costs $205 and Ashley only has $200. However, some bundles that were not affordable before but are affordable now contain more food and less gasoline than her original choice, so they may or may not provide more utility. Nothing can be said for certain.

If, after the changes, Ashley purchases eleven pounds of food, then she is spending $88 on food and the other $112 on gasoline. At gasoline's new price, this means she purchases 22.4 gallons of gasoline. To know whether she is better or worse off we can figure out whether she could have afforded this bundle before. At the original prices, this would have cost $94.80. In other words, she could have afforded this bundle before (its price is less than $100) but rejected it in favor of her original bundle. This means that she is definitely worse off after the price change.



If, after the changes, Ashley purchases 15 pounds of food, then she is spending $120 on food and the other $80 on gasoline. At gasoline's new price, this means she purchases 16 gallons of gasoline. At the old prices, this bundle would have cost her $107. In this case, she would be consuming a bundle that was previously unaffordable. This makes it impossible to say whether this bundle provides more or less happiness than her original consumption bundle.