

1. Draw an indifference curve to illustrate the satisfaction associated with the consumption of two products in each scenario below. Explain the assumptions you have made and the economic significance of each graph.
 - a. Left shoes and right shoes
 - b. Coke and Pepsi

Solution:

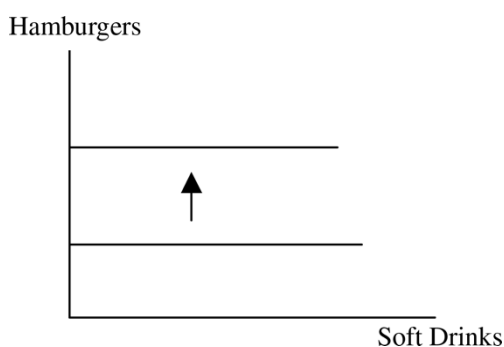
Describing the indifference curves associated with two goods that are perfect substitutes and perfect complements”

Two goods are perfect substitutes if the MRS of one for the other is a constant number. In this case, the slopes of the indifference curves are constant, and the indifference curves are therefore linear. If two goods are perfect complements, the indifference curves are L-shaped. In this case the consumer wants to consume the two goods in a fixed proportion, say one unit of good 1 for every one unit of good 2. If she has more of one good than the other, she does not get any extra satisfaction from the additional units of the first good.

2. Draw indifference curves that represent the following individuals’ preferences for hamburgers and soft drinks. Indicate the direction in which the individuals’ satisfaction (or utility) is increasing.

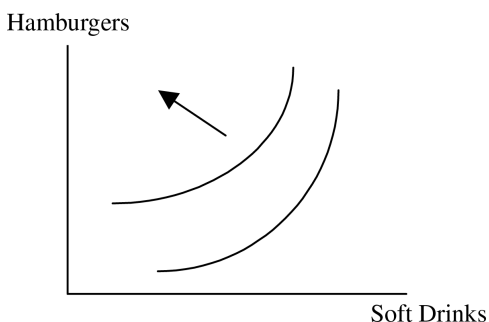
- a. Jane loves hamburgers and refuses to consume soft drinks. If she is served a soft drink, she will pour it down the drain rather than drink it.

Since Jane can freely dispose of the soft drink if it is given to her, she considers it to be a neutral good. This means she does not care about soft drinks one way or the other. With hamburgers on the vertical axis, her indifference curves are horizontal lines. Her satisfaction increases in the upward direction.



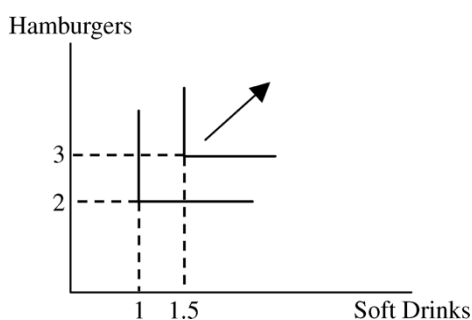
- b. Bob loves hamburgers and dislikes soft drinks. If he is served a soft drink, he will drink it to be polite.

Since Bob will drink the soft drink in order to be polite, it can be thought of as a “bad.” When served another soft drink, he will require more hamburgers at the same time in order to keep his satisfaction constant. More soft drinks without more hamburgers will worsen his utility. More hamburgers and fewer soft drinks will increase his utility, so his satisfaction increases as we move upward and to the left.



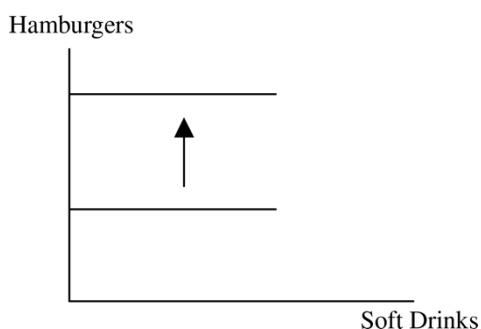
- c. **Molly loves hamburgers and soft drinks, but insists on consuming exactly one soft drink for every two hamburgers that she eats.**

Molly wants to consume the two goods in a fixed proportion so her indifference curves are L-shaped. For a fixed amount of one good, she gets no extra satisfaction from having more of the other good. She will only increase her satisfaction if she has more of both goods.



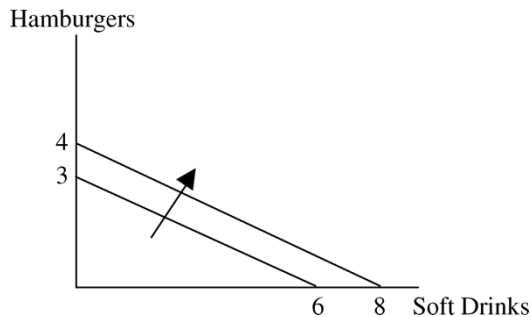
- d. **Bill likes hamburgers, but neither likes nor dislikes soft drinks.**

Like Jane, Bill considers soft drinks to be a neutral good. Since he does not care about soft drinks one way or the other we can assume that no matter how many he has, his utility will be the same. His level of satisfaction depends entirely on how many hamburgers he has, so his satisfaction increases in the upward direction only.



- e. **Mary always gets twice as much satisfaction from an extra hamburger as she does from an extra soft drink.**

How much extra satisfaction Mary gains from an extra hamburger or soft drink tells us something about the marginal utilities of the two goods and about her *MRS*. If she always receives twice the satisfaction from an extra hamburger then her marginal utility from consuming an extra hamburger is twice her marginal utility from consuming an extra soft drink. Her *MRS*, with hamburgers on the vertical axis, is $1/2$ because she will give up one hamburger only if she receives two soft drinks. Her indifference curves are straight lines with a slope of $-1/2$.



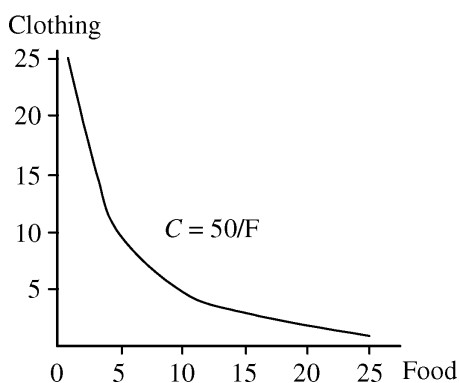
3. If Jane is currently willing to trade 4 movie tickets for 1 basketball ticket, then she must like basketball better than movies. True or false? Explain.

This statement is not necessarily true. If she is *always* willing to trade 4 movie tickets for 1 basketball ticket then yes, she likes basketball better because she will always gain the same satisfaction from 4 movie tickets as she does from 1 basketball ticket. However, it could be that she has convex preferences (diminishing *MRS*) and is at a bundle where she has a lot of movie tickets relative to basketball tickets. As she gives up movie tickets and acquires more basketball tickets, her *MRS* will fall. If *MRS* falls far enough she might get to the point where she would require, say, two basketball tickets to give up another movie ticket. It would not mean though that she liked movies better, just that she had a lot of basketball tickets relative to movie tickets. Her willingness to give up a good depends on the quantity of each good in her current basket.

4. Suppose that Bridget and Erin spend their incomes on two goods, food (*F*) and clothing (*C*). Bridget's preferences are represented by the utility function $U(F,C) = 10FC$, while Erin's preferences are represented by the utility function $U(F,C) = 0.20F^2C^2$.

- a. With food on the horizontal axis and clothing on the vertical axis, identify on a graph the set of points that give Bridget the same level of utility as the bundle (10,5). Do the same for Erin on a separate graph.

The bundle (10,5) contains 10 units of food and 5 of clothing. Bridget receives a utility of $10(10)(5) = 500$ from this bundle. Thus, her indifference curve is represented by the equation $10FC = 500$ or $C = 50/F$. Some bundles on this indifference curve are (5,10), (10,5), (25,2), and (2,25). It is plotted in the diagram below. Erin receives a utility of $0.2(10^2)(5^2) = 500$ from the bundle (10,5). Her indifference curve is represented by the equation $0.2F^2C^2 = 500$, or $C = 50/F$. This is the same indifference curve as Bridget. Both indifference curves have the normal, convex shape.



- b. On the same two graphs, identify the set of bundles that give Bridget and Erin the same level of utility as the bundle (15,8).

For each person, plug $F = 15$ and $C = 8$ into their respective utility functions. For Bridget, this gives her a utility of 1200, so her indifference curve is given by the equation $10FC = 1200$, or $C = 120/F$. Some bundles on this indifference curve are (12,10), (10,12), (3,40), and (40,3). The indifference curve will lie above and to the

right of the curve diagrammed in part a. This bundle gives Erin a utility of 2880, so her indifference curve is given by the equation $0.2F^2C^2 = 2880$, or $C = 120/F$. This is the same indifference curve as Bridget.

- c. Do you think Bridget and Erin have the same preferences or different preferences? Explain.**

They have the same preferences because their indifference curves are identical. This means they will rank all bundles in the same order. Note that it is not necessary that they receive the same level of utility for each bundle to have the same set of preferences. All that is necessary is that they rank the bundles in the same order.