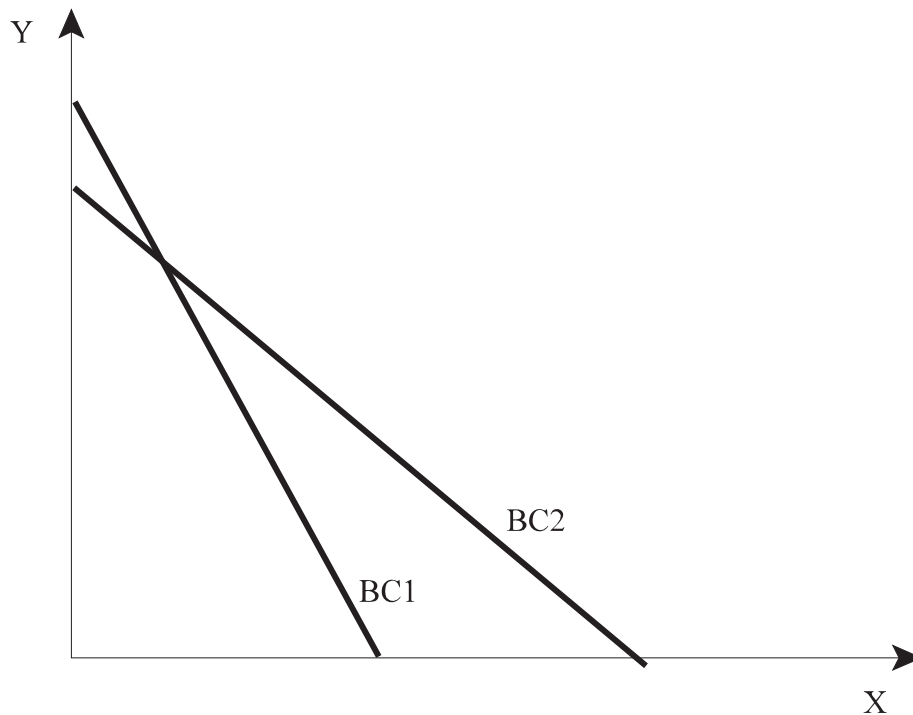


### Short Questions

1. Consider the figure with the following two budget constraints, BC1 and BC2.

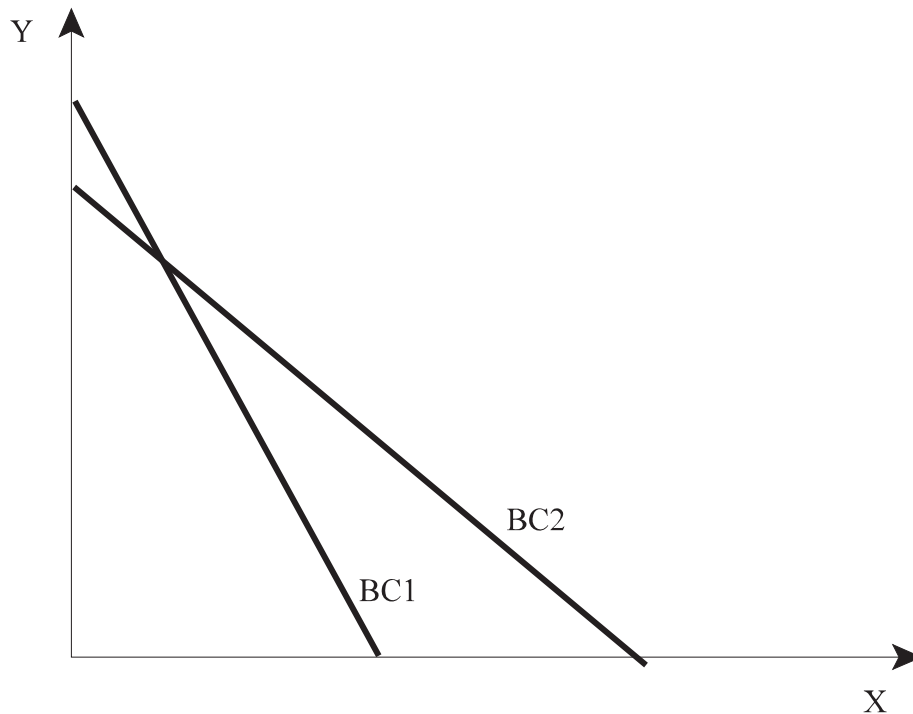


Consider next the following possibilities:

- A. Price of X increases and income of the consumer also increases.
- B. Price of Y decreases and income of the consumer also decreases.
- C. Price of Y increases and income of the consumer decreases.
- D. Price of X decreases and income of the consumer remains unchanged.
- E. Price of X decreases and income of the consumer increases.
- F. Price of X decreases and income of the consumer also decreases.

Which of the above possibilities can lead to a movement of the budget constraint from BC2 to BC1? (Write below the letters that correspond to each scenario that can have the effect stated above.)

2. Consider the figure with the following two budget constraints, BC1 and BC2.

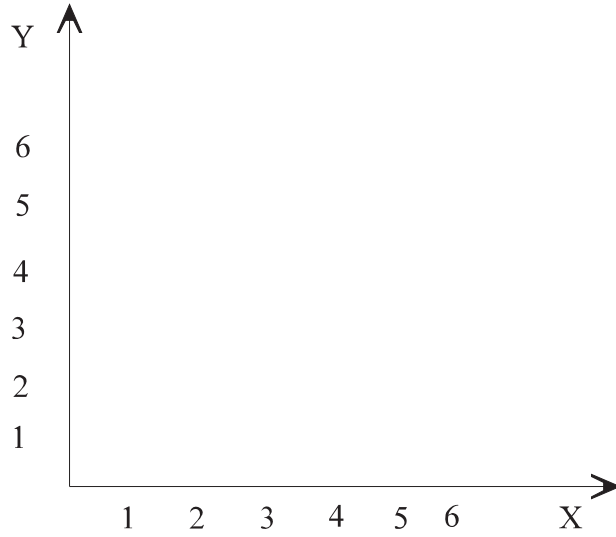


Consider next the following possibilities:

- A. Price of X increases and income of the consumer also increases.
- B. Price of Y decreases and income of the consumer also decreases.
- C. Price of Y increases and income of the consumer decreases.
- D. Price of X decreases and income of the consumer remains unchanged.
- E. Price of X decreases and income of the consumer increases.
- F. Price of X decreases and income of the consumer also decreases.

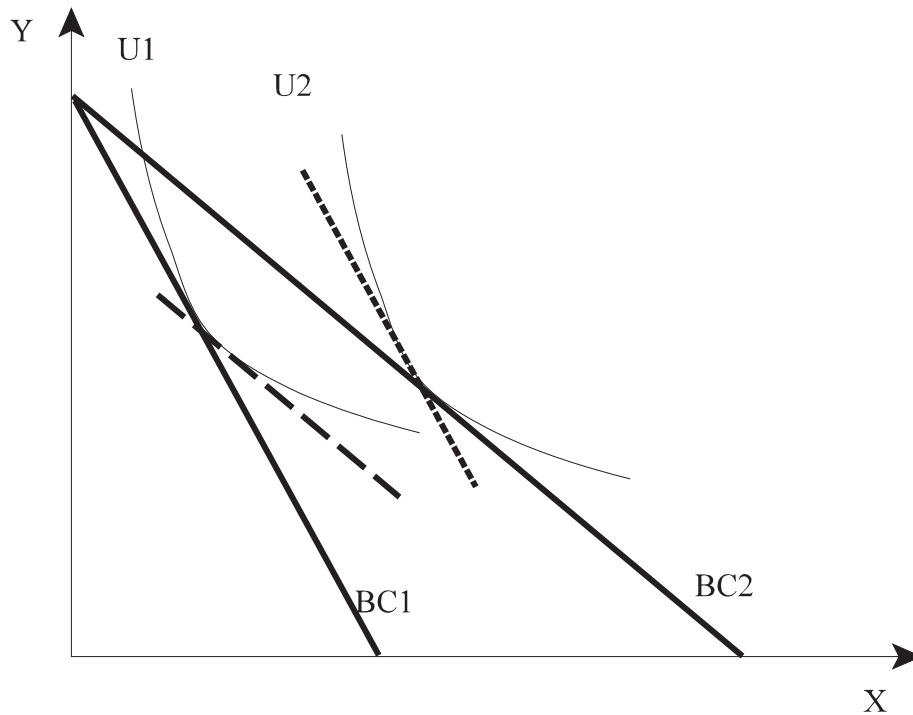
Which of the above possibilities can lead to a movement of the budget constraint from BC1 to BC2? (Write below the letters that correspond to each scenario that can have the effect stated above.)

3. A consumer always purchases 2 units of X with every 3 units of Y regardless of the prices of X and Y.



In the above figure, draw two of this consumer's indifference curves.

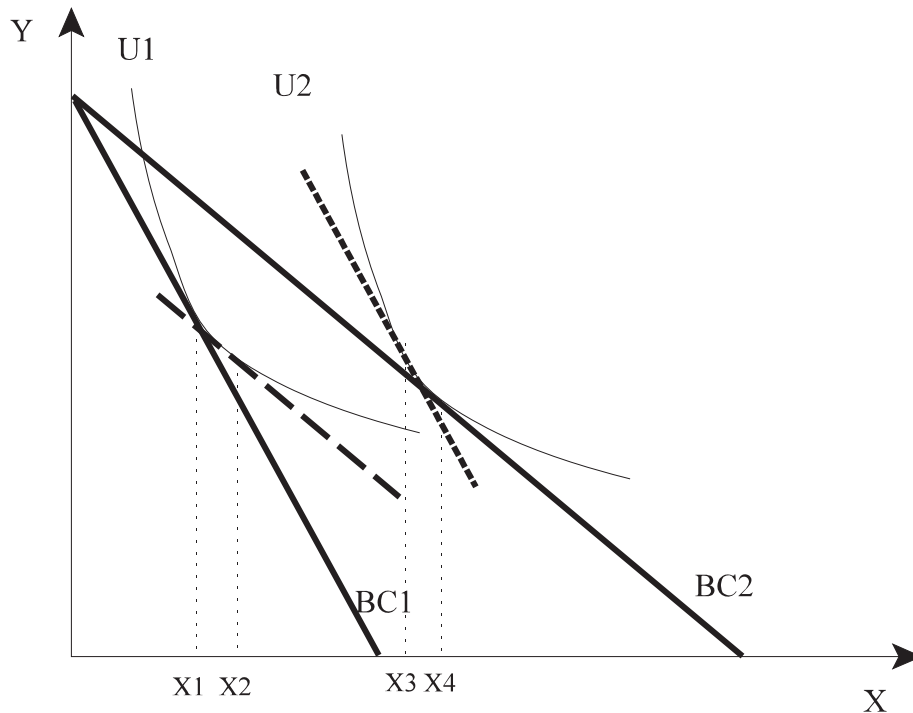
4. Consider the figure below, which has two indifference curves, U1 and U2 (U2 corresponds to a high level of utility) and two budget constraints, BC1 and BC2. The dashed line is parallel to BC2 and tangent to U1, while the dotted line is parallel to BC1 and tangent to U2.



Answer the following questions with regards to this figure.

- The shift from budget constraint BC2 to BC1 represents an increase in the price of product Y, decrease in income, a decrease in the price of X, or none of the above?
- In the range of prices and real income changes shown in the figure above, is good Y normal or inferior? Explain why (in one sentence or two at most).
- Good X is Giffen. Is this statement true, false, or we can't tell on the basis of the above figure. Explain in a single sentence.

5. Consider the figure below, which has two indifference curves, U1 and U2 (U2 corresponds to a high level of utility) and two budget constraints, BC1 and BC2. The dashed line is parallel to BC2 and tangent to U1, while the dotted line is parallel to BC1 and tangent to U2.



Answer the following questions with regards to this figure.

- The change in the consumption of X due to the substitution effect of the budget constraint shift from BC1 to BC2 is given by (i)  $X_2 - X_1$ , (ii)  $X_3 - X_1$ , (iii)  $X_3 - X_2$ , (iv)  $X_4 - X_2$ , or (v)  $X_4 - X_3$ ?
- In the range of prices and real income changes shown in the figure above, is good X normal or inferior? Explain why (in one sentence or two at most).
- Good Y is Giffen. Is this statement true, false, or we can't tell on the basis of the above figure. Explain in a single sentence.

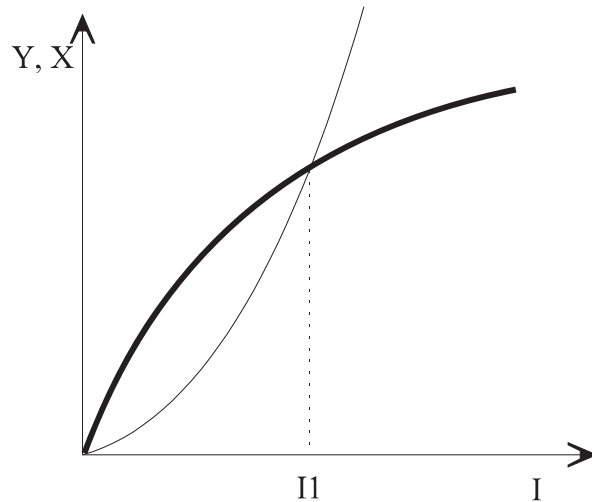
6. The demand for a good X is given by

$$X = \frac{P_Y}{P_X} \sqrt{I}$$

Answer the following questions. Support your assertions using algebra.

- a. Is good X normal? Why or why not?
- b. Is good X a luxury? Why or why not?
- c. Is good X Giffen? Why or why not?

7. Consider the following two Engel curves for goods X and Y. The Engel curve for Y is in bold.



Which of the following statements are true and why. [They are not mutually exclusive, so more than one of them can be true. You have enough information to answer all of them.]

- a. This consumer consumes more Y than X when his income is less than  $I_1$ .
- b. Y is a normal good.
- c. X is an inferior good.
- d. X is a luxury good.
- e. X is a luxury only for incomes that exceed  $I_1$ .
- f. Y is a Giffen good.

8. Consider the following statement:

“A good may be a luxury to some people but a necessity to others.”

Is this statement true or false. Explain why in the space provided below. [You only need 2 or 3 sentences for this.]

9. Consider two goods, X and Y, that are perfect complements. [In other words, consumers have Leontieff preferences for them.] Consider an increase in the price of X. Show in a diagram how big is the change in the consumption of X that is due to the *substitution* effect.

10. What is a Giffen good ? Illustrate the concept of a Giffen good by using a figure with indifference curves and budget constraints. Label your figure carefully.

11. What goods are known in economic terminology as ‘luxuries’ ?



## Problems

1. The Kreatofagos family is having a barbecue. They send their son, Bobiras, to the local store to buy meat. The parents don't know the prices of meat in the store. They give Bobiras \$40 and tell him to spend all the money on beef and chicken, but buy twice as many pounds of beef than chicken *regardless of the prices* in the store.

- a. Do the instructions of the parents imply that beef and chicken perfect substitutes or do they imply that they are perfect complements ? Why ?
- b. What is the budget constraint of Bobiras as he heads into the store ?
- c. If the price of chicken is \$2.7 per pound and the price of beef \$4.0 per pound, how many pounds of each will he purchase ?
- d. Suppose that, on the way to the check out counter, Bobiras finds out a coupon that entitles him to 25% off on any beef. [It is today's special!] Will Bobiras buy more beef as a result? If so, how much more ?
- e. Will he also buy more chicken ? If so, how much more ?

2. A consumer always consumes products  $X$  and  $Y$  in fixed proportions regardless of prices: 2 units of  $X$  are consumed with 3 units of  $Y$ . The price of  $X$  is  $P_X$  and the price of  $Y$  is  $P_Y$ . The consumer's income is  $I$ .

- a. How many units of  $X$  and how many units of  $Y$  will this consumer purchase? (The answer will be a function of prices and income.)
- b. In the space below, draw the Engel curve for  $X$ . Make sure you label the graph carefully, including giving the intercept and the slope of the Engel curve.

3. Consider a consumer with a utility function for goods  $X$  and  $Y$  given by

$$U = 5Y - \frac{10}{X}$$

The price of  $Y$  is equal to 5 and the price of  $X$  is equal to 10. The consumer has income  $I$ .

- a. How many units of  $X$  and how many units of  $Y$  will the consumer purchase if  $I=5$ ?
- b. How many units of  $X$  and how many units of  $Y$  will the consumer purchase if  $I=20$ ?
- c. Derive and plot the Engel curve for good  $Y$ . Label your graph carefully.

4. A consumer always consumes soda ( $S$ ) and chips ( $C$ ) in fixed proportions regardless of prices: 5 ounces of  $S$  are consumed with 2 ounces of  $C$ . The price of chips is always equal to 0.2 per ounce, while the price of soda varies from time to time, as it is often on sale, and is denoted by  $P_S$ . The consumer's income budget for soda and chips is equal to  $I$ .

- a. How many units of soda ( $S$ ) and how many units of chips ( $C$ ) will this consumer purchase? (The answer will be a function of the price of soda and the budget for soda and chips).
- b. Does the consumption of chips change when soda is on sale, and if so, in what way? Can you explain in plain, clear English why the price of soda has this effect on the consumption of chips?
- c. In the space below, draw the relationship between the consumption of soda and the consumer's budget for soda and chips, with  $I$  in the horizontal axis and the consumption of soda in the vertical axis. Make sure you label the graph carefully, including labeling the slope and intercept.

5. Consider a consumer with a utility function for goods  $X$  and  $Y$  given by

$$U = \min\{5Y, X\}$$

The price of  $Y$  is equal to 5 and the price of  $X$  is equal to 10. The consumer has income  $I$ .

- a. Draw two indifference curves for this consumer with  $Y$  on the vertical axis and  $X$  in the horizontal axis. It does not matter which two indifference curves you draw, but you must label your graph clearly.
- b. How many units of  $X$  and how many units of  $Y$  will the consumer purchase if  $I=110$ ?
- c. Compute the optimal consumption of  $Y$  as a function of income  $I$ . Plot your answer in a graph with income in the horizontal axis and  $Y$  in the vertical axis. Label your graph carefully.