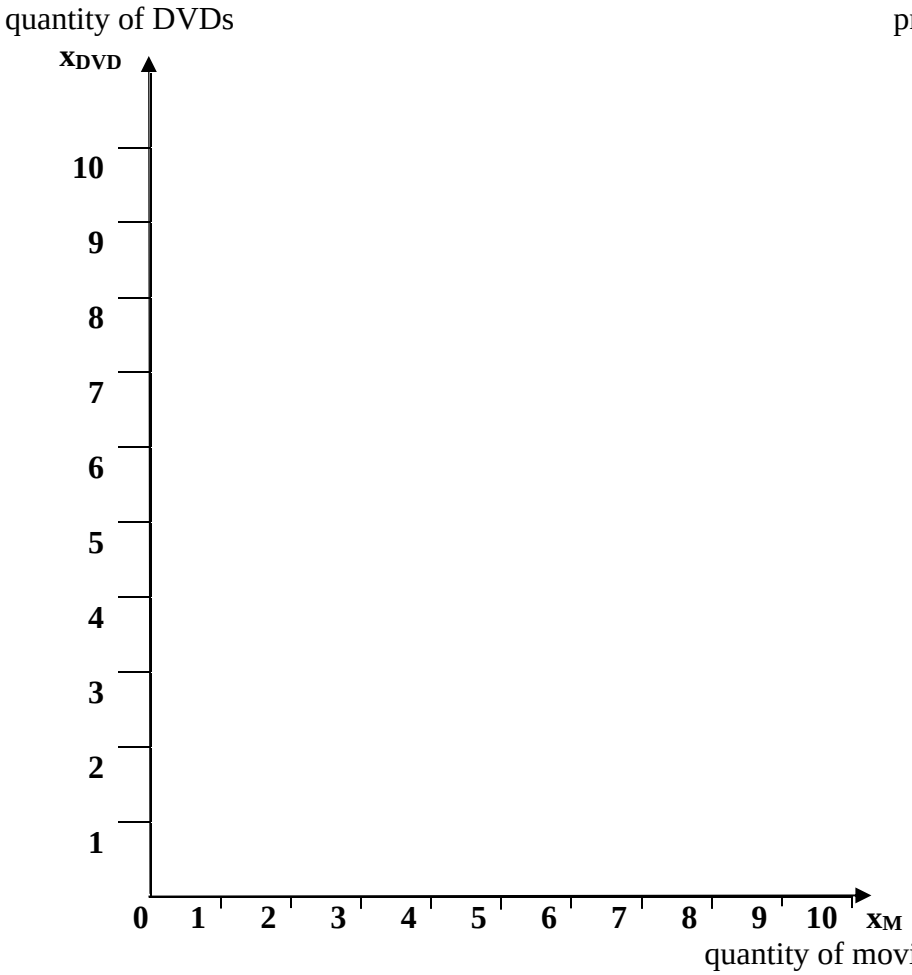
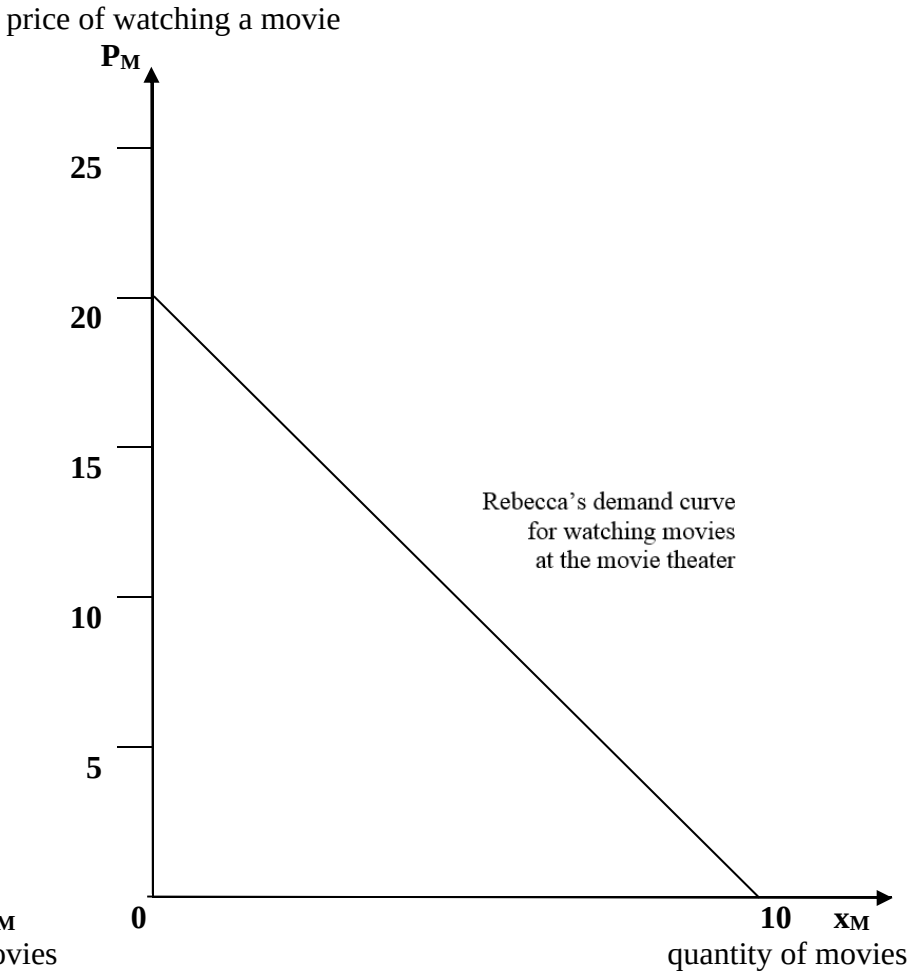
Exercise: Deriving the Consumer Optimum from an Individual's Demand Curve





NOTE:

This exercise reverses the approach that we used in class. In Section 5.1 we used information about the consumer optima to derive an individual's demand curve. Here you are asked to find the consumer optima based on a given demand curve.

Deriving Rebecca's Consumer Optimum

In addition to Rebecca's demand curve on the previous page the following information is given:

- Rebecca sets aside a monthly "film budget" of 72 that she spends entirely on DVDs (x_{DVD}) or visits to the movie theater (x_M).
- The price of a DVD is $P_{DVD} = 12$.
- The price of movies increases from $P_M = 8$ to $P_M = 12$.

Questions / Tasks:

a) Determine Rebecca's initial consumer optimum (i.e. the optimal quantities of x_{DVD} and x_M) when the price of visits to the movie theater is $P_M = 8$.

b) What is Rebecca's new consumer optimum when the price of movies increases to $P_M = 12$?

c) Illustrate the two consumer optima in the diagram on the left hand side: Draw the two budget constraints and mark the consumer optima. Sketch the indifference curves for each optimum.

d) The increase of the price of movies from $P_M = 8$ to $P_M = 12$ involves a substitution effect and an income effect. Which effect is stronger with regard to the consumption of DVDs?

For a start, and as an intellectual challenge, you should try to solve the questions a) to d) by using only the information provided.
If you cannot come up with an idea how to derive the consumer optima, you can follow the step-by-step approach on the next page.

Step-by-step approach to answer the questions a) to d):

1. From the figure on the right hand side derive the equation for Rebecca's demand curve for visits to the movie theater.
2. The equation of this demand curve allows you to find the quantities of movies that Rebecca will consume at the price of $P_M = 8$ and $P_M = 12$, respectively.
3. You are now able to determine which amount of money Rebecca will spend for movies when the price is $P_M = 8$ or $P_M = 12$.
4. Use the information about her monthly film budget, the price of a DVD, and the prices of movies to derive two different budget constraints (one for $P_M = 8$ and one for $P_M = 12$).
5. The next step is to determine the optimal quantities of DVDs in each consumer optimum. => ***Answer questions a) and b).***
6. You can now draw the budget constraints and mark the consumer optima in the diagram on the left hand side. Just sketch two indifference curves because you do not have information about the utility function. => ***This is the answer to question c).***
7. Finally, you have to compare the optimal quantities of DVDs in the two consumer optima. Has the quantity demanded gone up or down or has it remained unchanged? What does that tell you about the magnitude of the substitution and income effect? => ***Answer question d).***