



B.E. International Program

Faculty of Economics, Thammasat University



EE311 Microeconomics Theory, Semester 1/2019

Homework Assignment # 1 | Due date: Wednesday 4 September 2019 (in-class submission, before lecture begins!)

Instruction:

- 1) Attempt all questions.
- 2) You may study and discuss in group but you have to write up your solutions independently and by handwriting only. Copying and/or Plagiarism is considered as a serious crime in academic arena and it will not be tolerated. If detected, all parties involved receive 'zero.'
- 3) If you have any questions, please feel free to email me at pwrasai@econ.tu.ac.th

Preferences and Utility (CH 3)

2. Suppose Michael purchases only two goods, fish (F) and chips (C).

- a) What is the relationship between MRS_{HC} and the marginal utilities MU_H and MU_C ?
- b) Draw a typical indifference curve for the case in which the marginal utilities of both goods are positive and the marginal rate of substitution of fish for chips is diminishing. Using your graph, explain the relationship between the indifference curve and the marginal rate of substitution of fish for chips.
- c) Suppose the marginal rate of substitution of fish for chips is constant. In this case, are fish and chips perfect substitutes or perfect complements?
- d) Suppose that Michael always wants two orders of fish along with every sachet of chips. Draw a typical indifference curve. In this case, are fish and chips perfect substitutes or perfect complements?

4. Jimmy has the following utility function for sausages: $U(S) = 10S - S^2$, with $MU_S = 10 - 2S$.

b) Suppose that Jimmy is allowed to consume as many sausages as he likes. Calculate the value of S at which he would stop consuming sausages.

5. Consider the utility function $U = xy$ with $MU_x = y$ and $MU_y = x$.

a) Does the consumer believe that more is better for each good?

b) Do the consumer's preferences exhibit a diminishing marginal utility of x ? Is the marginal utility of y diminishing?

6. Consider the utility function $U = xy^2$ with $MU_x = y^2$ and $MU_y = 2xy$.

a) Does the consumer believe that more is better for each good?

b) Does the consumer have a diminishing marginal utility for each good?

7. For the following sets of goods draw two indifference curves, U_1 and U_2 , with $U_2 > U_1$. Draw each graph placing the amount of the first good on the horizontal axis.

d) Nuts (which the consumer neither likes nor dislikes) and ice cream (which the consumer likes)

e) Apples (which the consumer likes) and liver (which the consumer dislikes)

8. Julie and Toni consume two goods with the following utility functions:

$$U^{\text{Julie}} = (x + y)^2 \text{ and } U^{\text{Toni}} = x + y.$$

a) Graph an indifference curve where $U = 4$ for each of these utility functions.

13. Consider the utility function $U(x, y) = 3x + y$, with $MU_x = 3$ and $MU_y = 1$.

a) Is the assumption that more is better satisfied for both goods?

- b) Does the marginal utility of x diminish, remain constant, or increase as the consumer buys more x ?
- c) What is MRS_{XY} ?
- d) Is MRS_{XY} diminishing, constant, or increasing as the consumer substitutes x for y along an indifference curve?
14. Suppose a consumer's preferences for two goods can be represented by the Cobb–Douglas utility function $U = Ax^\alpha y^\beta$, where A , α , and β are positive constants. The marginal utilities are $MU_x = \alpha Ax^{\alpha-1}y^\beta$ and $MU_y = \beta Ax^\alpha y^{\beta-1}$.
- a) Is the assumption that more is better satisfied for both goods?
- b) Does the marginal utility of x diminish, remain constant, or increase as the consumer buys more x ?
- c) What is MRS_{XY} ?
- d) Is MRS_{XY} diminishing, constant, or increasing as the consumer substitutes x for y along an indifference curve?
15. Suppose a consumer has preferences over two goods that can be represented by the quasi-linear utility function $U(x, y) = 2\sqrt{x} + y$. The marginal utilities are $MU_x = 1/\sqrt{x}$ and $MU_y = 1$.
- a) Is the assumption that more is better satisfied for both goods?
- b) Does the marginal utility of x diminish, remain constant, or increase as the consumer buys more x ?
- c) What is MRS_{XY} ?
- d) Is MRS_{XY} diminishing, constant, or increasing as the consumer substitutes x for y along an indifference curve?
- f) Show that the slope of every indifference curve will be the same when $x = 4$. What is the value of that slope? (Hint: You can suppose any two ICs with $U = A$ and $U = B$ and find the slopes of these two ICs.)

17. Claire consumes three goods out of her income, food (F) shelter (S), and clothing (C). At her current levels of consumption, her marginal utility of food is 3 and her marginal utility of shelter is 6. Her marginal rate of substitution of shelter for clothing is 4. Do you have enough information to determine her marginal rate of substitution of food for clothing? If so, what is it? If not, why not?

18. Suppose a person has a utility function given by $U = [x^\rho + y^\rho]^{1/\rho}$ where ρ is a number between $-\infty$ and 1. This is called a constant elasticity of substitution (CES) utility function. You will encounter CES functions in Chapter 6, where the concept of elasticity of substitution will be explained. The marginal utilities are given by

$$MU_x = [x^\rho + y^\rho]^{1/\rho-1} x^{\rho-1}$$

$$MU_y = [x^\rho + y^\rho]^{1/\rho-1} y^{\rho-1}$$

Does this utility function exhibit the property of diminishing MRS_{XY} ?

Tell me and I forget. Teach me and I remember. Involve me and I learn.

Benjamin Franklin
