

METU, Department of Economics

ECON 201 – Problem Set 2

- 1- The relation “is preferred to” between commodity bundles is just one example of a binary relation. Another example is the relation “is a friend of” defined over the set of all human beings. Let xRy mean person x is a friend of person y . Is the relation R reflexive? Transitive? Complete? Explain your answer in few sentences using an example of a relationship between three individuals: Selahattin, Kemal and Meral.
- 2- Suppose that there are two commodities and a consumer prefers more to less of each good. If the consumer has transitive preferences, can her indifference curves cross? Why? Illustrate your answer with a graph.
- 3- Suppose that there are two goods, x and y , and that x is an inferior good. Show using the budget constraint why good y must be a normal good. Be as precise as you can.
- 4- Comment. If preferences are convex, then for any commodity bundle x , the set of commodity bundles that are worse than x is a convex set.

- 5- Consider the following utility functions:

$$U_1(x, y) = xy$$

$$U_2(x, y) = x^2y^2$$

$$U_3(x, y) = \ln x + \ln y$$

Show that all three utility functions have the same marginal rate of substitution, MRS_{xy} . Is this a coincidence? Why, why not?

- 6- Draw graphs with quantities of pepperoni pizza on the horizontal axis and quantities of anchovy pizza on the vertical axis to illustrate the following situations. In each case draw two different indifference curves and make a little arrow pointing in the direction of greater preference.
 - a. Hakan loves pepperoni pizza and hates anchovy pizza.
 - b. Hakan hates anchovy pizza and is completely indifferent about pepperoni pizza.
 - c. Hakan is vegan and hates both anchovy and pepperoni pizza equally.
 - d. Hakan only wants to eat 1 slice of anchovy pizza and 3 slices of pepperoni pizza. Any amount more or less that exact amount gives less joy to him.

- 7- Ahmet consumes coffee and cheese. Coffee is sold in an unusual way. There is only one supplier, and the more coffee you buy from him, the higher the price you have to pay per unit. In fact y units of coffee will cost Ahmet y^2 dollars. Cheese is sold in the usual way at a price of 2 dollars per unit. Ahmet's income is 20 dollars and his utility function is $U(x, y) = x + 2y$, where x is his consumption of cheese and y is his consumption of coffee.
- Sketch Ahmet's budget set and shade it in.
 - Sketch some of his indifference curves and label the point that he chooses.
 - Calculate the amount of cheese and the amount of coffee that Ahmet demands at these prices and this income.
- 8- Use separate graphs to draw indifference curves for each of the following utility functions:
- $U(x, y) = x + 2y$.
 - $U(x, y) = \min\{2x + y, 2y + x\}$.
 - $U(x, y) = \max\{2x + y, 2y + x\}$.
 - $U(x, y) = x + \min\{x, y\}$.
- 9- Harry Truman has the utility function $U(x, y) = (x + 1)(y + 4)$. The price of y is \$1. Harry spends all of his income to buy 6 units of y and no x . What must the price of x be? Explain your answer and draw a diagram to illustrate it.
- 10- Roger consumes no commodities other than Coke and Pepsi. Roger considers 2 cans of Pepsi to be perfect substitutes for 6 cans of Coke. What is the demand of Roger for Coke and Pepsi for the following cases:
- His annual budget for these two commodities is described by the equation $5C + 25P = 300$.
 - His annual budget for these two commodities is described by the equation $10C + 20P = 160$.
 - His annual budget for these two commodities is described by the equation $10C + 30P = 600$.