

Due: Oct. 7<sup>th</sup>, 2004

## Problem Set 2

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Write out your answers clearly in full sentences, explaining briefly the principles involved and showing the methods by which you reach your conclusions. Write each answer on a separate sheet of paper, clearly labeled with your name, the course number, the problem set number, and the problem number.

2-1. You are looking for the “best deal” for your Internet connection from home: the cheapest dial-up service that offers a reliable connection. Unfortunately, you cannot tell the difference between the numerous providers that offer inexpensive dial-up service.

- a) Set-up the price equation for this imperfect information model in general terms. Use Akerlof's "lemons" model as a basis.
- b) Given that you would be willing to pay \$4.95 for an unreliable service and \$14.95 for reliable service (and assuming that all other consumers are like you), what percentage of dial-up service providers would you assume offer reliable service if the market price was \$9.95 / month?
- c) If ISPs would not be willing to offer reliable service unless the market price was at least \$9.95 / mo., explain what would happen if 60% of ISPs offered unreliable service. What should the market price of dial-up be?
- d) Given the data in part b), how would the market for dial-up service be different if consumers could distinguish between reliable and unreliable service?

2-2. List the assumptions that are encompassed by the phrase “well-behaved preferences” and answer the following questions about them.

- a) Explain verbally and using a graph why the assumption that preferences are convex means that “averages are preferred to extremes.”
- b) What does monotonicity mean? Would averages be preferred to extremes if preferences were not monotonic?
- c) Give an example of preferences for a good that are not convex. Explain your choice using words and a graph.

2-3. Consider a household with a utility function  $u(x_1, x_2) = x_1^a x_2^b$ , where  $a$  and  $b$  are positive and less than one.

- a) What is the marginal rate of substitution in terms of  $x_1$  and  $x_2$ , and the coefficients  $a$  and  $b$ ?
- b) How are the price of good 1 in terms of good 2, the marginal rate of substitution, and the slope of the indifference curve related?
- c) If the amounts of good 1 and good 2 in the consumer's bundle increase proportionally, what happens to the marginal rate of substitution?
- d) Would the household's behavior be any different if the utility function was  $u(x_1, x_2) = a \ln x_1 + b \ln x_2$ ? Support your answer by finding the MRS.

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2-4. Consider a household with a quasi-linear utility function,  $u(x_1, x_2) = \ln x_1 + x_2$ .

- a) On separate graphs, sketch the income-offer curve and the Engel curve for good 1. Is good 1 best described as a luxury, a normal, a necessary, or an inferior good?
- b) On separate graphs, sketch the price-offer curve and the demand curve for good 1. Is good 1 a Giffen good?

2-5. Consider a consumer with preferences described by the following Cobb-Douglas utility function:  $u(x_1, x_2) = 0.6 \ln x_1 + 0.4 \ln x_2$ . The consumer starts with 5 units of good

1. The relative price of good 1 in terms of good 2 is  $P = 1$ .

- a) Express the budget constraint as an equation.
- b) Use the Lagrangian to solve for the consumption bundle that maximizes the consumer's utility given the budget constraint. Check your answer by confirming that the marginal rate of substitution equals the slope of the budget constraint at the consumption bundle that maximizes the consumer's utility.
- c) Sketch your answer on graph. Be sure to label the relevant indifference curve and the budget constraint, as well as the endowment and the final consumption bundle.
- d) Find the consumption bundle if  $P = 2$ . Show the effect of the different price on consumer's behavior using a graph, and give a verbal description of how consumer's behavior has changed.
- e) Sketch the price-offer and income-offer curves for this consumer. Is good 1 a normal good?