Econ 73-250A-F
Spring 2001
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Practice Exam #1

As indicated on the course syllabus, this practice exam will be discussed during your recitation section on Friday, February 16. In the first midterm exam of Monday, February 19 you should expect exercises comparable in their difficulty to the ones in this practice exam. Notice also that you won't be allowed to use any books or notes during the exam. The points associated to each question in this practice exam are indicated in brackets. The total number of points is 100.

Exercise #1. Andy consumes two goods: food (measured in dollars) and other things (also measured in dollars). Let x_1 be the amount that Andy spends on food in a given month and let x_2 be the amount that Andy spends on other things in a given month. Andy's preferences over consumption bundles (x_1, x_2) are summarized by the utility function:

$$u(x_1, x_2) = x_1 x_2.$$

Andy's monthly income is $400.

(a) [10 pts.] What is Andy's optimal consumption bundle? *Show your work.* Illustrate your answer with a neat and clear diagram showing Andy's budget line and indifference curves. Label the points at which the budget line intersects the axes and identify the optimal bundle.

(b) [10 pts.] Suppose now that the government implements a subsidy program for food. Specifically, for each dollar that Andy spends on food, the government will give Andy $0.50 in cash, with the restriction that the total amount of cash that Andy receives from the government cannot exceed $100. In a neat and clear diagram, graph Andy's budget line. Label the points at which the budget line intersects the axes and determine the coordinates of the kink point.

Exercise #2. Barb's preferences over consumption bundles (x, y) are summarized by the following utility function:
$$u(x_1, x_2) = 16x - 2x^2 + 4y,$$

where x is the amount of good x that Barb consumes and y is the amount of good y that Barb consumes. Let p_x and p_y be the prices of goods x and y, respectively. Let m be Barb's income. Barb's goal is to maximize her utility subject to her budget constraint.

(a) [10 pts.] Find an algebraic expression for Barb's marginal rate of substitution between goods x and y. *Show your work.* In addition, give a coincise explanation of the meaning of the marginal rate of substitution.

(b) [10 pts.] Suppose that $p_x = p_y = 2$ and $m = 24$. Use your answer from part (a) to determine Barb's optimal consumption bundle. *Show your work.*

(c) [10 pts.] Suppose now that p_x increases to 6, while p_y and m remain the same. What are Barb's optinal choices for x and y in this case? Is Barb better or worse off than she was in part (b)? Explain.

(d) [10 pts.] How much extra income must Barb be given in order to compensate her for the increase in the price of good x in part (c)? Explain.

Exercise #3. Consider the following statements and say whether they are true or false and why. To get credit you should provide a clear justification for your answers.

(a) [4 pts.] If two goods are perfect complements and the price of one of them increases, the quantity demanded of both goods decreases.

(b) [4 pts.] A non-transitive preference relation $\succeq$ can be represented by some utility function.

(c) [4 pts.] Consider two goods x and y. If preferences are strictly convex, the absolute value of the marginal rate of substitution between x and y is decreasing along an indifference curve as x increases.

(d) [4 pts.] The following Cobb-Douglas utility functions represent two different preference relations:

$$u_1 (x,y) = 0.3 \log(x) + 0.6 \log(y)$$
$$u_2 (x,y) = 0.6 \log(x) + 1.2 \log(y).$$

(e) [4 pts.] If a consumer is making an optimal choice between two goods x and y, then, independently of his preferences, the following condition must always hold:

$$-\frac{p_x}{p_y} = MRS (x,y).$$

(f) [4 pts.] If the following condition holds

$$-\frac{p_x}{p_y} = MRS (x,y)$$

then a consumer must be making the optimal choice between x and y, independently of his preferences.

(g) [4 pts.] A cigar is a luxury good for a consumer that has Cobb-Douglas preferences over cigars and food.

(h) [4 pts.] Consider two goods x and y, with prices p_x and p_y, respectively. A 0.07 percent value tax on these two goods does not affect the relative price of x in terms of y.

(i) [4 pts.] The marginal rate of substitution measures the rate at which the market is willing to substitute one good for the other.

(j) [4 pts.] An indifference curve represents the collection of all the bundles that a consumer can buy.