73-250 - Intermediate Microeconomics

Recitation #1 - January 19, 2001

Exercise #1. Consider an individual that derives utility from two "goods". Good 1 is the number of hours of leisure that the individual "consumes" in a given week. Good 2 is a basket of commodities whose value is measured in dollars. The individual earns income by working at the wage of 10$ per hour. (The individual has no other source of income.) The individual spends his income on good 2. Since the number of hours in a week is fixed at $24 \times 7 = 168$, the number of hours that the individual spends working plus the number of hours that the individual spends in leisure must equal 168 in any given week. Let x_1 and x_2 denote, respectively, the amount of good 1 and the amount of good 2 that the individual consumes in a given week. Note that since good 2 is measured in dollars, the dollar price p_2 of a unit of good 2 is 1.

(a) Fill in the following table:

Hours of Work	Hours of Leisure (x_1)	Income	Maximum amount of good 2 (x_2)
0			
40			
168			

Column 1 is the number of hours worked by the individual in a given week. Column 2 is the corresponding number of hours of leisure. Column 3 is the individual's income, and column 4 is the maximum number of units of good 2 that the individual can purchase with his income.

(b) Mark the three (x_1, x_2) bundles from part (a) on a clearly-labelled graph which has the quantity of good 2 on the y-axis and the quantity of good 1 (i.e. hours of leisure) on the x-axis.

(c) Draw a line connecting the three points. This line is the individual's budget line. What is the equation of this line? What is the "price" of an hour of leisure? How does this price compare to the hourly wage? (Hint: Write this equation in the form $p_1 x_1 + p_2 x_2 = m$, where you are to determine the values of p_1 and m. Recall that $p_2 = 1$.)

(d) Shade in the region on the graph which contains the set of consumption-leisure bundles (x_1, x_2) that the individual can "afford".

(e) Suppose now that the individual earns an overtime wage of 15$ per hour for all hours worked in excess of 40 hours. On a clearly-labelled graph, draw the individual's budget line and shade in the set of attainable (x_1, x_2) bundles. (Hint: The budget line is kinked in this case.) Is the individual better off with this budget set or with the budget set in part (d)? Explain.

(f) Suppose again that the wage is $10 per hour (no matter how many hours the individual works). Now, suppose that the government decides to implement an incentive scheme to induce people to work more hours. In particular, if an individual works at least 20 hours per week, then the government will give this individual $100 in cash. In a neatly drawn graph with the number of hours of leisure on the x-axis and the number of dollars of consumption on the y-axis, display

the individual's budget set. Label the x- and y-intercepts as well as all kink points. In addition, determine the slope of the budget line.

Exercise # 2: 2.3 in the Workouts book.

Exercise # 3: 2.4 in the Workouts book.

Exercise # 4. [Notice: in this exercise we will look at a government's, rather than a consumer's, budget constraint. The basic idea is the same. Given the government's budget ("income"), its budget line represents the set of policy bundles whose cost is exactly equal to the budget.]

The government of Bahnanas collects every year 10 million Bahnanas dollars (B$) worth of taxes. The constitution of the state of Bahnanas requires that in each year the government's budget be balanced.

The government has to decide, at the beginning of each year how to allocate tax revenues to two purposes. The government can pay down a certain amount of national debt. Let x_d denote the amount of dollars allocated to the payment of the national debt in a given year. The government can also contribute, to some extent, to its 1,000,000 citizens' medical expenditures. The government has computed that during a year around 50% of its population will make an appointment (and only one) with a doctor. Each visit to a doctor costs B$ 100. The government's health plan will cover a certain fraction x_h of the cost of a visit to a doctor.

(a) Write down the government's budget line in a given year. On a clearly-labelled graph, which has the quantity x_d on the y-axis and the fraction x_h on the x-axis, draw the government's budget line and shade in the set of attainable (x_h, x_d) bundles.

(b) What is the opportunity cost for the government of increasing the coverage of the cost of a visit to a doctor by 1%?

(c) Suppose that the government of Bahnanas has decided to allocate B$ 5 million to the payment of the national debt. Determine the fraction x_h of the cost of a doctor's visit that the government's health insurance plan will be able to cover in that year.