Problem Set #1

Due Wednesday 2/9/11 by 6 p.m. in the Econ 110-1 slot in the Economics Alcove

Use a stapler! Write legibly and use full and grammatically correct sentences in your answers.
Draw graphs neatly and label axes and points clearly. Each part below is weighted equally in
grading, as are subparts within a part.

A. Analyses of changes in markets:

1) Suppose today a snowstorm wipes out the Florida orange crop. Predict how this would
    affect the equilibrium price and quantity in the market for oranges and the market for
    apples. Draw market diagrams to illustrate your answers.

2) Suppose today a medical study is publicized reporting that eating a lot of salt and fat does
    not hurt you, but is actually good for you. Predict how this news will affect the
    equilibrium price and quantity in the market for cheeseburgers and the market for
    broccoli. Draw market diagrams to illustrate your answers.

3) A breakthrough in traintrack technology enables trains to travel twice as fast on the same
    amount of fuel. Predict how this change will affect the equilibrium price and quantity in
    the market for train travel and the market for airplane travel. Draw market diagrams to
    illustrate your answers.

4) Consider the market for marijuana. Assume marijuana is first legalized, and later taxed.
    Describe what you think will happen in this market. Draw market diagrams to illustrate
    your analysis.

B. Use of utility theory to consider how people allocate time between different activities:

    Consider the utility function $U = 2\sqrt{X} + Y$,

        where X = time spent doing your Econ 110 homework,
        and Y = time spent at a party

    Now the budget constraint is measured in time rather than dollars. In this case, assume you
    have 6 waking hours the night before this problem set is due, and you can either spend the
    time working on this problem set or go to a party.

B. 1) a. What is the price of X in this model? What is the price of Y?

    b. Sketch two indifference curves for this function.

    c. Draw a budget constraint tangent to one of the indifference curves.

    d. What is the slope of the budget constraint?

  2) a. In this model, how many hours will you spend doing homework?

    b. How many hours will you spend at the party?

    c. What is your MRS at this point?

    d. You decide to stay awake another hour, so now you have 7 hours to allocate between partying and studying. Now how many hours do you spend at the party?

Now consider instead the utility function $U = 2\ln R + \ln C$,

    Where C = $ spent consuming goods and services
    and R = time spent in leisure

Now the budget constraint shows how the implicit value of your time is allocated between purchasing goods and "purchasing" leisure. Specifically, for each week of your time (168 hours), at your hourly wage rate of $10 (and assume no other source of income except your earnings, i.e. no nonearned income):

  3) a. What is the price of R in this model?

    b. What is the price of C in this model?

    c. Write down an equation for the budget constraint.

    d. Graph the budget constraint.

  4) a. What is the marginal utility of R? What is the marginal utility of C?

    b. What is the MRS? What is the price ratio?

    c. Solve for the optimal point.

    d. Mark the optimal point on your graph from **3)d.**

C. Manipulation of budget constraints:

Ross, a college student, has $40 a week to spend; he spends it on pizza, at $4 a slice, and on graphic novels, at $5 each.

1) a. Draw Ross's budget constraint.

For each of the following changes, draw Ross's new budget constraint.

b. The price of pizza slices rises to $5.

c. Ross gets a raise and now has $60 a week to spend.

d. The price of graphic novels drops to $2.

Now assume that Nick, a recent high school graduate, has no nonearned income and his hourly wage rate is $9.

2) a. Draw Nick's weekly budget constraint.

b. Now assume that the government implements a welfare program where anyone who does not work in a given week receives $180. As soon as a person works for any amount of time in the week, they are ineligible for the program. Now what does Nick's budget constraint look like?

3) a. People complain that this program is overly harsh, so the government modifies the program to a guaranteed minimum program: All people who make less than $180 a week will be given a check to bring them up to the $180 level. Now what does Nick's budget constraint look like?

b. People complain that the new program has no work incentives, so the government changes welfare to operate as a wage subsidy: All people who make $9 or less an hour will be given a subsidy to increase their wage to $10 an hour for each of the first 20 hours worked. Now what does Nick's budget constraint look like?

4) Assuming that you must pick one of the three welfare programs to implement, explain which you would prefer and why.

D. Manipulation of demand functions and related concepts:

Angela has an entertainment budget of $150 per semester and spends it on movie DVD rentals at $3 apiece and movie tickets at $7.50 apiece,

1) Due to the opening of a new 20-screen movie theater in Middletown and the subsequent increased competition among local movie theaters, the price of movie tickets falls, first to $6, then to $5, then to $3. Graph Angela's four budget constraints, with movie tickets on the horizontal axis.

2) If Angela's demand for movie tickets, Q, is represented by the function $Q = 75 - 10P$, where P is the price, graph both the demand curve for movies and indicate the point she will choose on each of the four budget constraints.

Sarah's short-run demand curve for pints of orange juice is $Q = \dfrac{60}{P}$

3) a. What is the slope of Sarah's demand curve?

b. What is the formula for her demand elasticity?

c. What is her demand elasticity if orange juice costs $2 a pint?

d. Suppose Sarah's long-run elasticity of demand is 2. If the price of orange juice rises 25 percent, what effect on her quantity demanded will this have in the long run?

Michael's income I is $90 a month, which he completely spends on 18 gallons of beer and 9 pounds of pretzels. His demand function for beer is $Q = \dfrac{3I}{5P}$, where P = the price of beer.

4) a. What is the price of a gallon of beer? What is the price of a pound of pretzels?

b. What is Michael's income elasticity of demand for beer? Is beer a normal or an inferior good?

c. What is Michael's own price elasticity of demand for beer?

d. What is Michael's cross price elasticity of demand for beer with respect to pretzels? For Michael, is beer a substitute, complement, or unrelated good for pretzels?