Econ 14.01 Fall 2007
PS2:

The due date for this assignment is Friday September 21.

1. True or false (15 points). Explain.

   (a) If the marginal rate of substitution between two goods A and B is not equal to 1, then it is possible for these two goods to be perfect substitute.

   (b) If the price elasticity of demand is 1 along demand curve, then when the quantity of sale is doubled, the seller's revenue is also doubled.

   (c) When the consumer maximizes his utility over two goods, the marginal utilities of each good are always equal.

2. (20 points) Suppose the demand for the IBM personal computer is:

$$Q^d = 2400 - 4p$$

   (a) At what price is the price elasticity of demand equal to zero?

   (b) When the price elasticity of demand equal to 1, what's the quantity being demand at that point?

   (c) Figure out at what price, the price elasticity of demand is infinite, and explain what does infinite price elasticity of demand mean?

   (d) What's the change of revenue generated by sale when the price elasticity of demand falls from infinite to 1.

3. (16 points) Draw a set of indifference curves for the following pairs of goods:

   - Meat and carrots for a vegetarian who neither likes nor dislikes meat.
   - Bread and milk for an individual who always consume them together.
   - Fortune and Business Week for an individual who regard this two magzine are perfect substitute.
   - Ice cream and pie if these are goods that you like, but if you eat too much of either, you get sick of them. If you are sick of a good, eating more of it lowers you utility.

     (Note: need not to be precise, but the key idea is to describe the how indifference curve's slope changes in different situations)
   - (You also can look the following example)

4 (21 points) Bob's utility function over good X and Y is U(X,Y)=10X+5Y. His income is 100 and the price of X is 2 and price of Y is 5.

(a) Calculate the marginal rate of substitution (MRS) between X and Y (6 points).

(b) How much of X and Y will Bob buy? (6 points)

(c) Would Bob's decision change, if Bob's utility function is now

5 (28 points, 7 for each) Ann consumes two goods X and Y, his utility function is $U(X,Y) = 2XY^2$. Suppose the price of X is \$10, while the price of Y is \$15. Ann's income is \$500.

(a) Write the expression for indifference curve when Ann gets utility level 40. And along the indifference curve you found, calculate out the numbers of consumption of X when Y=4.

(b) Write the expression for Ann's budget constraint, graph the budget constraint and determine its slope.

(c) Determine the X, Y combination which maximizes Ann's utility, given her budget constraint. And figure out what's marginal rate of substitution (MRS) between two goods at that maximization point.

Note: You can define $MRS = \frac{\frac{\partial U}{\partial X}}{\frac{\partial U}{\partial Y}}$ either way is fine.

(d) Suppose now the price of X is changed to 15, calulate the impact on Ann's optimum choice. What's the change to her maximized utility?