Problem set 1

due on 2/1/2011

1. Suppose that weekly demand for the spicy chicken entrée at Sahara, Lexington's best restaurant, is given by $Q = 500 - 50P + 5x$, where x is the amount of money the average Lexington resident allocates to Mediterranean food each week. Suppose the restaurant's supply curve is $Q = 50p$.

a. If $x = 40$, find the market-clearing price p^* and quantity q^* for the entrée.

b. If $x = 100$, find the market-clearing price and quantity of spicy chicken.

c. Draw two graphs, one with market-clearing quantity on the y-axis and x on the horizontal axis, and one with market-clearing price on the y-axis and x on the horizontal axis. Sketch the relationships between price, quantity, and x, making sure that the two points you solved for in a. and b. appear on your graph. (hint: you can do this problem either by solving analytically for how P^* and Q^* depend on x and then plotting this relationship, or by simply solving for P^* and Q^* for a few more values of x, plotting these points, and then connecting the dots.)

2. The following table lists the salaries of US presidents.

Date established	Salary
9/24/1789	$25,000
3/3/1873	$50,000
3/4/1909	$75,000
1/19/1949	$100,000
1/20/1969	$200,000
1/20/2001	$400,000

Using the technique I demonstrated in class on 1/13 (google "cpi inflation calculator"), answer the following two questions:

i. In present value terms, out of the last 12 presidents (Truman-Obama), who made the highest salary, and in what year?

ii. Out of the last 12 presidents, who made the lowest salary, and in what year, again in terms of present value?

3. Suppose that the world supply and demand curves for oil are given by:

$$Q^D = 47.5 - .27P$$
$$Q^S = 12 + .16P$$

a. Suppose the market clears. What is the price elasticity of demand at the market clearing price and quantity?

b. What is the price elasticity of supply at the market-clearing price and quantity?

4. Suppose that Mancy and Lana spend their incomes on two types of alcoholic beverages, margaritas (M) and old fashioneds (O). Mancy's preferences are represented by the utility function $u(M, O) = 30MO$, while Lana's preferences are represented by the utility function $u(M, O) = \frac{1}{2}M^2O^2$.

a. With margaritas on the horizontal axis and old fashioneds on the vertical axis, identify on a graph the set of points that give Mancy the same level of utility as the bundle $(M, O) = (5, 8)$. Do the same for Lana on a separate graph.

b. On the same two graphs, identify the set of bundles that give Mancy and Lana the same level of utility as the bundle $(12, 1)$.

c. Do you think Mancy and Lana have the same preferences or different preferences? Explain.

5. Sheryl allocates her annual travel budget of $2,000 between days spent traveling domestically (D) and days spent traveling in a foreign country (F). She chooses the allocation to maximize her utility function $u(D, F) = \frac{1}{2}DF$. In addition, the price of a day spent traveling domestically is $100, the price of a day spent traveling abroad is $250.

a. Illustrate the indifference curve associated with a utility of 25 and the indifference curve associated with a utility of 50.

b. Graph Sheryl's budget line on the same graph.

c. Can Sheryl afford any of the bundles that give her a utility of 25? What about a utility of 50?

d. Graphically illustrate Sheryl's utility-maximizing choice of days spent traveling domestically (D) and traveling abroad (F). If her maximum obtainable utility more than 50? Less than 25? In between?

6. Explain why two indifference curves can never intersect, if the preferences they represent are transitive. (hint: "transitive" means that if bundle A is preferred to bundle B, and B to C, then bundle A must be preferred to bundle C.)

7. Connie has a monthly income of $200 that she allocates among two goods: meat and potatoes.

a. Suppose meat costs $4/pound and potatoes $2/pound. Draw her budget constraint.

b. Suppose also that her utility function is given by the equation $u(M, P) = 2M + P$. What combination of meat and potatoes should she buy to maximize her utility? (hint: meat and potatoes are perfect substitutes.)

c. Connie's supermarket has a special promotion. If she buys 20 pounds of potatoes (at $2/pound), she gets the next 10 pounds for free. The offer applies only to the first 20 pounds she buys. All potatoes in excess of the first 30 pounds (including the 10 free pounds) are still $2/pound. Draw her budget constraint.

d. An outbreak of potato rot raises the price of potatoes to $4/pound. The supermarket ends its promotion. What does her budget constraint look like now? What combination of meat and potatoes maximizes her utility?