EEP 100 - Problem Set 1
Date Due Thursday 09/24/2009

1. Suppose the U.S. government decides to expand New York city's ad campaign
(http://www.nyc.gov/html/doh/html/pr2009/pr057-09.shtml) against drinking soda
across the entire country. Assuming the campaign is effective, examine the effects of the
ad campaign on the market for soft drinks:
a) Using a generic downward sloping demand curve and a generic upward sloping supply
curve, graph the original supply and demand curves as well as the curves after the
change. Label the curves as well as the original and final equilibrium prices and
quantitites.
b) State how supply and demand change. Do the curves shift in or out, or do the
equilibrium points move up or down the curves? State how the equilibrium prices and
quantities change (increase or decrease).
c) Repeat parts a) and b) with the assumption that supply is perfectly elastic. Do the
equilibrium price and quantity change more or less when supply is perfectly elastic?
d) Who are the winners and losers of this policy on the supply side and on the demand
side? Name one group in each category (winners-supply, losers-supply, winners-demand,
losers-demand).

2. Suppose the FDA decides to put stricter standards on the fertilizer that can be used
in the production of organic apples so that the cost of fertilizer rises. Analyze the effects
on the organic apple market:
a) Repeat part a) from question 1.
b) Repeat part b) from question 1.
c) Repeat parts a) and b) with the assumption that supply is more elastic than you had
previously assumed. Do the equilibrium price and quantity change more or less when
supply is more elastic (given the same cost change for fertilizer)?
d) Repeat part d) from question 1.

3. Consider an economy with a representative consumer and two goods, 1 and 2.
Assume that the consumer's preference can be represented by a Cobb-Douglas utility
function: $U(x_1, x_2) = x_1^\alpha x_2^\beta$, where x_1 is the demand for good 1 and x_2 is the demand for
good 2, α, β are both positive real numbers and $\alpha + \beta = 1$. Suppose that the price of
good 1 is p_1, the price of good 2 is p_2, and that the consumer has an income m. Assume
that p_1, p_2, m are all positive. Derive the demand function for each good, and show that
the share of income spent on good 1 is α and the share spent on good 2 is β.

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4. Consider the same problem in question 3. Based on the demand functions you derive in question 3, first show that the demand function of each good has constant (cross) price elasticities over both prices, and determine whether good 1 is a substitute/complement/neither of good 2 by means of the cross price elasticity. Finally, calculate the income elasticity of demand for each good, and determine whether they are normal or inferior goods.

5. Consider a market with two consumers, 1 and 2, and two goods, 1 and 2. Assume that consumer 1's preference can be represented by a utility function: $U_1(x_1, x_2) = x_1^{\frac{1}{4}} x_2^{\frac{3}{4}}$, and consumer 2's preference can be represented by another utility function: $U_2(x_1, x_2) = x_1^{\frac{3}{4}} x_2^{\frac{1}{4}}$, where x_1 is the demand for good 1 and x_2 is the demand for good 2. Suppose that the price of good 1 is p_1, the price of good 2 is p_2, and that both consumers have the same income m. Assume that p_1, p_2, m are all positive.

Based on your results in question 3, first, for each consumer, write down his/her demand function for both goods (you should have two demand functions for each consumer), and then derive the market demand for each good. (Hint: recall the definition of market demand.)

6. Consider an economy with a representative consumer and two goods, 1 and 2. Assume that the consumer's preference can be represented by a Leontief utility function: $U(x_1, x_2) = min(2x_1, 3x_2)$, where x_1 is the demand for good 1 and x_2 is the demand for good 2. Suppose that the price of good 1 is p_1, the price of good 2 is p_2, and that the consumer has an income m. Assume that p_1, p_2, m are all positive. Derive the demand function for each good.

7. Consider an economy with a representative consumer and two goods, 1 and 2. Assume that the consumer's preference can be represented by a linear utility function: $U(x_1, x_2) = ax_1 + bx_2$, where x_1 is the demand for good 1 and x_2 is the demand for good 2, a, b are both positive real numbers. Suppose that the price of good 1 is 2, the price of good 2 is 1, and that the consumer has a positive income m. For each of the following cases, draw both the budget line and the indifference curve associated with the linear utility function in a two-dimensional diagram with x_1 on the horizontal axis and x_2 on the vertical axis, and derive the demand function for each good in the following cases: i) a special case where $a = b = 1$ ii) $a > 2b$ iii) $a < 2b$ iv) $a = 2b$.