Problem set 1
due by 5pm on 9/20/2010

1.   Suppose the demand curve for a product is given by $Q = 300 - 2P + 4I$, where I is average income measured in thousands of dollars. The supply curve is $Q = 3P - 50$.

a. If $I = 25$, find the market-clearing price and quantity for the product.

b. If $I = 50$, find the market-clearing price and quantity for the product.

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

2.   In 1930, Babe Ruth famously opined that he "had a better year" than President Hoover, and this fact justified his earning a salary of $80,000 while the president earned only $75,000.

a. How much did Ruth earn in 2010 dollars? How does this compare to what modern-day athletes of Ruth's stature earn?

b. How much did Hoover earn in 2010 dollars? How does this compare to President Obama's salary?

3.   In 1998 Americans smoked 23.5 billion packs of cigarettes. The average retail price was $2 per pack. Statistical studies have shown that the price elasticity of demand is $-.4$, and the price elasticity of supply is .5.

a. Using this information, derive linear demand and supply curves for the cigarette market.

b. Suppose a new tax reduces demand for cigarettes by 15%. Using your answer from a., what would happen to the equilibrium price and quantity?

c. If $-.4$ is the short-run elasticity of demand for cigarettes, is the long-run elasticity likely to be larger or smaller? Why?

4.   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?

5.   In class, I claimed that the proportion of economists who support the minimum wage at roughly its current level is surprisingly high. One reason for this is that there is evidence that the effect of the current minimum wage on unemployment is quite small.

a. Suppose that it is indeed true that a minimum wage of $7.75/hour does not lead to high unemployment, even though it is clearly a binding price floor. What implications would this fact have for the elasticity of demand and supply? (hint: an inelastic demand/supply curve is very steep, an elastic demand/supply curve is flat. Answer this question by explaining which type of supply/demand curve would lead to only a small reduction in Q given a price ceiling.)

b. Explain why your prediction in a. may/may not be consistent with actual behavior of minimum wage employees/employers.

6.   Suppose that Bridget and Erin spend their incomes on two goods, food (F) and clothing (C). Bridget's preferences are represented by the utility function $u(F, C) = 10FC$, while Erin's preferences are represented by the utility function $u(F, C) = \frac{1}{2}F^2C^2$.

a. With food on the horizontal axis and clothing on the vertical axis, identify on a graph the set of points that give Bridget the same level of utility as the bundle $(10, 5)$. Do the same for Erin on a separate graph.

b. On the same two graphs, identify the set of bundles that give Bridget and Erin the same level of utility as the bundle $(15, 8)$.

c. Do you think Bridget and Erin have the same preferences or different preferences? Explain.

7. Julio receives utility from consuming food (F) and clothing (C) as given by the utility function $u(F, C) = FC$. In addition, the price of food is $2/unit, the price of clothing is $10/unit, and Julio's weekly income is $50.

a. What is Julio's marginal rate of substitution of food for clothing when utility is maximized? Explain.

b. Suppose instead that Julio is consuming a bundle with more food and less clothing than his utility maximizing bundle, though he is still spending his entire weekly income. Would his marginal rate of substitution of food for clothing be greater than or less than your answer in part a? Explain.

8.   Jane receives utility from days spent traveling on vacation domestically (D) and days spent traveling in a foreign country (F), as given by the utility function $u(D, F) = 10DF$. In addition, the price of a day spent traveling domestically is $100, the price of a day spent traveling abroad is $400, and Jane's annual travel budget is $4000.

a. Illustrate the indifference curve associated with a utility of 800 and the indifference curve associated with a utility of 1200.

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

c. Can Jane afford any of the other bundles that give her a utility of 800? What about a utility of 1200?

d. Find Jane's utility-maximizing choice of days spent traveling domestically (D) and traveling abroad (F).

9.   Explain why two indifference curves can never intersect, if the preferences they represent are transitive.