Problem Set 1  
(due in class January 27, 2012)

1. Felicity is studying economics and political science. She can read 30 pages of political science per hour but only 5 pages of economics per hour. This week she has a 50-page assignment in economics and a 150-page assignment in political science. Because of sorority rush, she cannot devote more than 10 hours to studying these subjects this week. She realizes she cannot complete all of her assignments but is determined to complete at least 30 pages of her economics reading. Draw a graph with pages of economics on the horizontal axis and pages of political science on the vertical axis. On this graph, show the possibilities that are consistent with the constraints that Felicity has imposed on herself. (She is allowed to read ahead in either subject.) Label key points on your graph with their numerical values.

2. Blanche Carter has devised a system for rating the males in her economics class. She cares about their intelligence and their looks. She has ranked each male on a scale of 1 to 5 for intelligence and 1 to 3 for looks. She defines a preference relation, $R$, as follows: $xRy$ if boy $x$ scores at least as high as boy $y$ in either looks or intelligence. Give an example to show that Blanche’s method of determining preferences might not lead to transitive preferences.

3. Use separate graphs to sketch two indifference curves for people with each of the following utility functions:
   a. $U(x, y) = x + 2y$.
   b. $U(x, y) = \min\{x, 2y\}$.
   c. $U(x, y) = \max\{x, 2y\}$.

4. Max has a utility function $U(x, y) = 2xy + 1$. The prices of $x$ and $y$ are both $1 and Max has an income of $20.
   a. How much of each good will he demand?
   b. A tax is placed on $x$ so that $x$ now costs Max $2 while his income and the price of $y$ stay the same. How much of good $x$ does he now demand?
   c. Would Max be as well off as he was before the tax if when the tax was imposed, his income rose by an amount equal to $1 times the answer to part (b)?

5. With some services, e.g., checking accounts, phone service, or pay TV, a consumer is offered a choice of two or more payment plans. One can either pay a high entry fee and get a low price per unit of service or pay a low entry fee and a high price per unit of service. Suppose you have an income of $100. There are two plans. Plan A has an entry fee of $20 with a price of $2 per unit. Plan B has an entry fee of $40 with a price of $1 per unit for using the service. Let $x$ be expenditure on other goods and $y$ be consumption of the service.
   a. Write down the budget equation that you would have after you paid the entry fee for each of the two plans.
   b. If your utility function is $xy$, how much $y$ would you choose in each case?
   c. Which plan would you prefer? Explain.

6. Suppose that the inverse demand function for wool is $p = \frac{A}{q}$ for some constant $A$. Suppose that $1/4$ of the world’s wool is produced in Australia.
   a. If Australian wool production increases by 1% and the rest of the world holds its output constant, what will be the effect on the world price of wool?
   b. How does the marginal revenue to Australia from an extra unit of wool relate to the price of wool?