This assignment is due in class on Thursday October 5, 2006—only hand-in solutions to questions 2 and 3. You may work together but should not copy answers verbatim and must hand-in individual assignments. Assignments will not be returned so make a copy of what you turn in.

1. Suppose congress enacts a $0.75 per pack excise tax on cigarettes (an excise tax is a per unit tax). Show the original and new budget constraint for a representative consumer; place AOG (with a price of $1.00) on the vertical axis.
   a. Show the pre- and post-tax equilibrium, and decompose the change in cigarette consumption into income and substitution effects. Explain how the elasticity of demand for cigarettes varies with these two effects. Assume cigarettes are normal.
   b. What is the maximum amount the smoker would have been willing to pay the government not to impose the excise tax (the equivalent variation)?
   c. What amount of income would have to be given to the smoker after the tax to restore his or her utility to the pre-tax level (the compensating variation)? Would the consumer purchase his or her pre-tax amount of cigarettes?
   d. Show the amount of taxes the government collects from the consumer.
   e. Show that the government could levy a lump sum tax on the consumer without changing the price of cigarettes, collect the same amount of revenue, and leave the consumer better off. (What happens to the optimal level of cigarette consumption?)
   f. Explain this result to a non-economist friend, colleague or loved one. [Have them email me that they understand that a lump-sum transfer always makes the consumer better off, but may not get the socially desirable level of consumption.]

2. Recall your favorite utility function \( U(H,B) = H^{2/3}B^{1/3} \) from previous problem sets.
   a. If the price of \( H \) and \( B \) are (respectively) $10 and $2, what is the minimum expenditure necessary to attain a utility level of 27? [Hint: You already derived the expenditure function for these preferences last week—use that.] Compare your answer to the income constraint in Q4 on Problem Set 2.
   b. What are the Hicksian (or compensated) demand quantities at these prices and level of utility. How do these compare to your solution in the first part of Q4(c) of Problem Set 2? Explain.
   c. Say the price of \( H \) declines to $2. What is the new Hicksian consumption bundle? [Use the Hicksian or compensated demand functions you derived in Q2 on Problem Set 4.] Use your answer, along with your answer from Q4(c) on Problem Set 2 to show the income and substitution effects of this price change on an indifference curve diagram.
   d. What amount of money is needed to fully compensate the consumer for the price change (i.e to return him/her to the original utility level at the new prices)? What is the name of this concept?
   e. What is the equivalent variation for this price change?
   f. For these preferences, verify the Slutsky equation.

3. Maya consumes two goods, \( X \) and \( Z \) with prices \( p_i \) (i=X, Z) respectively. In addition she receives unearned income of \( A \) and has an endowment of \( Z \).
   a. Write down Maya’s utility maximization problem and present and interpret the FOC.
   b. Write down the general form of the solution to this problem—the reduced form ordinary demand functions for \( Z \) and \( X \).
   c. Using your knowledge about the theory of endowment goods, write down the Slutsky equation for \( Z \), and explain each of its components. [Hint: You should be able to identify the term \( (\bar{Z} - Z) \) somewhere in this equation.
      i. Compare Maya’s demand curve for \( Z \) in the case when she is a net seller of \( Z \) and when she is a net buyer of \( Z \). When does she appear to be more responsive to a price change in \( Z \)? Explain the intuition behind your answer.