PROBLEM SET ONE   **DUE 12 FEBRUARY**

*You will legibly write both your full name and section
on your completed assignment.*

**From Chapter 2 (These questions should also follow from the material
presented in lecture on 10 February)**

1.   True, False, Uncertain (Explain your answers)
      a.   If a country imports goods but does not export any, then
            its GDP has to be at least as big as imports.
      b.   In the old days when women stayed home to take care of
            children true output was much smaller than these days when
            women go to work and then pay someone else for child care.
      c.   The unemployment rate always falls when the economy is
            growing.
      d.   Reducing the rate of inflation has only good consequences.

2.   Consider the following data on output and prices for a fictional
      economy.

	Output		Price	
Product	**1998**	**1999**	**1998**	**1999**
Coke	10	20	1	1
Pepsi	10	10	1	2

      a.   Calculate nominal GDP in each year.
      b.   Calculate the percent increase in Real GDP and the GDP
            deflator using 1998 prices.
      c.   Calculate the percent increase in Real GDP and the GDP
            deflator using 1999 prices.

**From Chapter 15 (Please read pp. 302-311 for some context as this
material departs from that presented in lecture on 8 February)**

2.   Consider the following labor market. W is the nominal wage, P^e is
      expected price level, u is the unemployment rate, z is
      unemployment benefits, P is price level, and $(1+\mu)$ is the markup
      of price over marginal cost.

      $W = P^e*F(u,z)$ Wage-setting where $F(u,z) = 1-\alpha*u+z$
      $P = (1+\mu)*W$ Price-setting where $(1+\mu) = 1/(1+\beta u)$

a.   Graph wage and price setting curves in (W,u) space. Locate the
      equilibrium wage and unemployment rate on the graph. Solve for
      the equilibrium wage and unemployment rate as a function of other
      variables and parameters. Describe in words why there is any
      unemployment at all in this labor market.
b.   Define the natural rate of unemployment as equilibrium
      unemployment when $P^e = P$. What is the natural rate of
      unemployment for this labor market? What happens if unemployment
      benefits increase? Describe in words why this happens.
c.   Assume $P^e_t = P_{t-1}$ for the remaining parts of this question.
      Consider the consequences of a one-time increase in the price
      level this period on nominal wages and the unemployment rate over
      the next two periods. Answer using both graphs and your

equations for the nominal wage and unemployment rate above. Describe in words what is driving the dynamics.

d. Insert the wage-setting relation into the price-setting relation (eliminating the nominal wage) to derive a relationship between the price level and the rate of unemployment. Index both price and unemployment by t. Divide both sides of this equation by P_{t-1}, and note the gross rate of inflation $(1+\Pi_t) = P_t/P_{t-1}$. You should now have an equation relating current inflation with past inflation and the current unemployment rate. Use the approximation $\ln(1+x) = x$ for small x to simplify this expression by taking natural logs on both sides of the equation.

e. Using the new equation, solve for the rate of unemployment when the change in inflation is zero. This should look familiar, explain why this is true. Simplify the equation so that it is only a function of the unemployment rate, the natural rate of unemployment, and parameters α and β. Refer to this equation as the modified Phillips curve.

f. Assume the current rate of inflation is around 30 percent (like that in Mexico) and the central bank wants to reduce inflation by 10 percent in one year. Using the modified Phillips curve, describe what is going to happen unemployment rate in the next year?

g. Looking back at the initial wage-setting equation, interpret the parameter α. How does an increase in α affect the both the natural rate of unemployment and the modified Phillips curve? What effect does the increase in α have on the amount of unemployment necessary to reduce inflation (as in Mexico)? Describe in words what is really driving this result.