Economics 102
Spring 2012
Homework #4
Due 3/21/12

Directions: The homework will be collected in a box **before** the lecture. Please place your name, TA name and section number on top of the homework (legibly). Make sure you write your name as it appears on your ID so that you can receive the correct grade. Please remember the section number for the section **you are registered,** because you will need that number when you submit exams and homework. Late homework will not be accepted so make plans ahead of time. **Please show your work.** Good luck!

1) The production function for an economy is $Y = xK^{1/2}L^{1/2}$, where Y is real GDP, K refers to units of capital, L refers to units of labor, x is a constant.
In time period 0, x = 1.
In time period 1, x changes and stays the same for time periods 2, 3, and 4.
K is fixed at 25 units for all time periods.
Answer the following questions based on the above information and the table below.

Time Period	Labor	Real GDP	Growth in real GDP (round to two places past the decimal)	Labor Productivity
0	4		-	
1	9		200%	
2	25			
3	49			
4	64			

a) Find x.
b) Fill in the missing values in the table.
c) How can you describe the change in x in words?
d) If instead there is a constant growth rate that is equal to the growth rate in period 4, how many time periods would it take for real GDP to double itself?

2) 1,000,000 people live in the small mythical island of Narnia.
Of the population that is 16 years old or older, 40% have retired and are not looking for work anymore. Furthermore, the number of people in Narnia below 16 years of age is always two and a half times the number of retired people.

a) Write an expression for the number of retired people as a function of the population that is 16 years old or older. Use y as the symbol for the population of people 16 years old or older.

b) Write an expression for the number of people below 16 years of age. Once you have this expression, determine whether the number of people below 16 years of age is equal to any other subset of the population of Narnia? If so, identify this subset as well as the number of members in both sub-groups. Also, identify the number of retirees in Narnia.

c) Given your calculations in (a) and (b), what is the number of people 16 years old or older that are not retired?

You are now provided with some more information about the employment situation in Narnia. Currently Narnia is not at full employment and you know the following:

- Currently the number of people who are classified as discouraged workers is exactly equal to the number of people who are classified as cyclically unemployed people. (There are two separate groups here: the discouraged workers and the cyclically unemployed.)

- If Narnia was operating at the natural rate of unemployment, 80% of the unemployed would be frictionally unemployed.

- The recent unemployment survey has shown that the current structural unemployment rate is 10% of the overall current unemployment rate.

- The current number of employed people in Narnia is 150,000.

d) Before you get started on all sorts of calculations, take a moment and write a definitional equation for natural unemployment and current unemployment.

e) Given your work in (a), (b), (c) and (d) and the above information, what is the number of discouraged workers in Narnia?

f) Give a definition of the labor force and then calculate the value of the labor force in Narnia based upon your work in the previous parts of this question and the information you have been provided with.

g) What is the natural rate of unemployment in Narnia?

h) How many people in Narnia are structurally unemployed?

i) What is the labor force participation rate in Narnia?

j) In a strange Hollywood twist, Narnia forges an alliance with the Sith Lord Darth Sidious and goes to war with the Rebels. As a result, the labor force participation rate falls to 20% in the next demographic survey of Narnia, even though there has been no change in the employment or the population in Narnia. How is this drop in the labor force participation rate possible? Provide a verbal explanation of how this change could have occurred. (Hint: think about how Narnia will need people to be in the army in order to wage war against the Rebels.)

3) You are given the following data about prices (P) and quantities (Q) that are produced in an economy in three different years. This economy produces three different goods: good A, good B, and good C. You are asked to use the data to compute the CPI using 2010 as the base year. The market basket for computing the CPI is composed of 10 units of good A, 10 units of good B, and 10 units of good C.

Years	P(A)	Q(A)	P(B)	Q(B)	P(C)	Q(C)
2010	$10	10	$10	10	$10	10
2011	$15	5	$10	20	$20	10
2012	$12	8	$5	15	$10	10

a) Compute the value of the market basket for each of the three years. Enter your calculations in the table below.

Year	Cost of Market Basket
2010	
2011	
2012	

b) Compute the value of the CPI for each of the three years using 2010 as the base year. Enter your calculations in the table below.

Year	CPI
2010	
2011	
2012	

c) Using your answers from (b) compute the rate of inflation from 2010 to 2011and the rate of inflation from 2011 to 2012. Enter your results in the table below.

Time Period	Rate of Inflation
2010	-------------------
2011	
2012	

d) Now, change the base year to 2012 and recomputed the CPI for these three years using this new base year. Find the CPI in the three years with 2012 as the base year and enter your answers in the table below.

Year	CPI
2010	
2011	
2012	

e) Now, calculate the rate of inflation using the CPI with base year 2012. Enter your results in the table below.

Time Period	Rate of Inflation
2010	-------------------
2011	
2012	

f) Compare the rates of inflation you calculated using the CPI with base year 2010 and the CPI with base year 2012.

4) Suppose you are given the following Savings and Investment Curves for an economy where S is the amount of savings, I is the amount of investment, and i is the interest rate. The Savings Curve represents the supply of funds that are available in the loanable funds market while the Investment Curve represents the demand for funds from the loanable funds market.

$$S = 1000 + 800i$$
$$I = 5000 - 200i$$

a) Given the above information, calculate the equilibrium interest rate and the equilibrium quantity of loanable funds. In this setting, the equilibrium quantity of loanable funds will be that quantity where the supply of loanable funds (i.e, savings) is equal to the demand for loanable funds (i.e., investment).

b) Suppose the Supply Curve shifts leftwards by 1000 units. What does this signify? Find the new supply of loanable funds curve given this information. What is the new equilibrium level of savings in the economy?

c) Suppose you are in the original situation (part a). Due to the recession, the Government has to spend more money on unemployment benefits. At the same time the Government's tax revenues are diminished because people are not earning as much as they did prior to the recession. As a result, the Government runs a fiscal deficit (it has to spend more than what it is earning). To finance this deficit, it borrows from the loanable funds market just like the investors do. As a result, there is a shift in the Investment Curve to I + Deficit = 6000 – 200i where the deficit is equal to the amount the government must finance by borrowing in the loanable funds market.
   i.   What is the new equilibrium interest rate in the loanable funds market given this information?
   ii. How much has the government borrowed in the loanable funds market?
   iii. What is the level of investment spending in the economy when the government finances its deficit by borrowing?
   iv. How much is private investment spending crowded out by the financing of the government deficit?