Recitation 3: 61 points

Name_____, Email_____, Section_____

1. **National Income:**

a. (1 point) Write out what each letter stands for and solve for "M (imports)."

Category	$ in millions
C	8,591
I	4,201
G	2,618
X	2,342
M	?
GDP	**13,582**

2. **Calculate GDP**:

a. (1 point) Fill in the following table using 2013 as the base year:

YEAR	$ LALALOOPSY DOLLS	# LALALOOPSY DOLLS	$ RED RYDER BB GUNS	# RED RYDER BB GUNS	NOMINAL GDP	REAL GDP
2013	$15	10000	$53	12000		
2014	$17	12000	$58	13000		
2015	$21	11000	$62	13100		

b. (1 point) Calculate the percent change in Nominal and Real GDP from 2014 to 2015.

3. **Cost of Living:**

a. (1 point) Fill in the question marks.

Monthly Basket Cost					
Quantity	**Item**	**2014 Prices**	**Cost (in 2014)**	**2015 Prices**	**Cost (in 2015)**
1	Rent, 4BR	$2,000.00	?	$2,100	?
60	Double Bacon Cheese Burgers	$5.50	?	$6.25	?
30	6 pack - Hopadillo	$6.50	?	$8.00	?
		Total Expenditure	**?**		**?**

b. (1 point) Calculate the CPI in 2014 and 2015 using 2014 as the base year.
c. (1 point) Calculate the inflation rate from 2014 to 2015.
d. (1 point) Who has more purchasing power, you or grandpa?

Year	**CPI**	**Nominal Starting Salary**
1976	56.9	Grandfather - $25,000
2012	230	You - $100,000

e. (1 point) You receive $1,000 dollars today and put it in a savings account that earns 20% nominal interest. If a pizza costs $10 today and the inflation rate is 5%, then what is your purchasing power in terms of pizza one year from now? What is the real interest rate?
f. (1 point) What is indexing and what is the problem with indexing to the CPI. Explain using nominal and real.

EXTRA SHEET

4. **Labor:**

a. (1 point) If there are 144,170,000 employed persons in the U.S. and the unemployment rate is 7.3%, then what is the number of unemployed persons and the number of persons in the labor force?
b. (1 point) If the Working Age Population is 246,081,002 , then what is the Participation Rate.
c. (6 points – 1 each) Name that type of worker
    i. They are not in the Labor Force because they haven't searched for a job in the last 4 weeks, but they want to work and have looked in the past 12 months.
    ii. They are not in the Labor Force because they haven't searched for a job in the last 4 weeks because they don't think there is anything out there for them, but they want to work and have looked in the past 12 months.
    iii. They want to work full time, but they can only find part time work.
    iv. They have not worked in the last 4 months and are now vacationing around Europe, but did look for work in the first two months.
    v. You were fired 4 days ago and are interviewing for a new job.
    vi. You were fired 8 days ago and are interviewing for a new job.
d. (4 points – 1 each) If the unemployment rate for workers who can't find work due to a skills mismatch is 3%, the unemployment rate for workers who are unemployed due the everyday process of workers and firms searching for each other is 4% and the actual unemployment rate is 10%, then what is the:
    i. structural unemployment rate
    ii. frictional unemployment rate
    iii. natural rate of unemployment
    iv. cyclical unemployment rate?

5. **Solow Growth Model:**

Consider an economy with the following production function:

$$Y = AK^{\alpha}L^{1-\alpha}, \text{ where } 0 < \alpha < 1$$

where Y is GDP, A is total factor productivity, K is physical capital and L is labor.

Assume for simplicity that the labor force is equal to the size of the population. Transforming the production function into per capita terms relating GDP per capita to the capital-labor ratio:

$$y = Ak^{\alpha}$$

where lower case *y* represents GDP per capita and lower case *k* represents the capital-labor ratio.

The capital-labor ratio changes with investment as follows:

$$\Delta k = sAk^{\alpha} - (n + \delta)k$$

where the net change in the capital-labor ratio, Δk, is equal to investment per capita minus effective depreciation, which includes the population growth rate, *n*, and the depreciation rate, δ. Investment per capita is the share, *s* (savings rate), of GDP per capita that is saved. The share, *(1-s)*, of GDP per capita is consumed.

a. (1 point) Show me step by step how to get from levels in the first equation to per capita in the second equation.
b. (1 point) Draw the basic Solow growth model. Include in per capita terms, GDP, investment, consumption and effective depreciation. Label everything, including where the steady states are for the capital-labor ratio and all of the other the other per capita items mentioned. How does GDP per capita change as the capital-labor ratio increases?
c. (1 point) Solve for the capital to labor ratio steady state without numbers.
d. (1 point) Draw a new Solow growth model and show what happens to steady state with a technology boom. What happens to growth in the short run and long run and what is the effect on consumption?
e. (1 point) Using "c." for the capital to labor ratio steady state, solve for consumption per capita without numbers.
f. (1 point) Draw a new Solow growth models and show what happens if the government institutes a policy that encourages savings. What happens to growth in the short run and long run and what is the effect on consumption?
g. (1 point) Using s =0.1, A =1, n =0.03, δ =0.08 and α =1/3, solve for the capital to labor ratio steady state and the consumption per capita steady state.

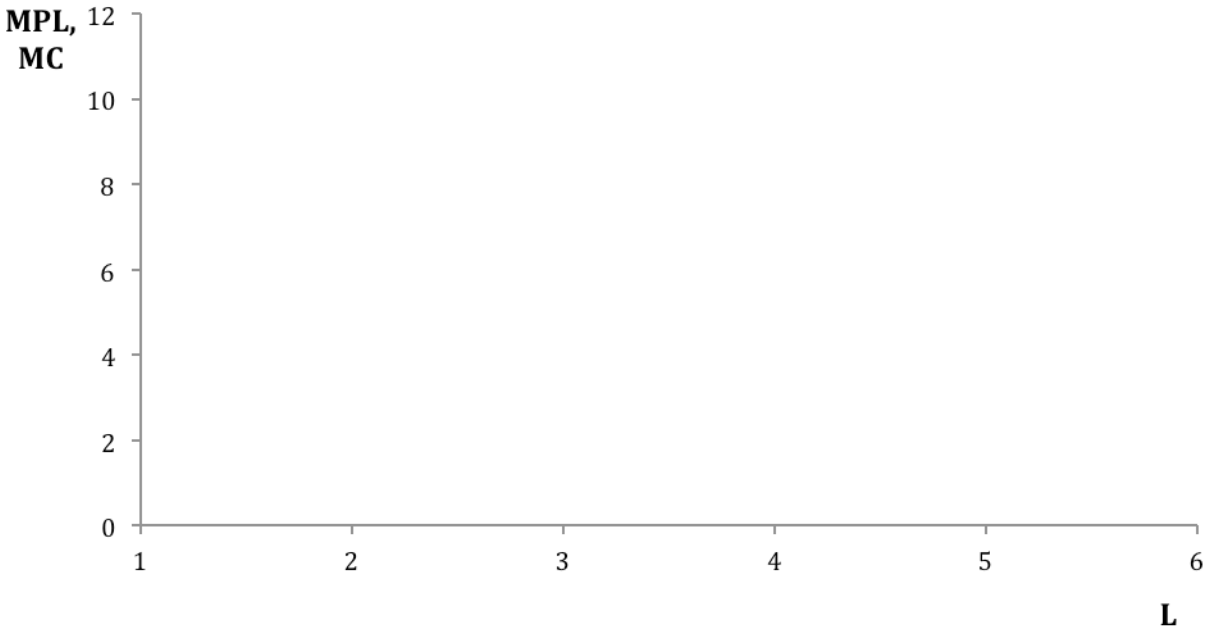
EXTRA SHEET

6. **How many workers to hire:**

a. (1 point – for optimal number of workers) Fill in the chart and circle the optimum number of workers.

Mr. Krabs Krabbie Patties: Patties=$10 ; Wages=$80 per day							
#Workers	# Patties	# MPL	$ Total Revenue	$ MRPL	$ Cost	$ MC	# MC
1	11						
2	20						
3	27						
4	32						
5	35						
6	36						

b. (1 point) Draw in the marginal cost and marginal product of labor and show me the profit maximizing point.



7. Labor Supply and Demand:

a. (1 point) Draw the aggregate supply and demand graph for the labor market. Then show what happens if a zombie outbreak kills a large swath of the working age population.
b. (1 point) Draw the aggregate supply and demand graph for the labor market. Then show what happens with if every worker were able to get a coveted Rice University education.
c. (1 point) Draw the aggregate supply and demand graph for the labor market. Then show what happens if aliens descend on the work force and simultaneously: 1) steal a large percentage of the people in order to make perform in their sick alien games 2) perform lobotomies on the rest of the work force so they have Hors d'oeuvre while they watch these sick games – this leaves the workers only able to perform menial tasks on the job.

8. **Search and Matching Model:**

Take a fixed labor force normalize it to make *U* the unemployment rate.

$$E = 1 - U$$

In the long run equilibrium, the flow of workers from unemployment to employment must equal the flow of workers from employment to unemployment.

$$s(1 - U) = UpH(w^*)$$

Where *s(1-U)* is the flow of workers to unemployment. *H(w*)* is the fraction of unemployed workers receiving a job offer with a wage greater than the reservation wage (w*). *UpH(w*)* is the flow of workers from unemployment to employment, where *p* is the frequency of job offers or the fraction of workers receiving an offer.

a. (1 point) With the value of being employed, dependent on the wage, and the value of being unemployed on the vertical axis and wages on the horizontal axis, show me the reservation wage.
b. (1 point) Show me what happens to the reservation wage in part "a." with an increase in unemployment benefits
c. (1 point) Solve for equilibrium unemployment and then show it to me in a graph with the flow of workers to unemployment and the fraction of unemployed workers receiving a job offer with a wage greater than the reservation wage on the vertical axis and unemployment on the horizontal axis.
d. (1 point) Now show me what happens to equilibrium unemployment in part "c." with an increase in unemployment benefits.

EXTRA SHEET

9. **Savings and Consumption:**

a. (1 point) Use the two budget constraints and combine them into a lifetime budget constraint. Separate one side into the Net Present Value of lifetime Resources and the Net Present Value of lifetime Consumption.

$$\text{1st period}: \; a + y_1 = c_1 + b$$
$$\text{2nd period}: \; y_2 + (1+r)b = c_2$$

where:

a = initial wealth

y_1 = period one income.

y_2 = period two income.

b = wealth (stock of assets) carried between periods.

r = real interest rate.

$(y_1 - c_1)$ = savings or the flow of assets.

b. (1 point) Draw a graph of the two period consumer model lifetime budget constraint with C2 on the vertical axis and C1 on the horizontal axis. Show me where consumption is inefficient, not feasible, and where consumption is most likely to take place. Name the theory that tells us why will choose to consume in this area.

c. (1 point) Draw a graph of the two period consumer model lifetime budget constraint with C2 on the vertical axis and C1 on the horizontal axis. What is the slope of the line? Show me the substitution effect of an increase in the interest rate. What does the interest rate represent?

d. (1 point) Fill in the following chart with up arrows, down arrows or questions marks when the answer is ambiguous for the net or overall effect for a decrease in the real interest rate.

Net Borrower: c_1_____ c_2_____ s_____

Net Saver: c_1_____ c_2_____ s_____

10. **Savings and Investment – Closed Economy:**

a. (1 point – for optimal number number of ovens) Fill in the following chart and show me how much capital we purchase.

Jimmy's Pizza Palace: Pizza=$15 ; Pk=15000; r=.05; δ=.08						
#Ovens	# Pizzas	# MPK	$ Total Revenue	$ MRPK	$ UCC	# MC
0	0	-	-	-	-	-
1	2000					
2	3200					
3	3800					
4	4200					
5	4400					
6	4500					

b. (1 point) Draw the savings and investment graph for a closed economy. Be sure to label each axis and the curves and show the equilibrium interest rates and equilibrium levels of Savings and Investment. Why is investment downward sloping and why is savings upward sloping?
c. (1 point) In a savings and investment graph, show me the effect of a decrease in current income.
d. (1 point) In a savings an investment graph show me the crowding out effect. What is being crowded out?
e. (1 point) Draw a graph with the MPK and the UCC on the vertical axis and K on the horizontal axis. Now show me what happens in that graph with an increase environmental regulation and show me what it does to our graph for Savings and Investment in a closed economy.

EXTRA SHEET

11. **Savings and Investment – Open Economy:**

a. (1 point) Suppose that China continues to run a large trade surplus with the United States. Consider China and the United States, as the only two countries in the world and both are large open economies. Construct three diagrams showing savings, investment, net capital outflows and net exports in China, the US, and the World market. Be sure to label everything and explain how the three graphs are related.
b. (1 point) Show what happens with an expected future decrease in income in the United States.

12. **Money:**

a. (1 point) In a money supply and demand graph, show me what happens if the reserve requirement ratio is increased. Be sure to show me what happens to interest rates and tell me if this is expansionary or contractionary monetary policy.

b. (1 point) Let's say the Fed buys $85B in bonds. The public will hold $5B of this as currency and there will be no excess reserves. Fill in the following chart and calculate the money supply.

With a 20% Required Reserve to Deposit Ratio

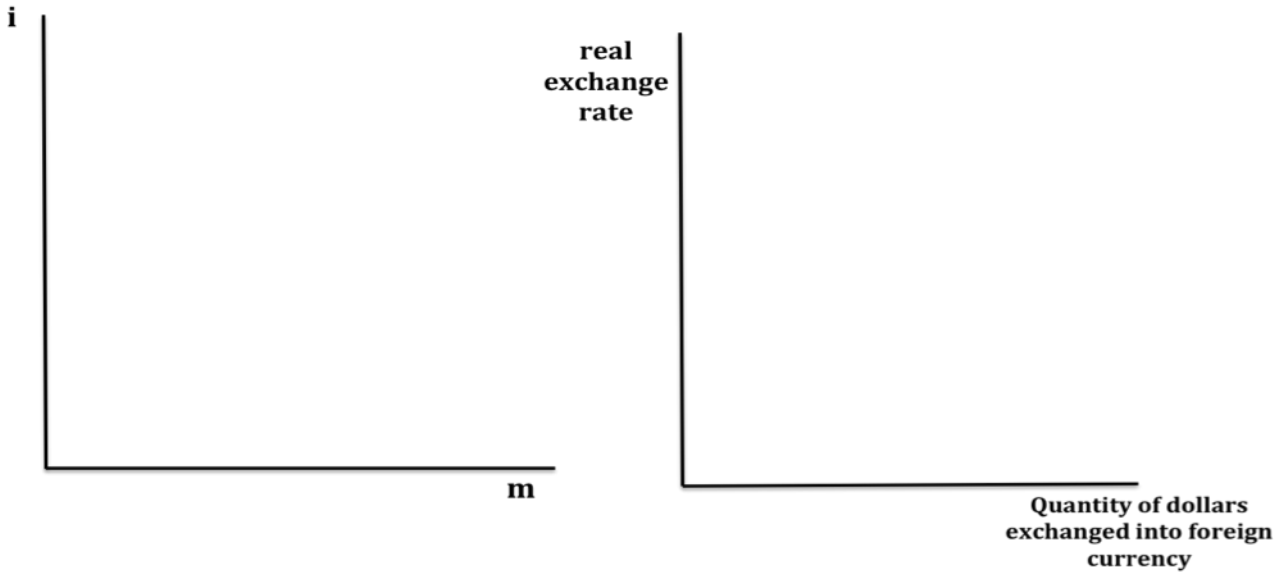
Assets		Liabilities	
Reserves =		Deposits =	
Loans =			

Money Supply =

c. (1 point) Let's say a bond that is going for $1,000 in a year from now and the interest rate is 5%. Would it be smart for someone to pay $970 for it?

13. Exchange Rates:

a. (1 point) Show in a money supply and demand graph and a real exchange rate supply and demand graph with real exchange rates on the vertical axis and the quantity of money exchanged into the foreign market on the horizontal axis, what happens when the Fed makes an Open Market Sale of Bonds.

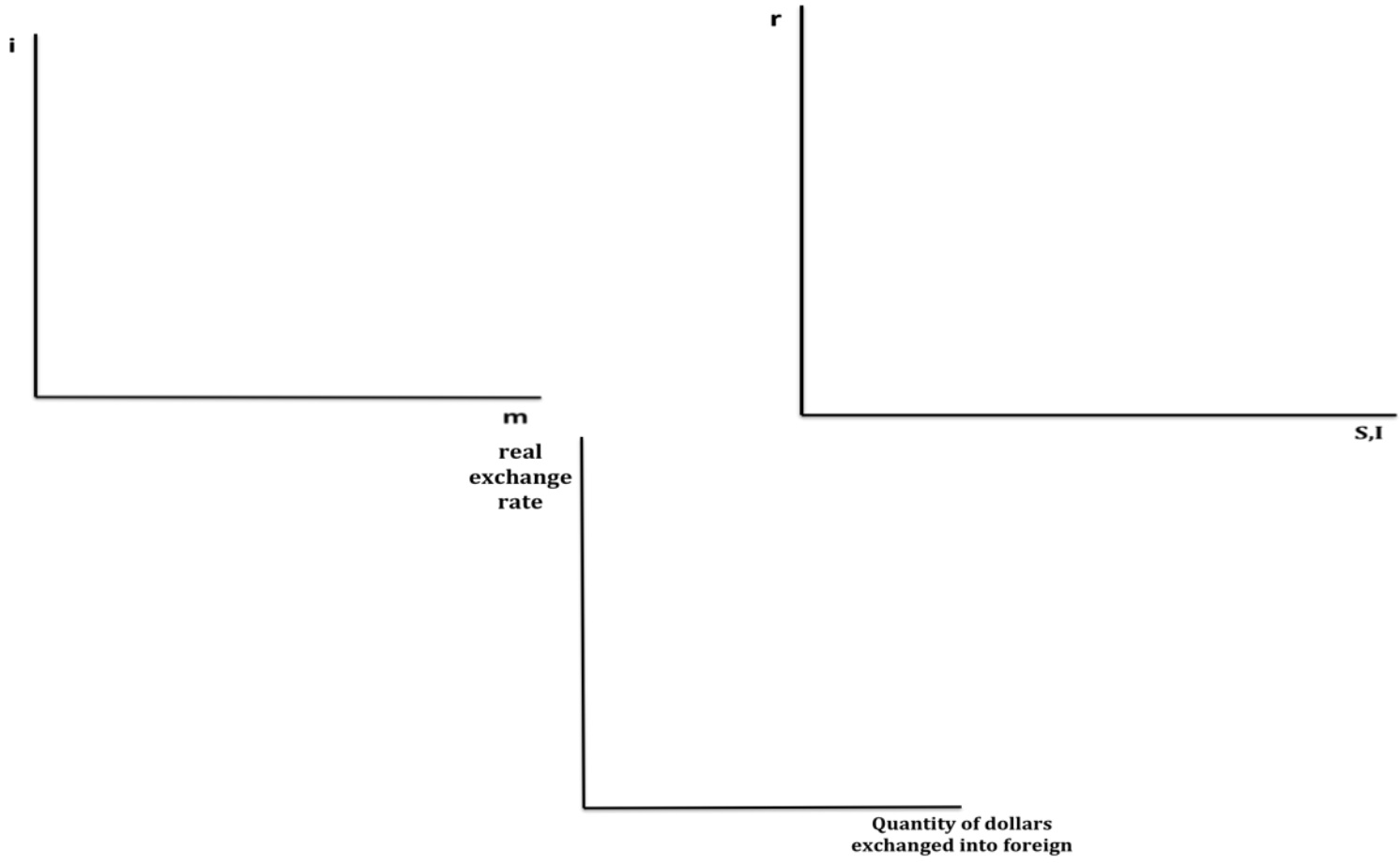


b. (1 point) If the PPP theory holds, what must the nominal exchange rate be in pesos per dollar between the U.S. and Mexico if a Big Mac in the U.S. costs $3.57 and a Big Mac in Mexico costs 46.62 pesos.

14. **Aggregate Supply and Demand:**

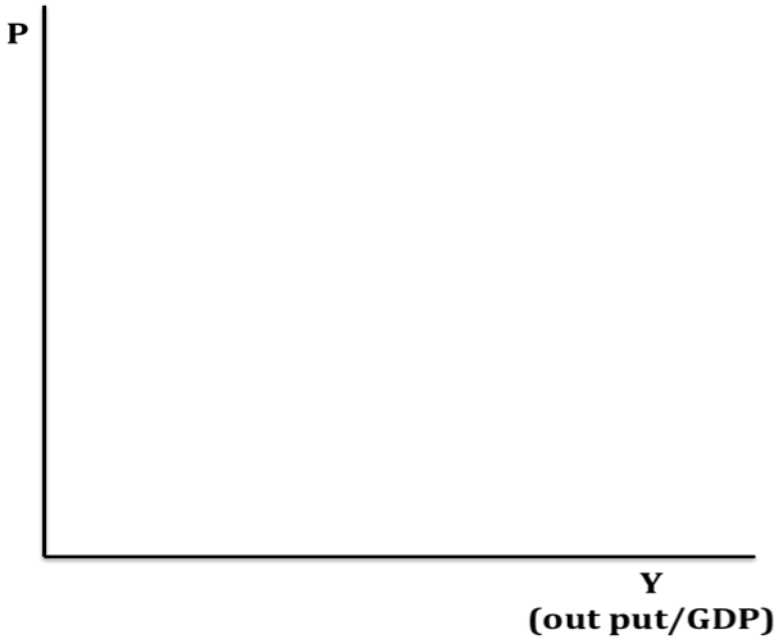
a. (1 point) Draw the aggregate Supply and Demand graph. Include the aggregate demand curve, the short run aggregate supply curve and the long run aggregate supply curve. Give me the equation for each and label the vertical and horizontal axis.

b. (1 point) In the following three supply and demand graphs show me the exchange rate effect for a decrease in prices. Be sure to show what happens to equilibriums. What happens to Net Exports?



15. **Recovery From Recession:**

a. (1 point) In and aggregate supply and demand graph starting at point E, show me what happens to the AD curve if go into a demand side recession. Label the second point F. Now show me what happens after this occurs. Label the third point G.

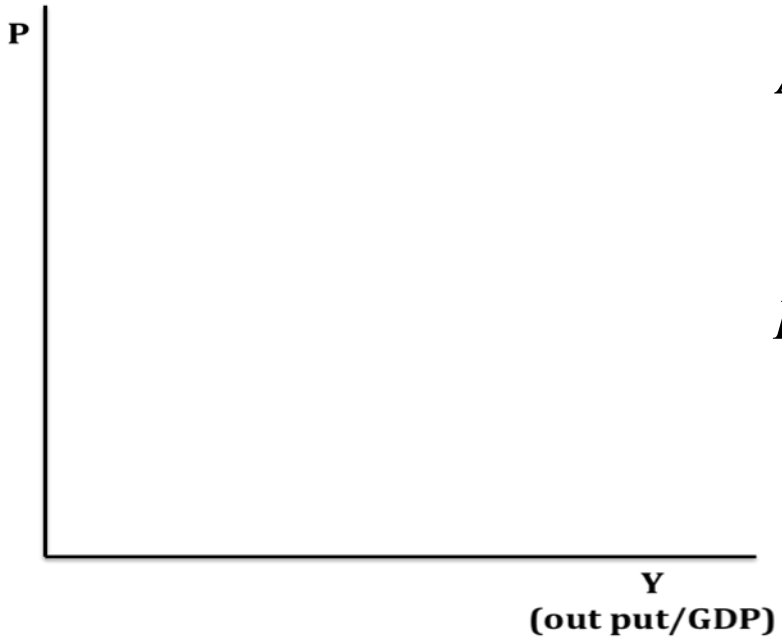


b. (1 point) Using arrows (up for an increase and down for a decrease) show me which variables change from E to F and from F to G.

E to F	F to G
$1.\ Y = Y^* + a(P - P^E)$	$1.\ Y = Y^* + a(P - P^E)$
$2.\ W^R = \frac{W^N}{P}$	$2.\ W^R = \frac{W^N}{P}$

16. Policy:

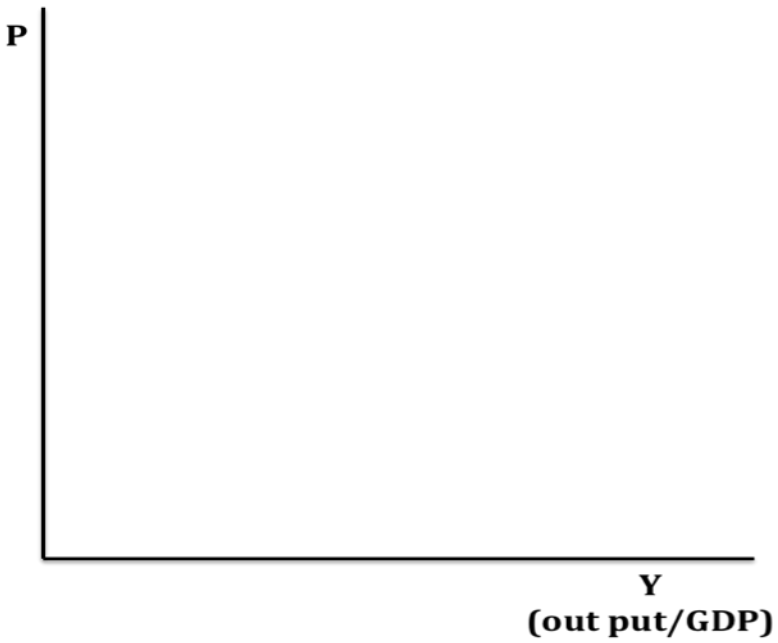
a. (1 point) Using the following three graphs show me in three steps, starting at A and going through to D, what happens in the short and long run with an increase in government spending. Using arrows (up for an increase and down for a decrease) show me which variables change in these equations from A to B, B to C and C to D.



$$AD = Y = C + I + G + NX$$

$$LRAS = Af(K, L, H, R)$$

b. (1 point) Using the following graph, show me in three steps, A through C, what happens in the short and long run with and corporate tax cut?



c. (1 point) In February 2008, the legislature and President agreed on a stimulus package worth about $168 billion in one-time (temporary) tax cuts. Suppose that the MPC was 0.75. What would be the total effect of the tax cut? What if the MPC was only 0.05?

d. (1 point) In the Spring of 2009, the President approved the American Recovery and Reinvestment ACT, which provided and increase of about 500 billion in government expenditures. Between March 2008 and June 2009, Aggregate demand fell by $500 billion in real terms, about 4% of GDP. If all the $500 billion is spent and the MPC is 0.05, will the policy be effective in restoring long run equilibrium if there is no crowding out?