Economics 102	Name _____ ANNOTATED KEY
Fall 2015	TA Name _____
November 16, 2015	Discussion Section # _____
Second Midterm	Student ID # _____

(handwritten, top right: ANNOTATED KEY FOR 8:50 CLASS)

Version 1

DO NOT BEGIN WORKING UNTIL THE INSTRUCTOR TELLS YOU TO DO SO
READ THESE INSTRUCTIONS FIRST.

You have 50 minutes to complete the exam, **including filling in your scantron**. The exam consists of **10 binary choice questions worth 2 points each** and **19 multiple choice questions worth 4 points each**. Please accurately and completely provide your **name, ID number, discussion section number, version number, and TA name** on the scantron sheet and the exam booklet. Writing all this information correctly is **worth 4 points**. Answer all questions on the scantron sheet with a #2 pencil. There are 17 printed pages in this exam, including this cover sheet. **DO NOT PULL THE EXAM APART OR REMOVE THE STAPLE**.

WARNING: NO COMMUNICATION OR CALCULATING DEVICES, OR FORMULA SHEETS ARE ALLOWED. NO CONSULTATION AND CONVERSATION WITH OTHERS ARE ALLOWED WHILE YOU ARE TAKING EXAM OR IN THE EXAM ROOM. ACADEMIC MISCONDUCT IS A SERIOUS OFFENSE AND PUNISHABLE TO THE FULLEST EXTENT. PICK THE BEST ANSWER FOR EACH QUESTION.

How to fill in the scantron sheet and other information:
1. Print your last name, first name, and middle initial in the spaces marked "Last Name," "First Name," and "MI." Fill in the corresponding bubbles below.
2. Print your student ID number in the space marked "Identification Number." Fill in the bubbles.
3. Write **the number of the discussion section you've been attending** under "Special Codes" spaces ABC, and fill in the bubbles. You can find the discussion numbers below on this page.
4. Write the **version number** of your exam booklet **under "Special Codes" space D**, and fill in the bubble. The version number is on the top of this page.

• If there is an error on the exam or you do not understand something, make a note on your exam booklet and the issue will be addressed AFTER the examination is complete. No questions regarding the exam can be addressed while the exam is being administered.

• When you are finished, please get up quietly and bring your scantron sheet and this exam booklet to the place indicated by the instructors.

Saiah Lee	Omer (Omar) Baysal	Carlos Yevenes
335 Fri 9:55 AM Van Hise 487	**337** Fri 9:55 AM Van Hise 475	**330** Thurs 3:30 PM Van Hise 387
340 Fri 11:00 PM Van Hise 495	**341** Fri 12:05 PM Ingraham 223	**331** Thurs 2:25 PM Ingraham 224
	342 Fri 11:00 AM Van Hise 491	**332** Fri 2:25 PM Van Hise 367
		333 Fri 1:20 PM Van Hise 386

I, _____, agree to neither give nor receive any help on this exam from others. I understand that the use of a calculator or communication device on this exam is academic misconduct. I also understand that providing answers to questions on this exam to other students is academic misconduct, as is taking or receiving answers to questions on this exam from other students. Thus, I will cover my answers and not expose my answers to other students. It is important to me to be a person of integrity and that means ALL ANSWERS on this exam are my answers. Any violation of these guidelines will result in a penalty of <u>at least</u> receiving a zero on this exam.

Signed _____

Binary Choice (worth 2 points each)

Definitional plus Basic Understanding of Concepts

1) True or False? The nominal GDP growth rate from 2013 to 2014 in the US was 3.88%. From this statement we can conclude that the real output (quantity of goods) produced in 2014 was larger than in 2013.

nom GDP

a. True
b. False *(circled)*

2013
2014

↑ by 3.88%

real

we don't know what happened
⇒ nom GDP may ↑ because ↑
i) ↑ in P_i's
ii) ↑ in Q_i's
iii) ↑ in both P_i's and Q_i's

Covered in class

2) Why does the U.S. Bureau of Labor (BLS) use <u>a high</u> standard for considering an individual as unemployed?

a. The BLS uses this standard since it is the most efficient and correct way to measure unemployment in the U.S. *↳ no basis to conclude This*
b. A more lenient standard would result in higher levels of reported unemployment ✓ that might not be an accurate reflection of actual labor market conditions. ✓ *(b circled)*

Definitional

3) True or False? The natural rate of unemployment is defined as the sum of the frictional and structural unemployment rates. Alternatively, the natural rate of unemployment is equal to the value of the actual unemployment rate minus the cyclical unemployment rate.

Actual unempl = Natural rate + Cyclical rate

a. True *(circled)*
b. False

4) Suppose that lenders want a real return of 3 percent per year and the lenders expect the inflation rate to be 2 percent over this year. If the actual inflation rate turns out to be 3 percent, then lenders will find that their real return on this loan will be approximately equal to:

a. 2 percent
b. 3 percent

real return = 3%
expected inflation = 2%
based on this they set nom interest rate = 5%

actual inflation = 3%
actual real rate = nom - actual inflation rate
actual real rate = 5 - 3 = 2%

5) Suppose Bill borrows $2000 from Jane for one year. At the end of the year, Bill pays Jane $2500. Given this information, which of the following statements is true?

a. If the actual rate of inflation turns out to be more than the expected rate of inflation, then Bill will be worse off. *X Bill will be better off since he will be paying back Jane w/ dollars that represent less purchasing power*

b. If Jane thinks inflation will be 10% for this time period, then she expects to receive a real return of approximately 15% on this loan.

500/2000 = 1/4 = 25% → nominal rate

expected real interest rate = nominal interest rate - expected inflation

expected real = 25% - 10% = 15%

6) Consider the aggregate production function for a small economy depicted in the following graph:

slope represents initial labor productivity

slope represents new labor productivity
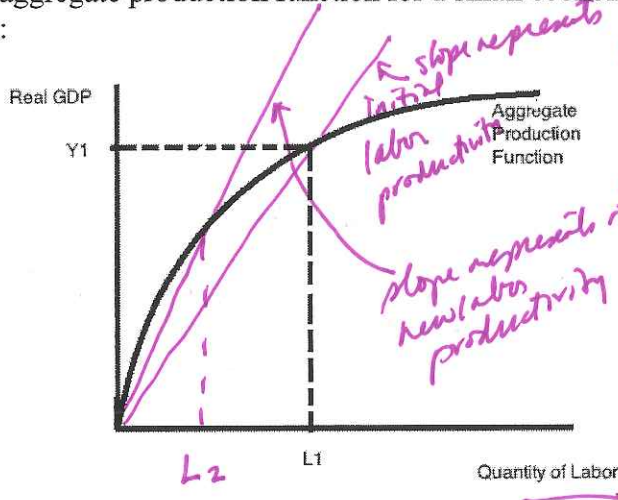
Suppose that from the initial situation shown in the graph, this economy hires a smaller number of workers. Given this information and holding everything else constant, the level of labor productivity will:

a. decrease.
b. increase.

Easy.

7) Recall the examples given in lecture about price levels in Germany right after World War I. The story about the guy who went to the bar and bought two beers at a time instead of one beer is a clear example of:

    a. deflation
    (b.) hyperinflation

A little thought here.

8) Suppose that in an economy human capital increases. Holding everything else constant including population, real GDP must increase and real GDP per capita must increase. This statement:

    (a.) Is true.
    b. Might be true, depending upon what happens to labor productivity.
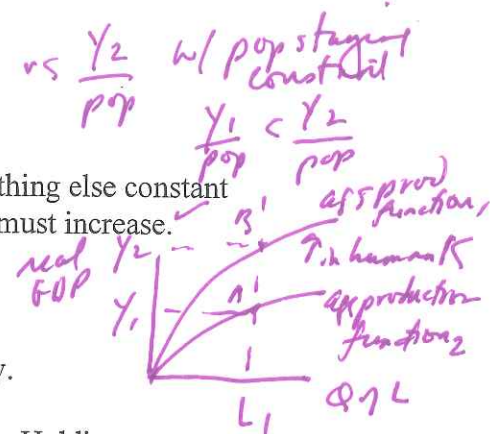
Straightforward Loanable Funds Analysis

9) Consider the market for loanable funds that is initially in equilibrium. Holding everything else constant, an increase in the government's deficit will:
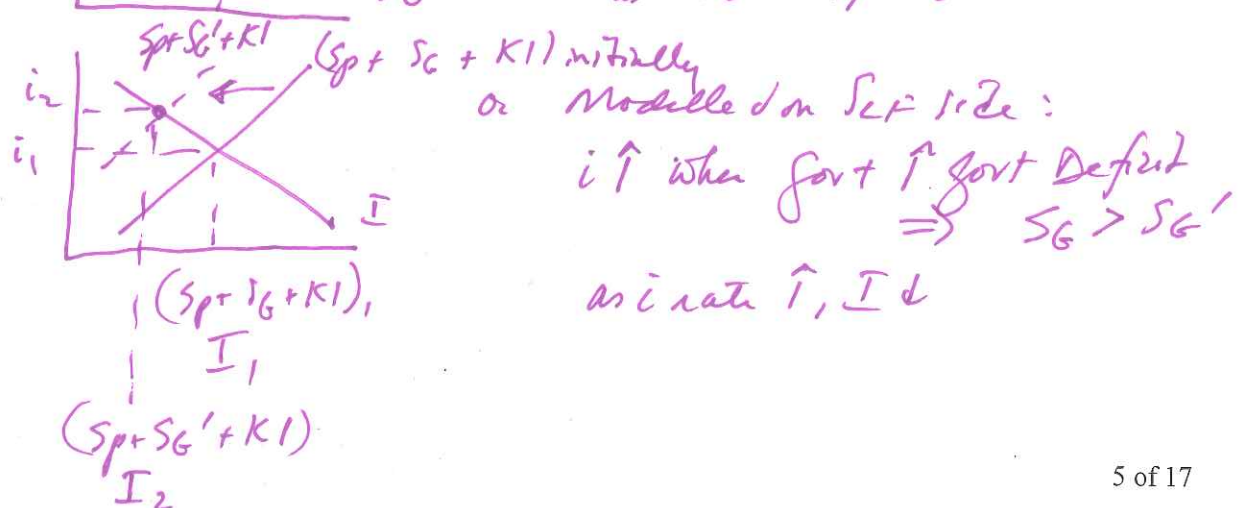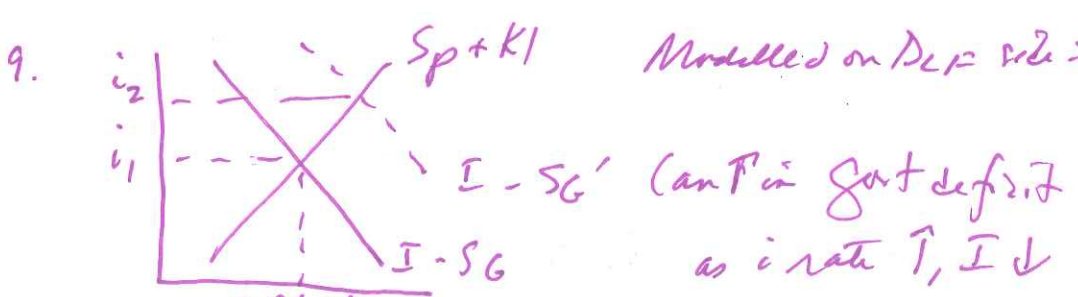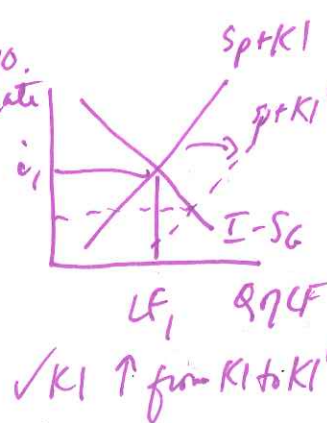
    (a.) Increase the equilibrium rate of interest and reduce the level of private investment. ✓
    b. Increase the equilibrium rate of interest and have no effect on the level of private investment. ✗

Simple S&D Analysis in LF framework

10) Consider the market for loanable funds. You note that relative to the initial equilibrium, this market now has a lower equilibrium interest rate and a higher equilibrium level of private investment. A possible explanation for this outcome is:

    (a.) There has been an increase in net capital inflows from the rest of the world. ✓
    b. That investors expect an improvement in economic conditions. ✗ —

(handwritten) This would shift D_{LF} to right causing i rate ↑ and NOT ↓

(handwritten notes for Q8):
$\frac{Y_1}{POP}$ vs $\frac{Y_2}{POP}$ w/ pop staying constant

$\frac{Y_1}{POP} < \frac{Y_2}{POP}$

$Y_1 \, \& \, Y_2$

aggregate production function, ↑ in human K → aggregate production function₂

real GDP — Y_2, Y_1 — L_1 — $Q \cap L$

(handwritten notes for Q9 and Q10):

9. graph: i_2, i_1 axis; curves $Sp + KI$ and $I - S_G$

Modelled on D_{LF} side:
$I - S_G'$ (an ↑ in govt deficit as i rate ↑, I ↓
$(Sp + S_G + KI)$ initially

or Modelled on S_{LF} side:
i ↑ when govt ↑ govt Deficit ⟹ $S_G > S_G'$ as i rate ↑, I ↓

graph: i_2, i_1; $Sp + S_G' + KI$; I; $(Sp + S_G + KI)_1$, I_1; $(Sp + S_G' + KI)$ I_2

10. graph: $Sp + KI$; i_1; $Sp + KI'$; $I - S_G$; LF_1, Q of LF
✓ KI ↑ from KI to KI'

Multiple Choice (worth 4 points each)

Easy

11) Which of the following statements is **NOT** true? *Looking for FALSE statement*

    a. The prices used to calculate nominal GDP are current year prices. *True - Definition*
    b. The prices used to calculate real GDP for year n are the prices from the base year. *True - Definition*
    c. The values of real GDP and nominal GDP for a particular year are always different. *False, in BY they are the same*
    d. The GDP deflator for year n can be computed if real GDP for year n and nominal GDP for year n are known. *True - Definition*

Use the following information to answer the next two (2) questions.

Suppose that the real GDP per capita this year is $55,000 in the U.S. and $15,000 in China, and that the growth rate of real GDP is 2% in the U.S. and 7% in China. For each country assume that the annual growth rate of real GDP is constant and does not change over time.

Easy

12) Using the rule of 70 as an approximation, how long would it take for China to double its real GDP per capita?

Time to Double = $\frac{70}{\text{Annual Growth Rate}}$

    a. 5 years
    b. 10 years
    c. 15 years
    d. 20 years

Time to Double in China = $\frac{70}{7}$ = 10 years

A little more complicated - a bit of logic to do after the computation

13) Using the rule of 70 as an approximation, what would be the approximate difference in real GDP per capita between China and the U.S. in 40 years?

    a. China's real GDP per capita would approximately equal U.S. real GDP per capita. ✗
    b. China's real GDP per capita would exceed the U.S. real GDP per capita by less than $130,000. ✓
    c. China's real GDP per capita would exceed the U.S. real GDP per capita by more than $130,000. ✗
    d. The U.S. real GDP per capita would exceed China's real GDP per capita by less than $130,000. ✗ *No China would exceed the US*

[Handwritten timeline and calculations:]

0   10 years   20 years   30 years   40 years

China 15,000   30,000   60,000   120,000   240,000

US 55,000

$\frac{70}{2\%}$ = 35 years to double

35 years 110,000

110,000 + (at 35 years - US is at 110,000 as at 40 years US is at 110,000 +)

Use the following information to answer the next two (2) questions.

Suppose that the Republic of Economists (ROE) is a country with a population of 30,000 people. Of those 30,000 people, 20,000 of them are age 16 or older. You also know that in this economy there are 9,000 employed people and 1,000 unemployed people. Among the 1,000 unemployed workers, 250 of these workers are involved in job searches focused on locating jobs that are a good fit for their specific skills and talents. An additional 200 of these unemployed workers are searching for jobs in the market where there are few vacancies, at the prevailing wage rate, due to the type of job that is being sought. Assume that there are no seasonally unemployed workers in this economy.

Ready: not hard

14) What is the labor force participation rate in the ROE? For this calculation assume that all adults are part of the population to be considered (i.e., there is no military, no institutionalized people, and no other scenario where the adult population is not considered when calculating this labor force participation rate).

    (a.) 50%
    b. 55%
    c. 60%
    d. 70%

Application of Definitions; Reading =) not HARD)

15) Given the above information, which of the following statements is true?

    a. 250 people are structurally unemployed in this country. X No, 200.
    (b.) The frictional unemployment rate is 2.5%. ✓
    c. The natural unemployment rate is less than 4%. X 2 + 2.5% = 4.5%
    d. The cyclical unemployment rate is 5.8%. X $\frac{550}{10,000}(100\%) = 5.5\%$

30,000 people
−14,000 < 16
——————
20,000 ≥ 16
9000 ⇒ E
——————
11000
1000 ⇒ U
——————
14,000

250 : frictionally unemployed
200 : structurally unemployed
550 : cyclically unemployed

$$LF \; part. \; rate = \frac{U+E}{Civ \; pop \geq 16} = \frac{10,000}{20,000} = 50\%$$

$$Frictional \; Unemployment \; Rate = \left[\frac{\# \; of \; Frictionally \; Unemployed}{U+E}\right](100\%)$$

$$= \frac{250}{10,000}(100\%) = 2.5\%$$

Use the following information to answer the next two (2) questions.

Suppose that the Republic of Economists (ROE) produces two goods: books and potatoes. The following table provides information about the prices and outputs for these goods for the years 2013, 2014 and 2015. Assume that the base year is 2013 and that the GDP deflator is measured on a 100-point scale.

	Price per book	Quantity of books	Price per potato	Quantity of potatoes
2013	$5	10	$5	5
2014	$10	10	$5	10
2015	$10	20	$5	10

Lot of calculation & application of formulas — not hard if you know the formulas

16) Which of the following statements is true?

a. Nominal GDP in 2013 is higher than real GDP in 2013. *No in BY they are equal*
b. Real GDP in 2014 is $100, so we know that there was not any inflation between 2013 and 2014. *False — GDP Deflator ↑ between 2013 & 2014*
c. There was a recession in 2014. *No — real GDP ↑ from 2013 to 2014*
d. Both nominal GDP and real GDP in 2015 are higher than they were in 2014. *True* (circled)

A reward for doing the work for #16 — Easy if you could do #16

17) Given the above information, which table depicts the GDP deflators for each year accurately?

Table A:

Year	GDP deflator with BY 2013
2013	80 ✗ *BY # must be scale*
2014	100
2015	120

Table C: ✓ (circled)

Year	GDP deflator with BY 2013
2013	100
2014	150
2015	167

Table B:

Year	GDP deflator with BY 2013
2013	100
2014	127 ✗
2015	150 ✗

Table D:

Year	GDP deflator with BY 2013
2013	120 ✗ *BY # must be scale*
2014	167
2015	192

a. Table A
b. Table B
c. Table C (circled)
d. Table D

Notice: You should be able to IMMEDIATELY Eliminate Table A & Table D!

$$nom \, GDP = \sum_{i=1}^{\hat{}} P_i^{CY} Q_i^{CY} \qquad real \, GDP = \sum_{\substack{BY \, 2013 \\ i=1}}^{\hat{}} P_i^{BY} Q_i^{CY}$$

Year	Nom GDP	Real GDP BY 2013
2013	$5(10) + (5)(5) = 75$	$nom \, GDP = real \, GDP \, in \, BY = 75$
2014	$10(10) + 5(10) = 150$	$5(10) + 5(10) = 100$
2015	$10(20) + (5)(10) = 250$	$5(20) + 5(10) = 150$

Year	GDP Deflator $= \dfrac{nom \, GDP_{CY}}{real \, GDP_{CY}}$ (scale)
2013	$\left(\dfrac{75}{75}\right)100 = 100$
2014	$\left(\dfrac{150}{100}\right)(100) = 150$
2015	$\left(\dfrac{250}{150}\right)(100) = \dfrac{5}{3}(100) = \dfrac{500}{3} = 166\frac{2}{3}$

since GDP def $\hat{\uparrow}$
over all 3 years $\Rightarrow$
there is inflation

Use the following information to answer the next <u>three (3)</u> questions.

In the small island country of Montecristo, people consume only services. Thus, their representative consumer basket for one year consists of 5 haircuts, 20 bus rides, 4 visits to the dentist, 10 visits to the movies, and 1 consultation with a lawyer. The prices of these services for the years 2013, 2014, and 2015 per usage (visit) in US dollars are as follows:

Service/Year	2013	2014	2015
Haircut	$8 per haircut	$20 per haircut	$20 per haircut
Bus Ride	$2 per bus ride	$3 per bus ride	$5 per bus ride
Dentist	$20 per dentist visit	$20 per dentist visit	$25 per dentist visit
Movies	$4 per movie	$8 per movie	$10 per movie
Lawyer	$50 per consultation with a lawyer	$80 per consultation with a lawyer	$100 per consultation with a lawyer

Some work, basic CPI calculation → you could predict this would be here!

18) Given the above information, what is the value of the CPI in 2015 when the base year is 2013 and what is the value of the CPI in 2015 when the base year is 2014? Assume that the CPI is measured on a 100-point scale and is rounded to the nearest whole number.

 a. The CPI in 2015 with base year 2013 is 100; ✗
 the CPI in 2015 with base year 2014 is 95.
 b. The CPI in 2015 with base year 2013 is 150; ✗
 the CPI in 2015 with base year 2014 is 110.
 c. The CPI in 2015 with base year 2013 is 200; ✓
 the CPI in 2015 with base year 2014 is 125. ←
 d. The CPI in 2015 with base year 2013 is 250; ✗
 the CPI in 2015 with base year 2014 is 140.

$CPI_{2015\ w/\ BY\ 2013} = 200$

I don't even need to compute $CPI_{2015\ w/\ BY\ 2014}$! But, $CPI_{2015\ w/\ BY\ 2014}$ is 125.

Based on #18 → But simple to change calculation

19) Given the above information, what is the inflation rate from 2014 to 2015?

 a. 0%
 b. 25%
 c. 50%
 d. 75%

Tougher — several calculations plus some logic

20) Suppose Edmond lives in Montecristo and Mercedes is Edmond's wife. Their combined annual nominal income in 2014 is $8,000. What should Mercedes' annual nominal income in 2015 be so that the two together don't experience a drop in their real income, if Edmond's nominal income in 2015 is $6,250?

 a. $3,000
 b. $3,250
 c. $3,500
 d. $3,750

Year	nom income	CPI BY 2013	real income
2014	8,000	160	5000
2015	$\pi = 10,000$	200	Want real income to be 5000

$real income_{2015} = \left[\dfrac{nom\ income_{2015}}{CPI}\right](scale)$

$5000 = \left(\dfrac{x}{200}\right)(100)$

$10,000 = x$

$real\ income = \left[\dfrac{nom.income\ c.y}{CPI\ c.y}\right](scale)$

$real\ income_{2014} = \dfrac{8,000}{\frac{160}{2}}(100) = 5000$

Finally nom income$_{2015}$ = Edmond's + Mercedes' nom income$_{2015}$ + nom income$_{2015}$

$10,000 = 6250 + Y$
$Y = 3750 = $ Mercedes' nom income

(18)

Market basket

5 haircuts
20 bus rides
4 visits to dentist
10 visits to movies
1 visit to lawyer

	2013	2014
	80	100
	80	140
	90	160
	250	400

Year	Cost of Market Basket
2013	$(5)(8) + 20(2) + (4)(20) + (10)(4) + (1)(50) = \boxed{250}$
	$40 + 40 + 80 + 40 + 50 = \boxed{250}$
2014	$(5)(20) + 20(3) + (4)(20) + (10)(8) + (1)(80) = \boxed{400}$
	$100 + 60 + 80 + 80 + 80 = \boxed{400}$
2015	$(5)(20) + 20(5) + (4)(25) + (10)(10) + (1)(100) = \boxed{500}$
	$100 + 100 + 100 + 100 + 100 = \boxed{500}$

Year	CPI BY 2013	CPI BY 2014
2013	$\frac{250}{250}(100) = 100$	
2014	$\frac{400}{250}(100) = 160$	$\frac{400}{400}(100) = 100$
2015	$\frac{500}{250}(100) = 200$	$\frac{500}{400}(100) = 125$

(19.)

Inflation Rate 2014 to 2015 $= \left[\dfrac{CPI_{2015} - CPI_{2014}}{CPI_{2014}}\right](100\%)$

$= \left[\dfrac{200 - 160}{160}\right](100\%)$

$= \left[\dfrac{40}{160}\right]100\% = 25\%$

11 of 17

Use the following information to answer the next two (2) questions.

(handwritten margin note: This is a lot to read - look at question first! Then scan for info needed!!)

Suppose that there are only 10 people living on a small island. The following people live there.

- Adam, age 34, teaches preschool. He has a wife, Beth, and two sons, David and Eric.
- Beth is Adam's wife, and she does not have a job because she is very busy taking care of two wild boys.
- David is 4 years old, and he thinks he is so cute.
- Eric is 2 years old, and he does not like his brother.
- Frank, age 28, is Adam's brother. He was looking for a job in 2013, but he failed to find one, so he gave up looking for work years ago. Now (11/16/2015) he lives with his kind brother. *(handwritten: Not U ⇒ not looking for work)*
- George, age 41, left his current job 2 weeks ago to move to a new job. He began working at the new job yesterday.
- Harry, age 18, is a swimming instructor. It is the only skill he has. Now it is winter and he is unemployed, because there is no indoor swimming pool on this island. He is sure to get a job as a swimming instructor next summer.
- Jenny is 23 years old. When she was 21 years old, she won the lottery, so she has enough money for her entire life. She does not have a job and will never look for one.
- Kyle, age 50, was fired from his job last month because his company bought new equipment that could do Kyle's job in less time. He is looking for a job, available for work, and submitting job applications every week.
- Lois, age 46, is a steelworker. She was laid-off from her job 3 months ago, because the economy on the island is sluggish and orders for new cars are below their usual level. She is looking for a job, applied for a job at the local hardware store last week, and is available to work.

(handwritten margin note: Can save some time here - but next question requires you to look at data)

21) Given the above information, which of the following statements is TRUE?

a. David and Eric will be included in the government's calculations when the government measures the unemployment rate. *(handwritten: <16 <16 No, too young to be included)*

b. Frank is cyclically unemployed, and George is frictionally unemployed. *(handwritten: False)*

c. Harry is seasonally unemployed, and Jenny is a discouraged worker. *(handwritten: X Jenny is Not a discouraged worker ⇒ False)*

d. Adam is in the labor force, and Beth is not in the labor force. *(handwritten: TRUE — circled)*

22) Given the above information, what is the unemployment rate today (11/16/2015) on this small island?

(handwritten margin note: Pretty Easy calculation + application of formula)

a. 100%
b. 80%
c. 75%
d. 60% *(circled)*

(handwritten work:)
$$U = Harry + Kyle + Lois$$
$$E = Adam + George$$

$$U\ rate = \left[\frac{U}{U+E}\right]100\%$$

$$= \left[\frac{3}{3+2}\right](100\%)$$

$$= \frac{3}{5}(100\%) = 60\%$$

Qualitative analysis of LF mkt => not hard

23) Assume that as a result of increased political instability, loanable funds are moved out of the country of Macroland. Which of the following statements describe the outcome in Macroland given this information?

   a. There is a rightward shift in the demand for loanable funds curve in Macroland and this shift results in a lower equilibrium interest rate in this market. ✗ *No*
   b. There is a a leftward shift in the demand for loanable funds curve in Macroland and this shift results in a higher equilibrium interest rate in this market. ✗
   c. (circled) There is a leftward shift in the supply of loanable funds curve in Macroland and this shift results in a higher equilibrium interest rate in this market.
   d. There is a rightward shift in the supply of loanable funds curve in Macroland and this shift results in a lower equilibrium interest rate in this market.

Some thinking here – a return to indeterminacy but in a new setting

24) Assume that The University of Wisconsin-Madison releases an annual index of business confidence for the United States, which indicates that business confidence in the United States has dropped over the past year. At the same time, consumers in China decide to increase their domestic consumption of goods and services. When you consider the loanable funds market from the perspective of the United States, which of the following statements is true given the above information and holding everything else constant?

   a. The real interest rate in the United States must increase. ✗
   b. The interest rate in the United States must decrease. ✗
   c. (circled) The interest rate in the United States might increase. *A possible outcome*
   d. The level of investment spending in the United States must increase. ✗ *I ↓ due to ↓ in business confidence*

23.

Sp+KI
Sp+KI
I - SG
i₂
i₁
LF₁
LF₂
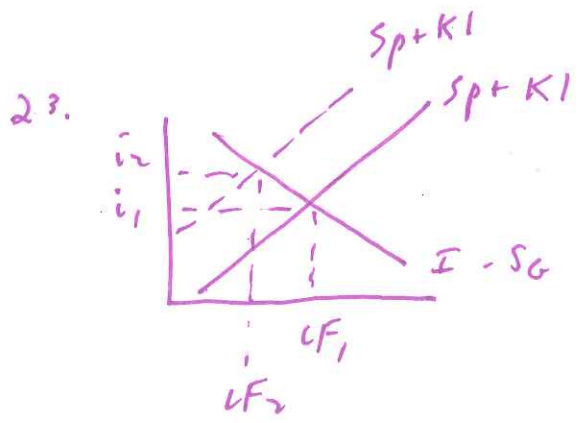
initial situation : LF₁, i₁
new situation : LF₂, i₂

24

Sp+KI
i₁
I - SG
LF₁
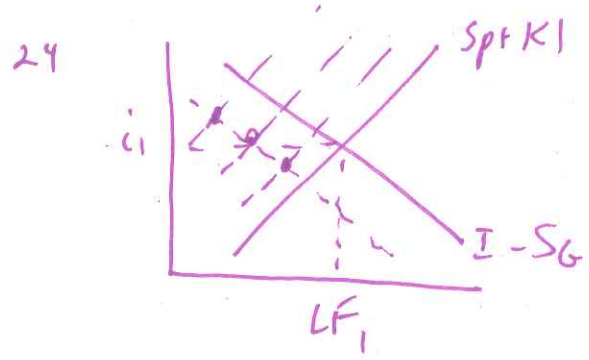
i rate is INDETERMINATE

I - SG shifts left due to ↓ in business confidence
Sp+KI shifts to left as China runs smaller trade surplus => Chinese consumers spending more & saving less
=> 2 curves shifting => expect indeterminacy
=> LF ↓ from LF₁ to LF₂; i rate may ↑, ↓ or stay the same

Use the following information to answer the next two (2) questions.

In a **closed** economy, the production function is given by:

$$Y = 10(K^{.5})(L^{.5})$$

Where Y is output or real GDP, K is units of capital and L is units of labor.
This economy is currently at a full employment equilibrium with 100 units of workers.
This means L=100. The capital stock is constant and equal to 100 units (K=100). You are
also told that the consumption and investment functions are given by the following
equations where C is consumption spending, I is investment spending, and i is the
nominal interest rate expressed as a whole number in the equation (e.g., if i = 5%, then
the value of I in these two equations would be given as 5):

$$C = 400 - 200i$$
$$I = 1100 - 100i$$

Finally, assume that government spending is represented by G = 100. For this problem
assume that taxes and transfers are equal to 0: this will greater simplify our analysis even
if it is not particularly realistic. Hint: you will need to use some of your knowledge of
GDP measurement to proceed with this question.

A little bit of work, but not very hard if you can figure out how to set up the problem.

25) Given the information above, what is the equilibrium nominal interest rate and the
equilibrium quantity of investment in this economy?

   a. The equilibrium interest rate is 3%, ✗
      and the equilibrium quantity of investment is $900.
   b. The equilibrium interest rate is 3%, ✗
      and the equilibrium quantity of investment is $800.
   (c.) The equilibrium interest rate is 2%, ✓
      and the equilibrium quantity of investment is $900. ✓
   d. The equilibrium interest rate is 2%, ✓
      and the equilibrium quantity of investment is $800. ✗

$$Y = 10\sqrt{K}\sqrt{L}$$
$$L = 100$$
$$Y = 10\sqrt{K}\sqrt{100}$$
$$Y = 10 \cdot 10\sqrt{K}$$
$$\boxed{Y = 100\sqrt{K}}$$
$$K = 100$$
$$Y = 100\sqrt{100}$$
$$Y = 100 \cdot 10$$
$$\boxed{Y_{fe} = 1000}$$

$$C = 400 - 200i$$
$$I = 1100 - 100i$$
$$G = 100$$
$$T - TR = 0$$

$$Y = C + I + G + (X - IM) \quad \text{in open economy}$$
$$Y = C + I + G \quad \text{in closed economy}$$
$$1000 = 400 - 200i + 1100 - 100i + 100$$
$$1000 = 1600 - 300i$$
$$300i = 600$$
$$i = 2\% \Rightarrow \text{can eliminate answers (a) } \&(b) \text{ here}$$
$$I = 1100 - 100(2) = 1100 - 200 = 900$$
$$\hookrightarrow \text{correct}$$
$$\text{answer is (c)}$$

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26) Now, suppose that investors expect a worsening in the economic conditions and therefore at each interest rate the desired level of investment is lower. The new investment function is given by the following equation:
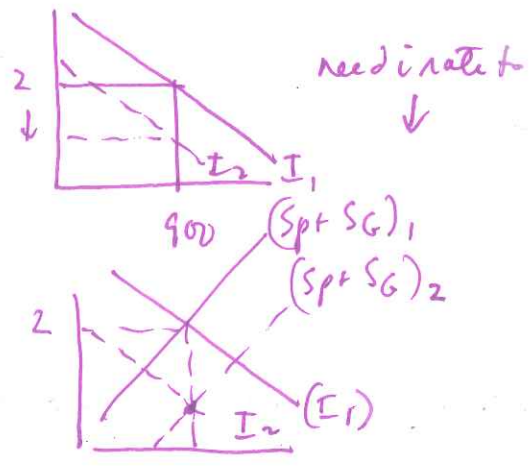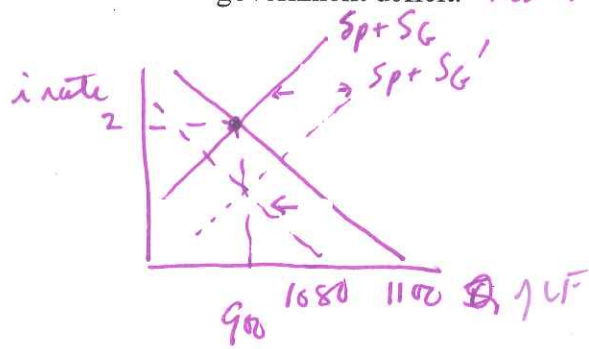
$$I = 1080 - 100i$$

But, the government does not want the equilibrium level of investment spending to decrease in this economy from its initial level (the level you found in the last problem): so, the government decides to implement a policy with regard to the level of government spending that results in the level of investment spending by businesses staying at its original level. Given this information and holding everything else constant, the government should:

a. Increase the level of government spending which will increase the size of the government deficit. ✗ — *no. That will ↑ deficit el ↑ interest rate*

b. Decrease the level of government spending which will decrease the size of the government deficit. ✓

c. Increase the level of government spending which will decrease the size of the government deficit. *This is a false statement: ↑ in G will ↑ def. holding everything else constant*

d. Decrease the level of government spending which will increase the size of the government deficit. *This is a false statement: ↓ in G will ↓ def. holding everything else constant*

i rate
$S_p + S_G$
$S_p + S_G'$

900 1080 1100 Q, ↑ LF

need i rate to ↓
I_2 I_1
900
$(S_p + S_G)_1$
$(S_p + S_G)_2$
I_2 (I_1)

$S_{G_1} < S_{G_2}$
↑ govt savings
↓ deficit

Use the following information to answer the next three (3) questions.

Suppose Y is output, K is capital, L is labor, and A is the level of technology in an economy and we can express the relationship between output and K, L, and A with the following aggregate production function:

$$Y = A(K^{.5})(L^{.5})$$

Initially K is equal to 100 units, the state of the technology is represented by A = 10 and L is equal to 100 units. Now assume that in one decade the technology improves in such a way that the economy can now produce exactly twice as much output as it could initially with the same amount of capital and labor (that is, now A = 20). During the same decade, the country suffers an earthquake that destroys a big part of its capital stock (fortunately the population and the labor force remain constant). Now the stock of capital is 1/4 of its initial level.

Hardest thing is reading and interpreting question and provided information

27) Holding everything else constant, the GDP rate of growth over the decade was:

    a. 0 %
    b. -10%
    c. 10%
    d. 50%

CONCEPTUAL Challenging!

28) Assume the same initial situation as in the previous problem (that is K=100, L=100, A=10). Assume that in this economy there is an outflow of workers because they expect better living conditions in some other country. Now the number of workers in this country has fallen to L=81. Given this information and holding everything else constant, what would need to <u>happen to the stock of capital in this economy in order to maintain the original level of labor productivity?</u>

    a. The stock of capital would need to increase by 21 units from its original level.
    b. The stock of capital would need to increase by 10% from its original level.
    c. The stock of capital would need to decrease by 19 units from its original level.
   d. The stock of capital would need to decrease by 10% from its original level.

A little thought here!!

29) Start again from the initial situation (A=10, K=100, L=100). Assume that the rate of growth in GDP was 10% over a year. Suppose that the state of technology and the number of workers remained constant over that one-year time period and that the reason this economy grew during this period was because the capital stock increased. Given this information and holding everything else constant, capital productivity at the end of this year will be:

    a. Lower than 10 units of output per unit of capital. ✓ *Know this from image I drew (next page)*
    b. Higher than 10 units of output per unit of capital. ✗
    c. Equal to 10 units of output per unit of capital. ✗
    d. Impossible to compute from the given information. ✗

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DO NOT DETACH THIS SHEET FROM THIS EXAM BOOKLET!
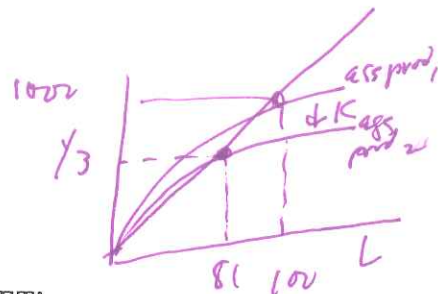
(27)

$$Y = A\sqrt{K}\sqrt{L}$$
$$K = 100$$
$$A = 10$$
$$L = 100$$
$$Y_1 = 10\sqrt{100}\sqrt{100}$$
$$\boxed{Y_1 = 1000}$$

$$A' = 20$$
$$Y_2 = 20\sqrt{100}\sqrt{100}$$
$$Y_2 = 20(10)(10)$$
$$\boxed{Y_2 = 2000} \quad \text{if } \overrightarrow{K} = 100$$

now $K_2 = \frac{1}{4}K_1 = \frac{1}{4}(100) = 25$

to calculate Y_3 as

$$A = 20$$
$$K_2 = 25$$
$$L = 100$$
$$Y_3 = 20\sqrt{25}\sqrt{100}$$
$$Y_3 = 20(5)(10)$$
$$\boxed{Y_3 = 100(10) = 1000}$$

(29) cont

$K \text{ prod in year 1} = \frac{Y_1}{K_1} = \frac{1000}{100} = 10$ units of output per unit of capital

$K \text{ prod in year 2} = \frac{Y_2}{K_2} = \frac{1100}{152}$

(28)

Initially $A = 10, K = 100, L_1 = 100$
$$\Rightarrow \boxed{Y_1 = 1000}$$

Then, $A = 10, K = 100, L_2 = 81$
$$\Rightarrow Y_2 = 10\sqrt{100}\sqrt{81}$$
$$Y_2 = 10(10)(9) = 900$$

Labor prod initially $= \frac{Y_1}{L_1} = \frac{1000}{100} = 10$ units of output/unit of labor

Want labor prod' to equal 10

labor prod' $= \frac{Y_3}{L_2} = \frac{Y_3}{81}$

$\Rightarrow$ see graph $\Rightarrow$ to maintain labor prod at initial level as L↓ we need K to ↓ $\Rightarrow$ eliminate answers (a) & (b)
$\Rightarrow$ then check answer (c) since it's easiest to check $\Rightarrow$ if $A = 10, L_2 = 81, K_2 = 81$ what is Y_3? $Y_3 = 10 \cdot 9 \cdot 9 = 810 \Rightarrow \frac{Y_3}{L_2} = \frac{810}{81}$

GDP

Year 1	$Y_1 = 1000$
Year 1 + 10	$Y_3 = 1000$

$\Rightarrow$ 10 units of output per unit of labor $\Rightarrow$ Answer (c) is **CORRECT!**

(29) $A = 10, K_1 = 100, L_1 = 100 \Rightarrow Y_1 = 1000$

Rate of growth in GDP is 10% in year
$$\Rightarrow Y_2 = 1100$$

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