Economics 102
Spring 2018
Second Midterm
Date: Tuesday, April 10, 2018

Name _ANNOTATED KEY_
TA Name_____
Section_____

<u>**Version 1**</u>

The exam consists of three parts: (1) 11 Binary Choice Questions worth 2.5 points each (27.5 points total); (2) 20 Multiple Choice Questions worth 3.5 points each (70 points total); (3) Administrative Points worth 2.5 points that are awarded to you for correctly filling out the required information on your scantron and your exam booklet. Please accurately and completely provide your name, student ID number and section number on the provided scantron as well as on the exam booklet. Please provide the version number as well on your scantron. Answer all questions on the scantron sheet with a #2 pencil.

Directions for filling out scantron:
a) Bubble in name and student ID number after entering this information in the appropriate cells.
b) Bubble in your discussion section number in special codes ABC and your exam version number in special code D.

NO CELL PHONES, CALCULATORS, OR FORMULA SHEETS ARE ALLOWED FOR THIS EXAM.

PICK THE BEST ANSWER FOR EACH QUESTION.

Section	Time and Location	TA
320	Fri. 1:20 PM - 2:10 PM, Social Science 6314	Steven Zhang
321	Fri. 2:25 PM - 3:15 PM, Social Science 4322	Wentao Zhou
322	Fri. 2:25 PM - 3:15 PM, Social Science 6232	Erika Forst
323	Fri. 9:55 AM - 10:45 AM, Van Hise 482	Wentao Zhou
324	Fri. 11:00 AM - 11:50 AM, Van Hise 144	Wentao Zhou
325	Fri. 9:55 AM - 10:45 AM, Van Hise 590	Erika Forst
326	Fri. 11:00 AM - 11:50 AM, Van Hise 240	Erika Forst
327	Fri. 8:50 AM - 9:40 AM, Sterling 2333	Wenqi Wu
328	Thur. 3:30 PM - 4:20 PM, Social Science 6314	Wenqi Wu
329	Fri. 8:50 AM - 9:40 AM, Social Science 5231	Erika Forst
331	Fri. 12:05 PM - 12:55 PM, Sterling 1407	Wenqi Wu
332	Fri. 12:05 PM - 12:55 PM, Ingraham Hall 116	Steven Zhang
333	Fri. 1:20 PM - 2:10 PM, Sterling 1335	Wenqi Wu

<u>**Version 1**</u>

Worksheet
DO NOT REMOVE FROM EXAM BOOKLET!!

I, _____, agree to neither give nor receive any help on this exam from other students. Furthermore, I understand that use of a calculator on this exam is an academic misconduct violation. I also understand that failure to cover my answers is academic misconduct: it is important that I maintain the integrity of my work and that I do not make it available to other students.

Signed _____

Part I. Binary Choice Questions (11 questions each worth 2.5 points = 27.5 points)

Somework — *not that hard*

1. Between the year 2010 and 2011, the real GDP of Stormwind City grew by 30%, while the GDP deflator decreased by 25%. Did the nominal GDP of Stormwind City increase or decrease?

   a. Nominal GDP increased.
   (b) Nominal GDP decreased.

Easy

2. Suppose during a recession that Alice decides it is time for a change in her job, so she quits her job as a legal assistant and decides to look for a new job at a bakery. Alice is:

   (a) Frictionally unemployed.
   b. Cyclically unemployed.

   Alice is looking for a job with a "better fit" ⟹ this is about time search & ∴ frictional unemployment

Easy

3. Mr. Krabs makes the hard decision to fire Spongebob and replace him with a burger-flipping robot. Spongebob is:

   a. Frictionally unemployed.
   (b) Structurally unemployed.

   Spongebob looses his job due to structural changes in the economy

1.

Year	nom GDP	real GDP	GDP deflator
2010	100*	100*	100*
2011	y =	130	75

⟋30%↑   ↓↓25%

* makeup #'s

$130 = \frac{y}{75}(100)$ ⟹ $\frac{130(3)}{4} = y$

$\frac{130(75)}{100} = y$ $\frac{390}{4} = y < 100$

$\therefore$ nom GDP decreased

SOME WORK: NOT HARD

4. Suppose you are given the following information about the CPI for City A and City B.

City	CPI in that City in 2016
A	120
B	140

nom value   *real value*
180 $(180/120 \times 100) = 150$
$x = 210$ 300

If you had 180 dollars in city A, how many dollars would you need in B to have the same real purchasing power?

$\frac{180}{120}(100) = \frac{3}{2}(100) = 150$

(a) $210
b. $240

$150 = \frac{x}{140}(100)$

$\frac{150(140)}{100 x}$ 70 $= x = 210$

DEFINITION 5. The Consumer Price Index (CPI) is a measure of the average change over time in the prices paid by urban consumers for the total production of an economy.

↳ No, for the basket of goods & services the typical wage earner purchases

a. True
(b) False

DEFINITION 6. According to Yuval Noah Harari, the author of the bestselling book *Sapiens*, "Obesity is a double victory for consumerism. Instead of eating little, which will lead to economic contraction, people eat too much and then buy diet products - contributing to economic growth twice over." What is "economic growth" here referring to? Economic growth here refers to:

(a) The increase in the Gross Domestic Product.
b. The increase in the average wealth level.

C ↑ due to ↑ purchases of food + ↑ purchaser of diet products
⟹ as C ↑ ⟹ real GDP ↑

EASY 7. Suppose real GDP per capita of country A is 10,000 dollars in 2016, and the real GDP per capita annual growth rate of country A is - 7 %. The Rule of 70 suggests that real GDP per capita of country A will be approximately double this 2016 level in 2026.

Rule of 70 only works w/ positive growth rates

a. True
(b) False

EASY 8. The U.S. is currently running a trade deficit with China. What is the effect of this trade deficit on the U.S. loanable funds market? The trade deficit causes:
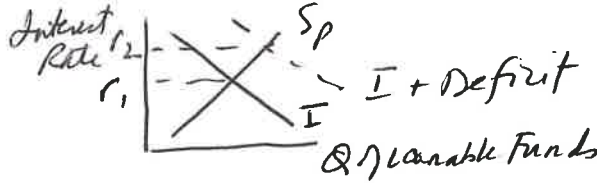
(a) A net inflow of loanable funds into the U.S.
b. A net outflow of loanable funds from the U.S.

Trade Deficit ⟹ Capital inflows into the country ⟹ Foreigners lending to country with the trade deficit

Version 1

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EASY

9. If the government increases the size of budget deficit while holding everything else constant, what will happen to the nominal interest rate? The nominal interest rate will:
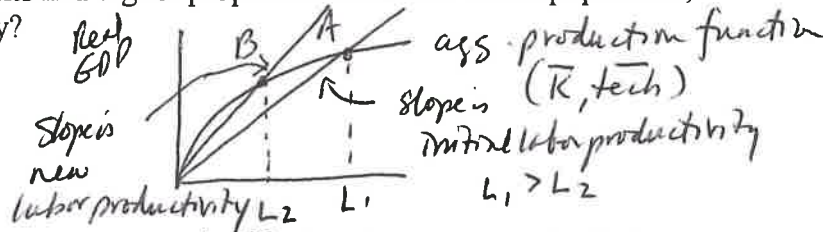
a. Fall.
b. Rise. ←(circled)

[handwritten graph: Interest Rate axis with r_2, r_1; curves labeled S_P, I, $I + Deficit$; horizontal axis labeled Q of Loanable Funds]

NOT HARD

10. Suppose that the total population, the total quantity of capital, and the level of technology are held constant. If population aging results in a higher proportion of retirees in the population, what is the effect on labor productivity?

a. Labor productivity increases. ←(circled)
b. Labor productivity decreases.

[handwritten graph: Real GDP axis, points B, A on curves; labeled "agg production function ($\bar{K}$, tech)", "slope is initial labor productivity", "Slope is new labor productivity L_2", "L_1", "$L_1 > L_2$"]

EASY

11. True or False: If the GDP deflator in a given year is 100, then that year must be the base year.

a. True
b. False ←(circled)

[handwritten note: → the year "might be" the base year but it does not have to be the base year]

Use the following table to answer the next question:

Good	T-Shirts	Loaves of Bread	Cookies	Movie Tickets
Price per unit in dollars	$21	$2.50	$1	$9.50
Quantity	3	4	80	2

EASY

12. Given the above information and holding everything else constant, GDP measured with the expenditure approach is equal to:

a. $179
b. $102
c. $172
d. $88

$GDP = (21)(3) + (2.5)(4) + (1)(80) + (9.50)(2)$

$GDP = 63 + 10 + 80 + 19$

$GDP = 73 + 99 = 172$

Assume That this data is complete / nothing has been left out.

Use the following data to answer the next question:

Fruits Incorporated		Rejuicinated Co	
Revenues		**Revenues**	
Sales to Rejuicinated Co	$15,000	Sales of juice to customers	-
Expenses		**Expenses**	
Wages	$8,000	Input: Fruits Inc.	$15,000
Profits	$500	Wages	$11,000
Rent	$750	Rent	$7,000
Interest Payments	$400	Profits	$4,000
		Interest Payments	$ 0

NOT TOO BAD!

13. Given the above information and holding everything else constant, GDP measured with the factor payment approach is equal to:

a. $22,000
b. $31,650
c. $46,500
d. $16,650

$GDP = wages + interest + rent + profit$

$GDP = (8000 + 11,000) + (400 + Interest payments from Rejuicinated Co.) +$

$(750 + 7000) + (500 + 4000)$

$GDP = 19,000 + 400 + Interest payments from Rejuicinated Co.)$

$+ 7750 + 4500$

$GDP = 31,650 + interest payments from Rejuicinated Co.$*

* Assume This is equal to zero!

14. Consider an economy with three companies – Cotton Inc, Yarnie Co, and Shirts & Pants Co. Cotton Inc processes raw cotton and sells all of its output to Yarnie Co for $1,000. Yarnie Co then turns cotton into thread, and sells all of their balls of thread to Shirts & Pants Co for $10 each. Shirts & Pants Co can use 1 ball of thread to make 1 shirt and that shirt can then be sold for $15, or they can use 2 balls of thread to make 1 pair of pants, and that pair of pants can then be sold for $30. Suppose that Shirts & Pants Co sells 200 pairs of pants and 200 shirts. Given this information and holding everything else constant, what is the value added by each firm?

a. Cotton Inc: $1,000; Yarnie Co: $5,000; Shirts & Pants Co: $3,000
b. Cotton Inc: $1,000; Yarnie Co: $5,000; Shirts & Pants Co: $2,000 X
c. Cotton Inc: $0; Yarnie Co: $6,000; Shirts & Pants Co: $9,000 X
d. Cotton Inc: $1,000; Yarnie Co: $5,000; Shirts & Pants Co: $9,000

Cotton Inc => no intermediate good costs given
∴ Value added is $1000 => eliminate Answer (c)

Yarnie Co => intermediate goods cost $1000
200 balls of thread for the 200 shirts => 200(10) = $2000
400 balls of thread for the 200 pants => 400(10) = $4000
                                    Revenue = $6000

Value added for Yarnie Co is 6000 - 1000 = 5000

Shirts & Pants Co =>
Final Product => GDP = 200 shirts ($15) = $3000
              + 200 pants ($30) = $6000
              GDP = $9000 => eliminate (b), (d)

∴ Answer must be (a)!
But, let's check value added:
    Value of Sales = 9000
  - Cost of Intermediate   6000
    Goods

    3000 = Value added by Shirts & Pants Co.

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

The Kingdom of Stormwind produced the following items in 2015 and 2016:

	Quantity in 2015	Price per unit in 2015	Quantity in 2016	Price per unit in 2016
Swords	5	$2	8	$8
Boots	2	$5	8	$10
Hats	10	$6	12	$12
Magic Stones	15	$8	14	$8

$$\frac{\begin{array}{r}24\\15\\120\\24\end{array}}{360}$$

$$\frac{\begin{array}{r}64\\-80\\144\\112\end{array}}{400}$$

EASY IF you KNOW DEFINI- TIONS

15. Using 2015 as the base year, what is the rate of growth in real GDP between 2015 and 2016?

a. 16%
b.) 20%
c. 33.3%
d. 66.7%

$real\ GDP = \frac{nom\ GDP}{GDP\ def}(scale)$

$240 = \frac{400}{GDP\ def}(100)$

$GDP\ def_{2016} = \frac{400(100)}{240} = \frac{25}{6}\cdot ... $

$GDP\ def_{2016} = \frac{1000}{6} = 166\frac{2}{3}$

If you DO THE WORK, THIS ONE IS HARD

16. Suppose that there is a change to __only one__ of the prices shown above for 2016. As a result of this price change the GDP deflator for 2016 is now equal to 150 (using 2015 as the base year). Given this information and holding everything else constant, what is this price change?

a. The price of one sword decreases by 50%.
b.) The price of one pair of boots decreases by 50%.
c. The price of one hat increases by 50%. ✗
d. The price of one magic stone decreases by 25%.

$nom\ GDP_{2016} = 8(8) + 8(10) + 12(12) + 14(8)$
$nom\ GDP_{2016} = 64 + 80 + 144 + 112$
$nom\ GDP_{2016} = 400$

15. $Real\ GDP_{2015} = (5)(2) + (2)(5) + (10)(6) + (15)(8) = 10 + 10 + 60 + 120 = 200$
(w/ 2015 BY)

$Real\ GDP_{2016} = (2)(8) + (5)(8) + (6)(12) + (8)(14)$
(w/ 2015 BY)

$= 16 + 40 + 72 + 112 = 240$

Rate of growth in real GDP $= \left(\frac{240 - 200}{200}\right)(100\%) = \left(\frac{40}{2}\right)(\%) = 20\%$

16.

Year	nom GDP	real GDP BY 2015	GDP deflator
2015	200	200	100
2016	400	240	166⅔ *

* we know GDP def is ↓ ⇒ so this eliminates answer (c)

So if new GDP def for 2016 = 150 then ⇒

⮕ So : (a) nom GDP' = 8(4) + ... ⇒ ↓ 32 not right ✗
(b) nom GDP' = ... + 8(5) + ... ⇒ ↓ 40 ✓ right
(d) nom GDP' = ... + 14(6) ⇒ ↓ 28 not right

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$GDP\ def' = \frac{nom\ GDP'}{real\ GDP}(scale)$

$150 = \frac{nom\ GDP'(100)}{240}$

$nom\ GDP' = \frac{150(240)}{100}\ 8$

$nom\ GDP' = 360$

Use the following information to answer the next <u>TWO</u> (2) questions.

Prelimania has a civilian non-institutionalized population of 25,000 people. 24,000 are adults over age sixteen, and 20,000 people are in the labor force. 12,000 people work full-time; 4,000 people work part-time but would prefer full-time work; and the rest of the labor force is actively seeking work.

NOT HARD

17. Given the above information and holding everything else constant, what is the unemployment rate in Prelimania using the "official unemployment rate" guidelines (the U-3 rate described in class)?

a. 33.33%
b. 20%
c. 40%
d. 25%

$$U \, rate = \frac{U}{U+E} \, (100\%) = \frac{4,000}{20,000} \, (100\%) = 20\%$$

NOT HARD

18. What is the unemployment rate in Prelimania if the government changes its definition of the official unemployment rate to one that states that a person is considered "unemployed if they are currently working a part-time job, but would prefer to have a full-time position"?

a. 33.33%
b. 20%
c. 40%
d. 25%

17. $\begin{array}{r} 25000 \\ -1000 \text{ children} \\ \hline 24000 \text{ adults} \end{array}$

↳ 20,000 in LF ⟹ 20,000 = U + E

12,000 E full-time
4000 E part-time but want full-time $\Big\}$ 16,000 E
∴ 4,000 U

18. $U \, rate' = \frac{U'}{U'+E} \, (100\%) = \frac{8000}{8000+12000} \, (100\%)$

$= \frac{8000}{20000} \, (100\%) = 40\%$

<u>**Version 1**</u>

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19. Consider the tiny town of Canopia. The total population in Canopia is 300 people. Canopia's civilian non-institutionalized adult population is 275 people. Canopia is largely a retirement community, with 105 retirees currently living there. There is a large factory in a nearby town and this factory employs 55 Canopians. 35 Canopians are employed in Canopia where they take care of the elderly population. There are 30 people working in shops in Canopia. Of those 30 people, 7 people are trained to work as nurses and would prefer to help the elderly, but they cannot find a job in that industry. Of the remaining adults in Canopia, 15 people are actively seeking work, 15 people have given up hope of finding a job due to the economic conditions in Canopia, and the rest of this group are not looking for work. Given this information and holding everything else constant, if we include discouraged workers in the calculation of the unemployment rate, what is the unemployment rate in Canopia?

a. 25%
b. 10%
c. 33%
d) 20%

$$
\begin{array}{l}
300 \\
-\ 25\ \text{children} \\
\hline
275\ \text{adults} \\
105\ \text{retired} \\
\hline
170 \\
55\quad E\ \text{at nearby factory} \\
\hline
115 \\
35\quad E\ \text{taking care of elderly} \\
\hline
80 \\
30\quad E\ \text{in shops} \quad (7\ \text{are nurses but can't find work as nurses}) \\
\hline
50 \\
15\quad \text{actively seeking work} \Rightarrow U \\
\hline
35 \\
15\quad \text{given up looking for work due to economic conditions} \Rightarrow \text{Discouraged Workers} \\
\hline
20\quad \text{not looking for work}
\end{array}
$$

$$U\ \text{including discouraged workers} = \frac{U + \text{discouraged workers}}{U + \text{discouraged workers} + \text{Employed}}\ (100\%)$$

$$= \left[\frac{15+15}{15+15+120}\right](100\%)$$

$$= \frac{\cancel{30}}{\cancel{150}}\,{}_{5}\,(100\%) = 20\%$$

10

Handwritten top:

$$169.2$$
$$22.1\overline{)3740.0}\,_{\wedge}0$$
221
1530
1326
2040
1989
1510
442
$$5.25$$
$$31.50$$
$$2.25$$
$$\overline{39.00}$$

$$176.5$$
$$22.1\overline{)3900.0}\,_{\wedge}$$
221
1690
1547
1430
1326
1040
1105

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

In LA LA land, there are only 3 goods: Gluten-free pizza, movie shows, and diet drinks. The following table shows the prices and quantities produced of these goods in 2015, 2016, and 2017:

	2015		2016		2017	
	Price per unit in dollars	Quantity	Price per unit in dollars	Quantity	Price per unit in dollars	Quantity
Gluten-free pizza	$1.00	500	$1.00	600	$1.05	590
Movie Shows	$5.00	300	$10.00	200	$10.50	210
Diet Drinks	$0.70	300	$0.80	400	$0.75	420

A "market bundle" for a typical family is deemed to be 5 Gluten-free pizza, 3 movie shows, and 3 diet drinks. Use 2015 as the base year for this problem.

SOME WORK

20. Using a 100-point scale, what was the CPI in 2017 in LA LA Land?

a. 100
b. 169.2
c. 176.5 *(circled)*
d. 173.8

Year	Cost of Market Basket
2015	$(5)(1) + (3)(5) + (3)(.70) = 5+15+2.10 = 22.10$
2016	$(5)(1) + (3)(40) + (3)(.80) = 5+30+2.40 = 37.40$
2017	$(5)(1.05) + (3)(10.50) + (3)(.75) = 5.25+31.50+2.25 = 39$

CPI BY 2015

TOUGH MATH

21. What was the inflation rate between 2016 and 2017 in LA LA Land?

a. 1.2%
b. 3.8%
c. 4.3% *(circled)*
d. 6.3%

$$\text{inflation rate} = \left[\frac{176.5 - 169.2}{169.2}\right](100\%)$$

$$= \frac{7.3}{169.2}(100\%)$$

$$= 4.3\%$$

2015 $\frac{22.10}{22.10}(100) = 100$

2016 $\frac{37.4}{22.1}(100) = \frac{3740}{22.1} = 169.2$

2017 $\frac{39}{22.1}(100) = \frac{3900}{22.1} = 176.5$

NOT TOO BAD

22. Suppose that this data results in the rate of change between the CPIs from year n to year $(n+1)$ being a negative number. Given this information and holding everything else constant, this implies that:

a. The average price level is increasing over time at a faster pace.
b. The average price level is increasing over time at a slower pace.
c. The average price level is decreasing over time. *(highlighted)*
d. The cost of the market basket in year $(n + 1)$ must be greater than the cost of the market basket in year n.

$$164.7\overline{)1180.0}\,_{\wedge}$$
$$\;\;\;\;6588$$

$$CPI_{n+1} = \frac{\text{cost of mkt basket}_{n+1}}{\text{cost of market basket BY}}[\text{scale}] \quad CPI_n = \frac{\text{cost of market basket}_n}{\text{cost of market basket BY}}[\text{scale}]$$

Version 1 $CPI_n > CPI_{n+1}$

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$\therefore \text{cost of market basket}_{n+1} < \text{cost of market basket}_n$

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

An economy's aggregate production function is given by the equation:

$$Y = AK^{1/2}L^{1/2}$$

(handwritten:) $\begin{rcases} K = 16 \\ A = 2 \end{rcases} \Rightarrow Y = 2\sqrt{16}\sqrt{L}$
$Y = 2 \cdot 4\sqrt{L}$
$Y = 8\sqrt{L}$

where Y is real GDP, A is the state of the technology in this economy, K is the number of units of capital and L is the number of units of labor. You are provided the following information about the labor market in this economy where W is the wage rate per unit of labor:

Demand for Labor: L = 800 – 20W
Supply of Labor: L = 30W – 200

(handwritten:) $800 - 20W = 30W - 200 \quad W = 20$
$1000 = 50W \qquad L^D = 800 - 20(20) = 400$
$\dfrac{1000}{50} = W \qquad L^S = 30(20) - 200 = 400$

You are also told that capital in this economy is initially equal to 16 units and A is initially equal to 2.

(handwritten:) If $L = 400 \Rightarrow Y = 8 \cdot 20 = 160$
Capital productivity $= \dfrac{Y}{K} = \dfrac{160}{16} = 10$ units of output/unit of capital

(handwritten left margin:) NOT TOO BAD)

23. Given the following information, which of the following statements is true?

(handwritten:) $W = 20, L = 400$

a. The equilibrium amount of labor in this economy is 20 units of labor and the value of real GDP is 400. ✗

==b. The equilibrium amount of labor in this economy is 400 units of labor and the value of capital productivity is 10 units of output per unit of capital.== ✓ *(circled)* ✓

c. The equilibrium amount of labor in this economy is 400 units of labor and the value of real GDP is 8000. ✗ $Y = 160$ ✓

d. The value of capital productivity in this economy is 1/25 units of output per unit of capital and the value of real GDP is 400 ✗ → capital productivity = 10 units of output/unit of capital → $Y = 160$

(handwritten left margin:) A LITTLE THOUGHT HERE

24. Suppose this economy is now experiencing an economic boom. We observe that even though the value of real GDP increases to 200 in this boom, the labor demand and supply curves are still the same as they were initially. Given this information and holding everything else constant, how many of the following statements could have lead the value of real GDP to increase to 200?

- The economy is experiencing technological progress. The state of technology increases from 2 to 2.5 and this increase contributes to this higher value for real GDP.
- The amount of capital in this economy increases from 16 units to 25 units and this increase contributes to this higher value for real GDP.
- The number of units of labor increases to 25 units and this increase contributes to this higher value for real GDP.

a. One of these statements is true.
==b. Two of these statements are true.== *(circled)*
c. Three of these statements are true.
d. None of these statements is true.

(handwritten:) $Y' = 200 \Rightarrow L = 400$
$200 = A\sqrt{K}\sqrt{400}$
$200 = 20 A\sqrt{K'}$
(•) if $A' = 2.5, K = 16$
$Y' = 2.5(4)(20) = 200 \Rightarrow$ a possible explanation
(•) Since $L^D \& L^S$ do not Δ ∴ L cannot Δ
NOT A POSSIBLE EXPLANATION

(handwritten bottom left:)
(•) $Y' = 2\sqrt{K'}\sqrt{L}$
$Y' = 2\sqrt{25}\sqrt{400}$
$Y' = 2(5)(20) = 200 \Rightarrow$ a possible explanation
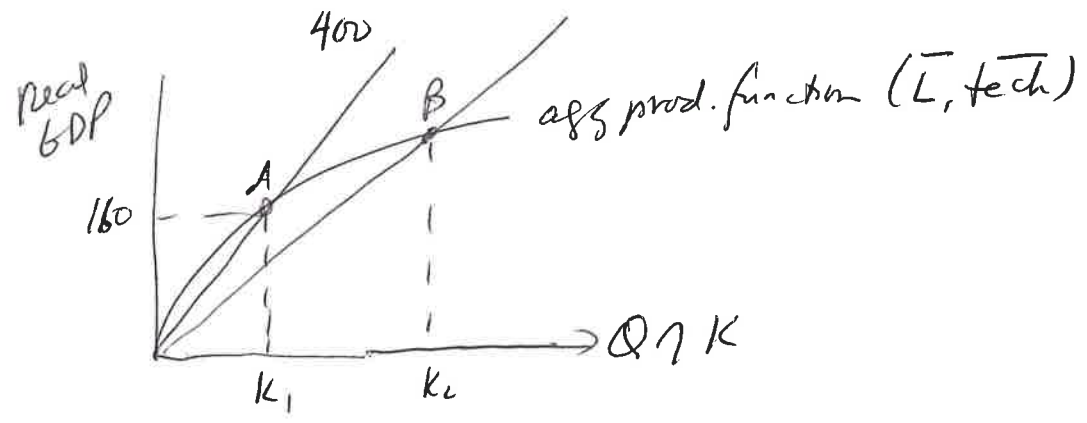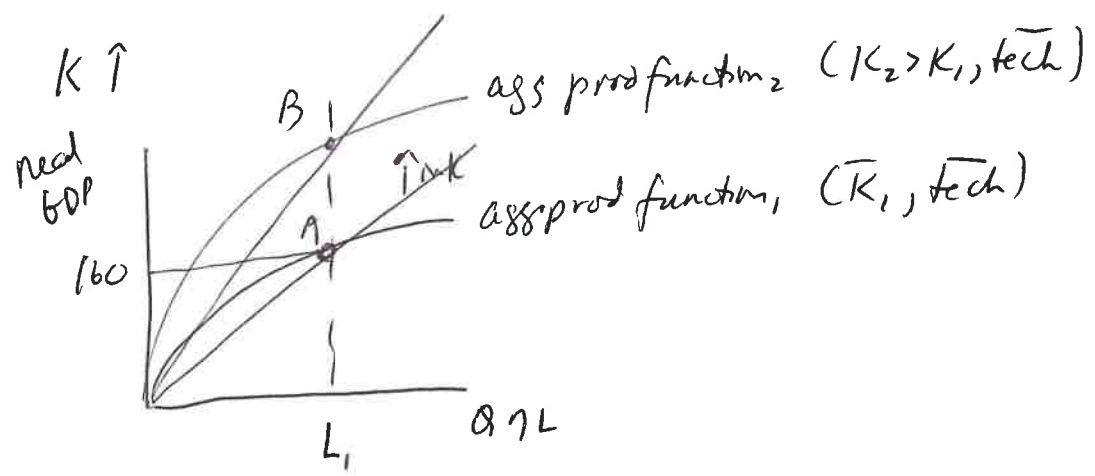
EASY

25. Return to the initial situation. Suppose now that the amount of capital in this economy increases while holding everything else constant. Given this change, which of the following statements is true?

a. Labor productivity decreases. X *Labor productivity* ↑
b. Capital productivity increases. X *Capital productivity* ↓
c. The level of real GDP produced in this economy decreases since more resources are now being devoted to the production of capital. X *real GDP increases*
d) The level of real GDP produced in this economy increases due to this change.

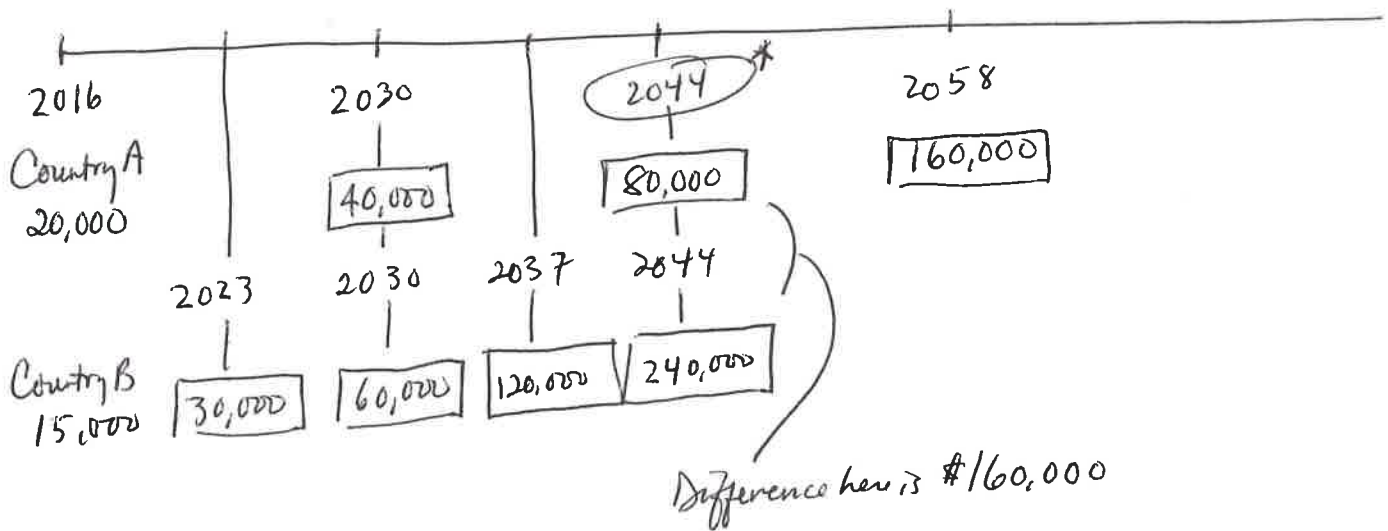K ↑

real GDP

B

ags prod function₂ $(K_2 > K_1, tech)$

↑ in K

aggprod function₁ $(\overline{K_1}, tech)$

160

L_1

$Q \uparrow L$

400

real GDP

B

ags prod. function $(\overline{L}, tech)$

A

160

$Q \uparrow K$

K_1 K_2

26. Suppose real GDP per capita in country A in 2016 is $20,000 while in country B real GDP per capita in 2016 is $15,000. Both countries are projected to have steady growth rates of real GDP per capita over the next 200 years: the growth rate in country A is projected to be 5% while the growth rate in Country B is projected to be 10%. Given this information and the Rule of 70, when will the real GDP per capita of country B be approximately $160,000 greater than that of country A?

a. 2030
b. 2037
c. 2044
d. 2051

Country A : 5% => 70/5 ≐ 14 years to double
Country B : 10% => 70/10 ≐ 7 years to double

2016   2030   2044   2058
Country A   80,000   160,000
20,000   40,000

         2023   2030   2037   2044
Country B 30,000 60,000 120,000 240,000
15,000

Difference here is $160,000

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

Suppose that the U.S. economy is represented by the following aggregate production function:

$$Y(L, K) = AK^{\frac{1}{2}}L^{\frac{1}{2}}$$

THIS ONE 27. Suppose that the total stocks of capital (K), the total labor force (L), and the total level of
MIGHT technology (A) in the U.S. all increase by 100%. Given this information and holding everything
SEEM else constant, how do these changes affect the level of total output or real GDP (Y) in the U.S.?

HARD → a. Total output increases by 300%.
LOOK b. Total output increases by 400%.
CARE- c. Total output increases by 700%.
FULLY d. Total output increases by 800%.
AT THE
EXPLANATION !
28. Return to the initial situation. Which of the following events will most likely lead to an
increase in the level of technology (A)?

NOT
HARD a. U.S. firms become increasingly reliant on capital as many labor-intensive firms have moved
operations overseas. X ↑ in K ≠ not ↑ in A
b. A tax reform bill encourages firms to build more factories in the U.S. instead of building them
overseas. X ↑ in K ≠ not in A
c. A new assembly line formulation is introduced from Japan, making U.S. car manufacturers
more productive. ✓ ↑ in A
d. Immigration reform results in more college-educated and highly productive workers
immigrating to the U.S. X ↑ in L ≠ not ↑ in A

27. $Y = A\sqrt{K}\sqrt{L}$

$Y' = 2A\sqrt{2K}\sqrt{2L}$
$Y' = 2A\sqrt{K}\sqrt{2}\sqrt{2}\sqrt{L}$
$Y' = 4A\sqrt{K}\sqrt{L}$

$\% \Delta \text{ in } Y = \frac{Y'-Y}{Y}(100\%) = \frac{4A\sqrt{K}\sqrt{L} - A\sqrt{K}\sqrt{L}}{A\sqrt{K}\sqrt{L}}(100\%)$

$= \frac{3A\sqrt{K}\sqrt{L}}{A\sqrt{K}\sqrt{L}}(100\%) = 300\%$

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

Suppose that the following table describes the loanable funds market in the U.S. at different interest rate levels.

Interest Rate	Total Supply of Loanable Funds (Unit: billion dollars)	Private Demand for Loanable Funds (Unit: billion dollars)	*Private Demand + New Govt Deficit*
0.5%	3000	5000	7500
1%	3500	4000	6500
1.5%	4000	3000	5500
2%	4500	2000	4500 * new equilibrium
2.5%	5000	1000	3500

Right now, the loanable funds market is at equilibrium, with an interest rate of 1.5%.

Given this information and holding everything else constant,

SOME THOUGHT REQUIRED

29. A new tax bill reduces the tax rate, resulting in the government budget deficit growing by 150%. What is the new equilibrium interest rate after the tax bill goes into effect?

a. 1.67% *at r = 1.5%: Initial Govt Deficit = 1000*   *since $S_{LF} = D_{LF}$*
b. 1.75%   *$S_{LF} = 4000$*
c. 2%   *$I = 3000$*
d. 2.5%   *New Govt Deficit:*   *So Govt Deficit = $-S_G = 1000$*
$$150 = \frac{x - 1000}{1000} (100\%)$$
$$1500 = x - 1000$$
$$2500 = x$$

THIS IS A DEMANDING QUESTION

30. Suppose that congress does not pass the tax bill (so the government budget deficit does not increase). However, assume the news of the proposed tax cut had an impact on the economy. Expecting their disposable income to grow, households are now willing to lend out 1500 billion dollars more at every interest rate level. Businesses are borrowing more money to expand their production, so the private demand for loanable funds doubles at every interest rate level. Given the above information and holding everything else constant, what will be the new equilibrium interest rate with these changes?

a. 1.6%
b. 1.8%
c. 2% X
d. 3.5% X

Interest rate	S' (now 1500 B)	I'	$I' +$ Initial Govt Deficit
.5%	4500	10000	11,000
1%	5000	8000	9,000
1.5%	5500	6000	7,000
2%	6000	4000	5,000
2.5%	6500	2000	3,000

equilibrium occurs b/w 1.5% & 2%
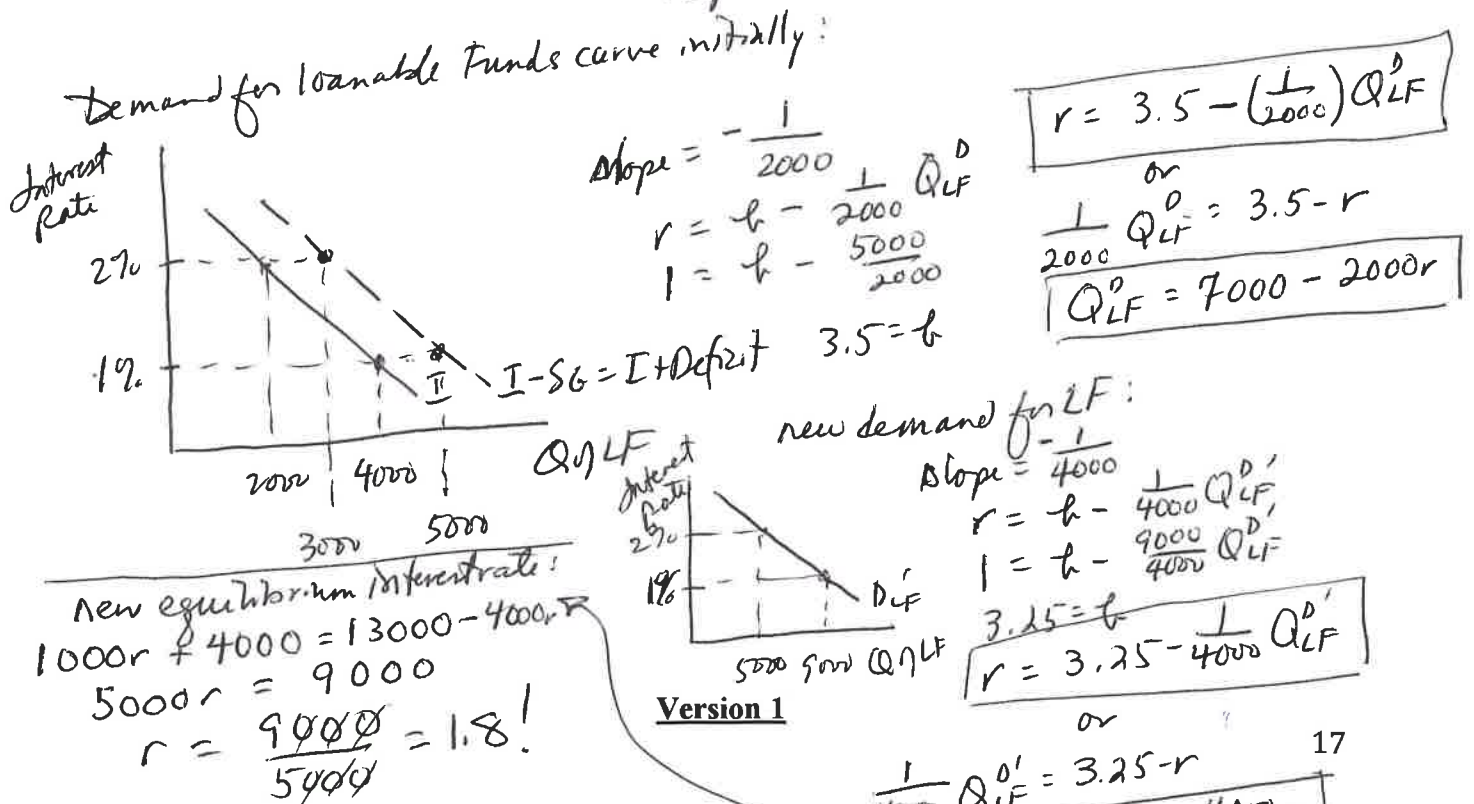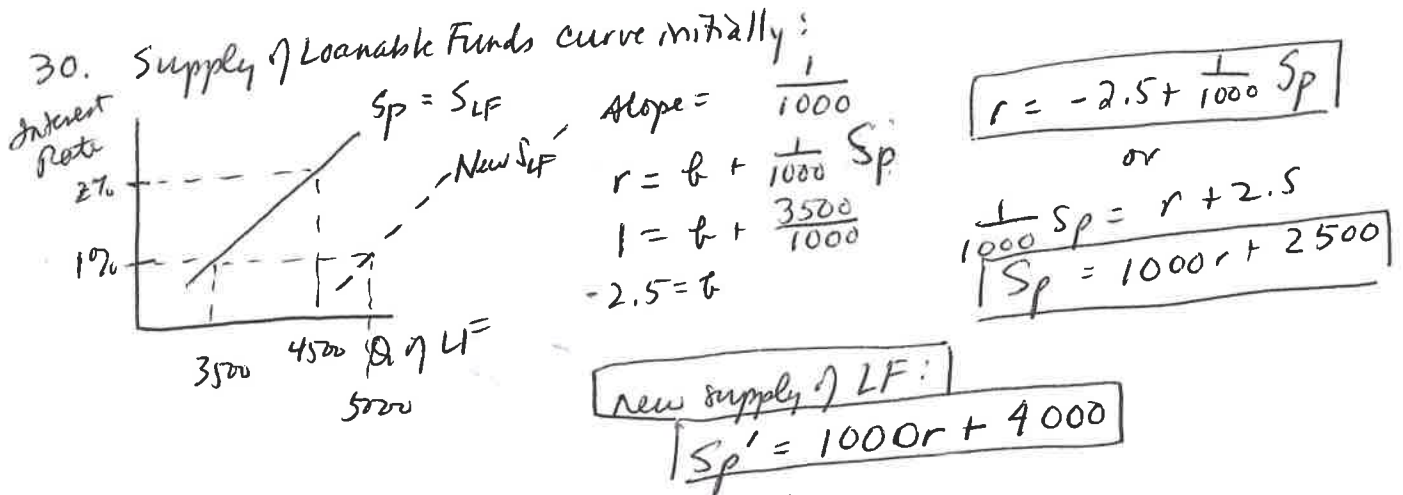*eliminates (c) and (d)*

see next page

Consider the U.S. where we are currently running a trade deficit with China as well as a budget deficit.

31. $\wedge$ Suppose a proposed tariff bill will raise the tariff levied on manufacturing products imported from China. The tariff would likely reduce the United States trade deficit with China, and it will increase the federal government's tax revenue. However, business leaders claim that such a tariff would harm the U.S. economy and force companies to cut back the level of investment in the economy. Given this information and holding everything else constant, what is the likely effect of such a tariff on the loanable funds market in the U.S.?
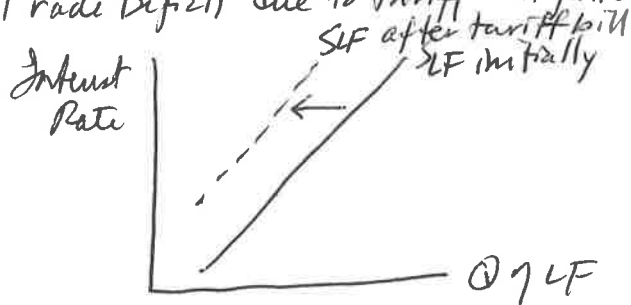
a. The equilibrium interest rate will increase.
b. The equilibrium interest rate will decrease.
c. The equilibrium quantity of loanable funds will increase.
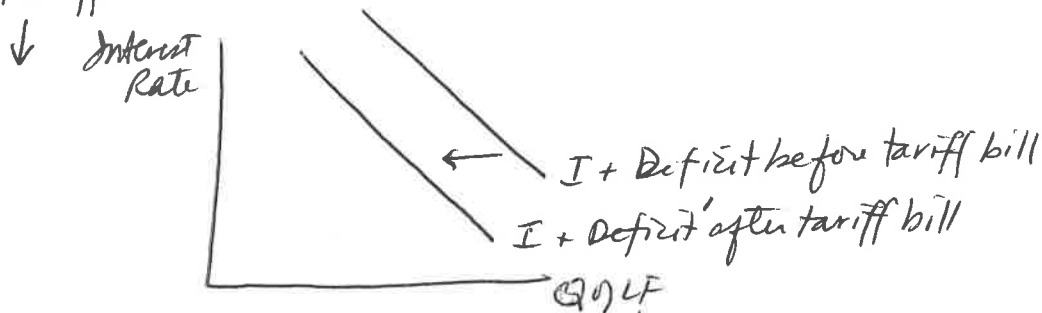d. The equilibrium quantity of loanable funds will decrease.

End of Exam! Thank you!

30. Supply of Loanable Funds curve initially:

$Sp = S_{LF}$, Slope $= \dfrac{1}{1000}$

$r = b + \dfrac{1}{1000} Sp$

$1 = b + \dfrac{3500}{1000}$

$-2.5 = b$

$$r = -2.5 + \dfrac{1}{1000} Sp$$

or

$\dfrac{1}{1000} Sp = r + 2.5$

$$Sp = 1000r + 2500$$

new supply of LF:

$$Sp' = 1000r + 4000$$

Demand for loanable Funds curve initially:

Slope $= -\dfrac{1}{2000}$

$r = b - \dfrac{1}{2000} Q_{LF}^{D}$

$1 = b - \dfrac{5000}{2000}$

$I - SG = I + Deficit$ $3.5 = b$

$$r = 3.5 - \left(\dfrac{1}{2000}\right) Q_{LF}^{D}$$

or

$\dfrac{1}{2000} Q_{LF}^{D} = 3.5 - r$

$$Q_{LF}^{D} = 7000 - 2000r$$

new demand for LF:

Slope $= -\dfrac{1}{4000}$

$r = b - \dfrac{1}{4000} Q_{LF}^{D'}$

$1 = b - \dfrac{9000}{4000} Q_{LF}^{D}$

$3.25 = b$

$$r = 3.25 - \dfrac{1}{4000} Q_{LF}^{D'}$$

new equilibrium interest rate:

$1000r + 4000 = 13000 - 4000r$

$5000r = 9000$

$r = \dfrac{9000}{5000} = 1.8!$

Version 1

or

$\dfrac{1}{4000} Q_{LF}^{D'} = 3.25 - r$

$$Q_{LF}^{D'} = 13000 - 4000r$$

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31. Trade Deficit due to tariff bill falls

Interest Rate

S_LF after tariff bill
LF initially

Q η LF

Tariff bill will ↑ U.S. govt tax revenue: size of govt deficit would

↓ Interest Rate

I + Deficit before tariff bill
I + Deficit after tariff bill

Q η LF

Tariff bill will ↓ Investment

Interest Rate

I after tariff bill   I initially

Q η LF

i. Demand for Loanable Funds will shift to the left
Supply of Loanable Funds will shift to the left

Interest Rate

S_2 S_1

$r_2 = r_1$

D_2 D_1

LF$_2$ LF$_1$ Q η LF

Possible

Interest Rate

S_2 S_1

r_1
r_2

D_2 D_1

LF$_2$ LF$_1$ Q η LF

Possible

Version 1

Interest Rate

S_2

S_1

r_2
r_1

D_2 D_1

LF$_2$ LF$_1$ Q η LF
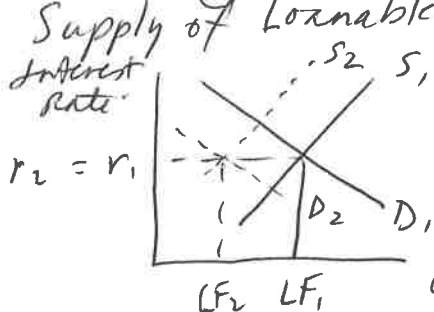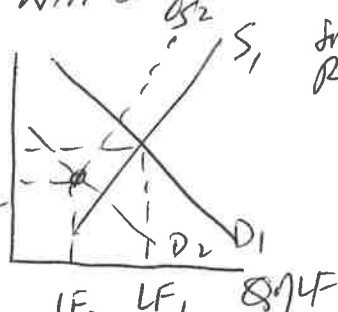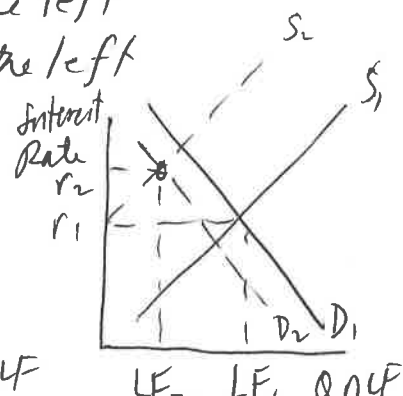
possible

r indeterminate, Q$_{LF}$ ↓

Worksheet
DO NOT REMOVE FROM EXAM BOOKLET!!

Worksheet
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