

TOTAL SCORE _____

MC _____

EXE 1 _____

EXE 2 _____

Econ 002- INTRO MACRO Prof. Luca Bossi February 11, 2016

MIDTERM #1 – SOLUTIONS

My signature below certifies that I have complied with the University of Pennsylvania's Code of Academic Integrity in completing this examination. In particular, I declare that I have not used a graphing calculator to complete this exam.

Student Name (printed)

PennID

Your Signature

Date

Your TA Name (printed)

INSTRUCTIONS

The exam is closed book. The exam is composed of 20 multiple choice questions and two exercises. Unless stated otherwise, all multiple choice questions are worth 3 points (the total is 60 points for the multiple choice part). The exercises are worth 20 points each (the total is 40 points for the exercise part). You can detach the answer sheet for the MC part at the end of the exam if this is more comfortable for you. If that is the case, be sure to put your name on it and to tell your TA to staple it back to the exam when finished. If you do not fill in the MC part on time and request extra time at the end of the exam to write the answers up, a proctor will take your name and you will receive a penalty of 5 points. Please follow the instructions as to how to submit your exam at the end of the 60 minutes. If you do not follow those instructions and/or delay your exam submission, a proctor will take your name and you will receive a penalty that will depend on your (miss)behavior.

ANSWER ALL QUESTIONS. TOTAL POINTS = 100. TOTAL TIME = 60 minutes

Provide your answers on the exam sheet directly. Read all questions very carefully. Write legibly.

EXAM TAKING POLICY

If you need to use the restroom, raise your hand and wait for the proctor to come to you. Only one person can be out of the examination room at a time, and the proctor will hold onto your exam papers while you are out at the restroom.

FOR THE DURATION OF THE EXAM, AND WITH THE EXCEPTION OF YOUR ALLOWED SCIENTIFIC CALCULATOR, YOU HAVE TO TURN OFF EVERYTHING ELSE THAT HAS A POWER BUTTON. NO CELL PHONES. NO BOOKS. NO NOTES. NO HELP SHEETS. NO TALKING TO EACH OTHER. NO ASKING THE PROCTORS ANY QUESTION OR HELP TO SOLVE THE EXAM. YOU CANNOT CONNECT TO THE INTERNET.

WRITE IN PENCIL OR IN PEN AS YOU LIKE, BUT IF YOU WRITE IN PENCIL THERE IS NO POSSIBILITY TO ASK FOR RE-GRADING. PLEASE WRITE YOUR NAME ON THE FIRST PAGE OF THE EXAM AND ON THE MC BUBBLE PAGE.

PLEASE DO NOT START THIS EXAM UNTIL INSTRUCTED TO DO SO.

GOOD LUCK!

MULTIPLE CHOICE QUESTIONS

Identify the letter that best completes the statement or answers the question. Mark your answer (fill in the letter of your choice) in the answer bubble sheet for the MC provided on the last page of the exam.

1) The residents of country A earn \$500 million of income from abroad. Residents of other countries earn \$200 million in country A. The earnings that Country A residents earn abroad are accounted for in country A's

- a. **GNP which is larger than GDP in country A.**
- b. GNP which is smaller than GDP in country A.
- c. GDP which is larger than GNP in country A.
- d. GDP which is smaller than GNP in country A.

2) Which of the following transactions does *not* take place in the markets for the factors of production in the circular-flow diagram?

- a. Jason provides plumbing services for a plumbing company and receives an hourly wage from the company for his services.
- b. **Jennifer works as a marriage counselor and her clients pay her on a per-hour basis for her services.**
- c. Brody owns several shopping malls and receives rent payments from the companies that operate those malls.
- d. Bree sells advertising for a newspaper and receives a commission from the newspaper company for each advertisement that she sells.

3) Darla, a Canadian citizen, only works in the United States. The value added to production from her employment is

- a. **included only in U.S. GDP.**
- b. included in both U.S. GDP and Canada GDP.
- c. included only in Canada GDP.
- d. not included in either U.S. GDP or Canada GDP.

4) Arnold quit his job because he was unhappy at work. Michael was fired because he frequently came to work late. Who is eligible for unemployment insurance benefits?

- a. both Arnold and Michael
- b. Arnold but not Michael
- c. Michael but not Arnold
- d. **neither Arnold nor Michael**

5) Suppose that over the last twenty-five years a country's nominal GDP grew to three times its former size. In the meantime, population grew by 40 percent and prices rose by 100 percent. What happened to real GDP per person?

- a. It more than doubled.
- b. **It increased, but it less than doubled.**
- c. It was unchanged.
- d. It decreased.

6) The city of Ann Arbor Michigan buys a police car manufactured in Germany. In the GDP accounts this transaction is included in

- a. in government expenditures and exports.
- b. **government expenditures and imports.**
- c. exports, but not government expenditures.
- d. imports, but not government expenditures.

7) James owns two houses. He lawfully rents one house to the Johnson family for \$10,000 per year. He lives in the other house. If he were to rent the house in which he lives, it has been estimated that he could earn \$12,000 per year in rent. How much do the housing services provided by these two houses contribute to GDP?

- a. \$0

- b. \$10,000
- c. \$12,000
- d. **\$22,000**

8) Rocket Energy Drink Company buys sugar to produce energy drinks. At the end of a quarter both its inventory of sugar and its inventory of energy drinks has increased. Investment for the quarter will include

- a. **both the increased inventory of sugar and the increased inventory of energy drinks.**
- b. the increased inventory of sugar, but not the increased inventory of energy drinks.
- c. the increased inventory of energy drinks, but not the increased inventory of sugar.
- d. neither the increased inventory of sugar nor the increased inventory of energy drinks.

9) Consider two cars manufactured by Chevrolet in 2009. During 2009, Chevrolet sells one of the two cars to Sean for \$24,000. Later in the same year, Sean sells the car to Kati for \$19,000. The second automobile, with a market value of \$30,000, is unsold at the end of 2010 and it remains in Chevrolet's inventory. The transactions just described contribute how much to GDP for 2009?

- a. \$24,000
- b. \$43,000
- c. **\$54,000**
- d. \$73,000

10) When the wage is above the equilibrium level,

- a. the labor market is functioning more efficiently than it otherwise would function.
- b. there is a shortage of labor.
- c. **the quantity of labor supplied exceeds the quantity of labor demanded.**
- d. job search is the primary explanation for the unemployment that is observed.

11) Suppose some unemployed people search for jobs only at places where they are unlikely to be hired, so that they can still qualify for unemployment benefits. These people are officially counted as unemployed. If these individuals were counted as out of the labor force instead of as unemployed, then

- a. both the unemployment rate and labor-force participation rate would be higher.
- b. **both the unemployment rate and labor-force participation rate would be lower.**
- c. the unemployment rate would be lower and the labor-force participation rate would be higher.
- d. the unemployment rate would be higher and the labor-force participation rate would be lower.

12) Steph buys a designer dress produced by an American-owned fashion shop in France. As a result, U.S. consumption increases, U.S. net exports

- a. **decrease, U.S. GDP is unaffected, and U.S. GNP increases.**
- b. decrease, U.S. GDP increases, and U.S. GNP is unaffected.
- c. decrease, U.S. GNP increases, and French GDP is unaffected.
- d. are unaffected, U.S. GDP is unaffected, and French GDP increases.

Table 1

2010 Labor Data for Adults (age 16 and older) in Meditor

Males not in labor force	45 million
Females not in labor force	35 million
Males unemployed	5 million
Females unemployed	5 million
Males employed	85 million
Females employed	65 million

13) Refer to Table 1. What is the adult population in Meditor?

- a. 90 million
- b. 160 million
- c. 230 million
- d. **240 million**

14) Refer to Table 1. What is the adult male unemployment rate in Meditor?

- a. 3.7 percent
- b. 5 percent
- c. **5.6 percent**
- d. 5.9 percent

15) Refer to Table 1. What is the adult female labor-force participation rate in Meditor?

- a. 38.1 percent
- b. 61.9 percent
- c. **66.7 percent**
- d. 95.2 percent

16) The CPI differs from the GDP deflator in that

- a. the CPI is a price index, while the GDP deflator is an inflation index.
- b. substitution bias is not a problem with the CPI, but it is a problem with the GDP deflator.
- c. **increases in the prices of foreign produced goods that are sold to U.S. consumers show up in the CPI but not in the GDP deflator.**
- d. increases in the prices of domestically produced goods that are sold to the U.S. government show up in the CPI but not in the GDP deflator.

17) Suppose an apartment complex converts to a condominium, so that the former renters are now owners of their housing units. Suppose further that a current estimate of the value of the condominium owners' housing services is the same as the rent they previously paid. What happens to GDP as a result of this conversion?

- a. GDP necessarily increases.
- b. GDP necessarily decreases.
- c. GDP is unaffected because neither the rent nor the estimate of the value owner-occupied housing services is included in GDP.
- d. **GDP is unaffected because previously the rent payments were included in GDP and now the rent payments are replaced in GDP by the estimate of the value of owner occupied housing services.**

18) At the University of Trinidad and Tobago, tuition in 1972 was \$15 per credit hour and in 1999 it was \$77 per credit hour. The consumer price index for Trinidad and Tobago was 26.1 in 1972 and 110.9 in 1999. What was 1972 tuition per credit hour in 1999 dollars?

- a. \$18.12.
- b. **\$63.74**
- c. \$13.26
- d. \$74.21

19) Which of the following statements about GDP is correct?

- a. GDP measures two things at once: the total income of everyone in the economy and the total expenditure on the economy's output of goods and services.
- b. Money continuously flows from households to firms and then back to households, and GDP measures this flow of money.
- c. RGDP per capita is generally regarded as the best single measure of a society's economic well-being.
- d. **All of the above are correct.**

20) (Attendance) When we studied inflation in class, in order to introduce the topic and make you understand that prices in the economy as a whole change over time, Professor Bossi showed you the evolution of prices of items that are related to a Marvel Superheroes. During that class, Professor Bossi also told you what his personal favorite super hero is. Please name it.

- a. Hulk.
- b. **Wolverine.**
- c. Superman.
- d. Spider Man.

To get full credit in these exercises below you really need to show your work. If you write just a number as the answer and even if that number is correct you will not get full credit in the exercise unless you show fully the formulas and your work (how you got that number and the steps involved in your computation).

EXERCISE I (20 points total)

Use the following table to answer the questions below. Assume that the base year is 2016 and that the representative urban consumer's bundle includes the following: **10 cookies, 5 envelopes, 2 chestnuts.**

	total units produced in 2010	total units produced in 2013	total units produced in 2016	per unit prices in 2010	per unit prices in 2013	per unit prices in 2016
Envelopes	100	150	200	\$0.50	\$0.60	\$0.70
Cookies	300	275	250	\$5.00	\$6.00	\$7.00
Chestnuts	50	52	55	\$3.00	\$3.25	\$3.50

a) (4 POINTS) What are the nominal and real GDP for this economy in year 2010?

Real GDP in 2010 = prices of the base year (2016) * quantities of 2010 = $0.7*100 + 7*300 + 3.5*50 = \$2,345$

Nominal GDP in 2010 = prices of 2010 * quantities of 2010 = $0.5*100 + 5*300 + 3*50 = \$1,700$

b) (8 POINTS) In 2015 the NGDP was 10% higher than what it used to be in 2013 and the RGDP was 5% higher than what it used to be in 2013. Use the GDP Deflator to compute the inflation rate for 2016. Use 2 decimal digits precision for your answer.

Real GDP in 2013 = prices of the base year (2016) * quantities of 2013 = $\$0.7*150 + \$7*275 + \$3.5*52 = \$2,212$

Nominal GDP in 2013 = prices of 2013 * quantities of 2013 = $\$0.6*150 + \$6*275 + \$3.25*52 = \$1,909$

RGDP 2015 = RGDP 2013 *(1+5%) = $\$2,212*(1.05) = \$2,322.6$

NGDP 2015 = NGDP 2013 *(1+10%) = $\$1,909*(1.1) = \$2,099.9$

Taking their ratio of the nominal GDP in 2015 to the real GDP in 2015 and multiplying by 100, we get that the 2015 GDP Deflator is 90.41.

The GDP Deflator in 2016 is 100 since 2016 is the base year.

Thus, inflation for 2016 using the GDP deflator is

$100*(100-90.41)/90.41=10.61\%$

c) (8 POINTS) Use the CPI to compute the inflation rate for the 3 years period 2010 to 2013 and for the 3 years period 2013 to 2016. Compare both figures with the corresponding figures you would get for core inflation using the CPI. Use 2 decimal digits precision for your answer.

Recall that the CPI basket is composed only of 10 cookies, 2 chestnuts, and 5 envelopes in this exercise.

Cost of the basket in 2016 = $5*0.7 + 10*7 + 2*3.5$

This is the cost of the basket in the base year, as 2016 is the base year.

Cost of the basket in 2013 = $5*0.6 + 10*6 + 2*3.25$

Cost of the basket in 2010 = $5*0.5 + 10*5 + 2*3$

CPI 2010 = $(58.5/80.5)*100=72.67$.

CPI 2013 = $(69.5/80.5)*100 = 86.34$

CPI 2016 = 100 (base year)

Thus inflation using the CPI is

For the period 2010 to 2013

$100*(86.34 - 72.67)/72.67 = 18.81\%$.

For the period 2013 to 2016

$$100 \cdot (100 - 86.34) / 86.34 = 15.82\%$$

CORE CPI: only 5 envelopes because cookies and chestnuts are food and food and energy products do not enter core inflation calculations.

$$\text{Cost of the basket in 2016} = \$3.5 = 5 \cdot 0.7$$

This is the cost of the basket in the base year, as 2016 is the base year.

$$\text{Cost of the basket in 2013} = \$3 = 5 \cdot 0.6$$

$$\text{Cost of the basket in 2010} = \$2.5 = 5 \cdot 0.5$$

$$\text{CPI 2010} = (2.5/3.5) \cdot 100 = 71.43.$$

$$\text{CPI 2013} = (3/3.5) \cdot 100 = 85.71$$

$$\text{CPI 2016} = 100 \text{ (base year)}$$

Thus inflation using the CPI is

For the period 2010 to 2013

$$100 \cdot (85.71 - 71.42) / 71.42 = 20\%.$$

For the period 2013 to 2016

$$100 \cdot (100 - 85.71) / 85.71 = 16.67\%$$

Alternatively -to compute the core inflation-, if you used only the price of envelopes and you did not compute the basket cost because you recognized envelopes are the only good that matter in this case and this way everything is so much faster because you keep track only of \$0.7, \$0.6 and \$0.5 over time that is a fully acceptable answer too.

Core inflation is higher because over this period the percentage increase in the envelopes prices is more significant than the percentage increase in the chestnuts and cookies prices.

EXERCISE II

Consider the following information for the imaginary country of Mordor

Population Stats of Mordor in Year 1

# employed	100
# unemployed	20

Since this is a magical world, all Mordorians are born adults, capable of working immediately. No Mordorian ever dies. You know that 50% of the population is hired by Gandalf's company. Gandalf's company is the only employer on Mordor. Mordor is an island and no movement is possible in and out of Mordor.

a) (2 POINTS) What is the size of Mordor's labor force?

$$\text{Labor force} = \# \text{ employed} + \# \text{ unemployed} = 100 + 20 = 120$$

b) (4 POINTS) What is the number of Mordorians not in the labor force in year 1? (Note you will need to use this number in part d) of the exercise below)

You know that 50% of the population is employed and this corresponds to 100 Mordorians the remaining 50% of the population is either not in the labor force or unemployed. So 100 Mordorians are either unemployed or not in the labor force. You also know that 20 Mordorians are actually unemployed so 80 are those not in the labor force.

c) (10 POINTS) Frodo runs a census study on Mordorians in Year 1. He trips over a ring and loses some information. Help him recover what he lost. Frodo knows that 60% of Mordorians are elves while the rest

are trolls. What are the value of A, B, C, D, E, and F in the table below? Show your computations and how you obtain your results. (**Hint:** carefully match the column information with the row information to find your answers)

	Mordorians	Elves	Trolls
# employed	100	80	A
# unemployed	20	5	15
Not in labor force	# from part b) above =	B	C
Total population	D	E	F

A = 20 (because total Mordorians employed are 100 – 80 Elves employed = 20 Trolls employed)

B = 35 (Because the total population of Mordorians is 200 of which 60% =120 are the total number of Elves in the population. Of those 120, we are told 80 are employed and 5 are unemployed hence 35 = 120 - 80 – 5 are the one that are not in the labor force).

C = 45 (from part b) of the question above you know that 80 is the total number of Mordorians not in the labor force, from letter A you know that 20 are the trolls employed hence 45 = 80-20-15 are the trolls not in the labor force)

D = 200 this is simply adding 120 to 80

E = 120 (60% of 200 are Elves)

F = 80 (40% of 200 are Trolls)

d) (4 POINTS) What is the unemployment rate for Elves? And for Trolls? Use 2 decimal digits precision for your answer.

Total labor force for Elves is 85 (80 employed + 5 unemployed).

Total labor force for Trolls is 35 (20 employed + 15 unemployed).

U-rate for Elves = $100 * \frac{\text{Elves unemployed}}{\text{Labor force of Elves}}$

So $100 * \frac{5}{85} = 5.88\%$

U-rate for Trolls = $100 * \frac{\text{Trolls unemployed}}{\text{Labor force of Trolls}}$

So $100 * \frac{15}{35} = 42.86\%$

MARK CLEARLY (FILL IN) THE LETTER OF YOUR CHOICE FOR THE MULTIPLE CHOICE QUESTIONS. ONLY THIS PAGE WILL BE GRADED FOR THE MC PART.

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|-----|---|---|---|---|
| 1. | Ⓐ | Ⓑ | Ⓒ | Ⓓ |
| 2. | Ⓐ | Ⓑ | Ⓒ | Ⓓ |
| 3. | Ⓐ | Ⓑ | Ⓒ | Ⓓ |
| 4. | Ⓐ | Ⓑ | Ⓒ | Ⓓ |
| 5. | Ⓐ | Ⓑ | Ⓒ | Ⓓ |
| 6. | Ⓐ | Ⓑ | Ⓒ | Ⓓ |
| 7. | Ⓐ | Ⓑ | Ⓒ | Ⓓ |
| 8. | Ⓐ | Ⓑ | Ⓒ | Ⓓ |
| 9. | Ⓐ | Ⓑ | Ⓒ | Ⓓ |
| 10. | Ⓐ | Ⓑ | Ⓒ | Ⓓ |
| 11. | Ⓐ | Ⓑ | Ⓒ | Ⓓ |
| 12. | Ⓐ | Ⓑ | Ⓒ | Ⓓ |
| 13. | Ⓐ | Ⓑ | Ⓒ | Ⓓ |
| 14. | Ⓐ | Ⓑ | Ⓒ | Ⓓ |
| 15. | Ⓐ | Ⓑ | Ⓒ | Ⓓ |
| 16. | Ⓐ | Ⓑ | Ⓒ | Ⓓ |
| 17. | Ⓐ | Ⓑ | Ⓒ | Ⓓ |
| 18. | Ⓐ | Ⓑ | Ⓒ | Ⓓ |
| 19. | Ⓐ | Ⓑ | Ⓒ | Ⓓ |
| 20. | Ⓐ | Ⓑ | Ⓒ | Ⓓ |