

TOTAL SCORE _____

MC _____

EXE 1 _____

EXE 2 _____

Econ 002- INTRO MACRO Prof. Luca Bossi September 29, 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). Only the answer sheet for the MC part will be graded for your MC. 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) A Minnesota farmer buys a new tractor made in Iowa by a German company. As a result,
- U.S. investment and GDP increase, but German GDP is unaffected.
 - U.S. investment and German GDP increase, but U.S. GDP is unaffected.
 - U.S. investment, U.S. GDP, and German GDP are unaffected because tractors are intermediate goods.
 - U.S. investment, U.S. GDP, and German GDP all increase.
- 2) Efficiency wages
- increase productivity and reduce unemployment.
 - increase productivity but increase unemployment.
 - decrease productivity but reduce unemployment.
 - decrease productivity and increase unemployment.
- 3) Darla, a Canadian citizen, only works in the United States. The value added to production from her employment is
- included only in U.S. GDP.
 - included in both U.S. GDP and Canada GDP.
 - included only in Canada GDP.
 - 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?
- both Arnold and Michael
 - Arnold but not Michael
 - Michael but not Arnold
 - 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?
- It more than doubled.
 - It increased, but it less than doubled.
 - It was unchanged.
 - It decreased.
- 6) Which of the following items is counted as part of government purchases?
- The federal government pays \$2,000 in Social Security benefits to a retired person.
 - The city of Athens, Ohio pays \$10,000 to a tree-trimming firm to trim trees along city boulevards.
 - The state of Nebraska pays \$1,000 of unemployment benefits to help person who qualifies for those.
 - All of the above are correct.

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) Which of the following is not included in U.S. GDP?

- a. unpaid cleaning and maintenance of houses
- b. services such as those provided by lawyers and hair stylists
- c. the estimated rental value of owner-occupied housing
- d. production of foreign citizens living in the United States

9) 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.

10) A survey shows that in each of the past 12 months there was one person who was unemployed. That person worked in all other months of the year. The survey shows that there were also two other persons who were unemployed for all 12 months. Given this information, what percentage of the unemployment spells during the year was short-term, and what percentage of the unemployment in a given month was long-term?

- a. 75 percent and 33.3 percent
- b. 75 percent and 66.7 percent
- c. 85.7 percent and 33.3 percent
- d. 85.7 percent and 66.7 percent

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) In the economy of Ukzten in 2010, consumption was 60% of GDP, government purchases were \$212, imports were \$67 and equal to 67% of the value of exports, investment was one-half of the value of consumption. What was Ukzten's GDP in 2010?

- a. \$1450
- b. \$1790
- c. \$2450
- d. \$2790

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) Assume an economy experienced a positive rate of inflation between 2003 and 2004 and again between 2004 and 2005. However, the inflation rate was lower between 2004 and 2005 than it was between 2003 and 2004. Which of the following scenarios is consistent with this assumption?

- a. The CPI was 100 in 2003, 110 in 2004, and 105 in 2005.
- b. The CPI was 100 in 2003, 105 in 2004, and 130 in 2005.
- c. **The CPI was 100 in 2003, 120 in 2004, and 135 in 2005.**
- d. The CPI was 100 in 2003, 90 in 2004, and 88 in 2005.

17) GDP does not reflect

- a. the value of leisure.
- b. the value of goods and services produced at home.
- c. the quality of the environment.
- d. **All of the above are correct.**

18) A worker received \$5 for a daily wage in 1930, which has the equivalent value of \$63.24 today. If the CPI was 17 in 1930 what is the value of the CPI today, rounded to the nearest whole number?

- a. **215**
- b. 134
- c. 17
- d. 1.3

19) When looking at a graph of nominal and real interest rates you notice that nominal rates always lie above real rates. From this you can conclude for sure

- a. there were serious episodes of deflation in the time frame represented on the graph.
- b. the economy never experienced a recession in the time frame represented on the graph.
- c. **consumer prices were always rising in the time frame represented on the graph.**
- d. GDP was always increasing for the time frame represented on the graph.

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 super-hero. Please name that super-hero.

- 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)

The table below presents information for all the products that are produced and/or consumed in Narnia's economy for the period 2010-2012. Let 2010 be the base year. Use 2 decimals (rounding to the nearest one) when necessary.

Year	Coffee - imported		Tractors- produced domestically	
	P	Quantity	P	Quantity
2010	8	4	50	3
2011	9	5	55	3
2012	8.5	4	56	4

Year	Bread – produced domestically		Butter- produced domestically	
	P	Quantity	P	Quantity
2010	3	12	5	6
2011	2	10	Not Available	Not Available
2012	4	13	Not Available	Not Available

- a) (7 POINTS) For each year compute the inflation rate using the GDP Deflator.
- b) (7 POINTS) There are two identical households that consume all the available amount of consumption goods that are in Narnia in 2012. The two households split each relevant consumption good exactly in equal amounts (do not round). This arrangement constitute the typical market basket of a consumer that is used to compute the CPI. Using this information, compute for each year the inflation rate using the CPI.
- c) (6 POINTS) For each year compute the inflation rate using the Personal Consumption Expenditure Deflator.

PAPER FOR YOUR USE

Answers:

a) First, calculate the NGDP and RGDP. Notice that they coincide in 2010 because the base year is 2010. Besides, as coffee is imported it is not included when calculating GDP.

Year	Nominal GDP	Real GDP
2010	$50 \times 3 + 3 \times 12 + 5 \times 6 = 216$	216
2011	$55 \times 3 + 2 \times 10 = 185$	$50 \times 3 + 3 \times 10 = 180$
2012	$56 \times 4 + 4 \times 13 = 276$	$50 \times 4 + 3 \times 13 = 239$

Then calculate the GDP Deflator and the inflation rate. Recall the following formulas:

$$GDPD_t = 100 * NGDP_t / RGDP_t$$

$$\text{Inflation in period } t = 100 * (GDPD_t - GDPD_{t-1}) / GDPD_{t-1}$$

Year	GDPD	Inflation rate
2010	100	Not available
2011	$100 \cdot 185 / 180 = 102.78$	$100 \cdot (102.78 - 100) / 100 = 2.78\%$
2012	$100 \cdot 276 / 239 = 115.48$	$100 \cdot (115.48 - 102.78) / 102.78 = 12.36\%$

b) First notice that in the typical basket each consumer consumes 2 units of coffee and 6.5 units of bread. We must not include butter because butter is not a good that is in the basket of 2012. Also we cannot include tractors because tractors are an investment good and not a consumption good. Coffee is imported and obviously consumed (otherwise it would not be imported) and bread is a consumption good. Then calculate the CPI and the inflation rate. Recall the following formulas:

$$CPI_t = 100 \cdot BK_t / BK_{BP}$$

$$\text{Inflation in period } t = 100 \cdot (CPI_t - CPI_{t-1}) / CPI_{t-1}$$

Year	Basket cost	CPI	Inflation Rate
2010	$2 \cdot 8 + 6.5 \cdot 3 = 35.5$	100	Not available
2011	$2 \cdot 9 + 6.5 \cdot 2 = 31$	$100 \cdot 31 / 35.5 = 87.32$	$100 \cdot (87.32 - 100) / 100 = -12.68\%$
2012	$2 \cdot 8.5 + 6.5 \cdot 4 = 43$	$100 \cdot 43 / 35.5 = 121.13$	$100 \cdot (121.13 - 87.32) / 87.32 = 38.72\%$

c) When solving this you have to remember that in the RPCE and NPCE all the consumption goods are included when available (coffee, bread, and butter). Besides, remember we are using 2010 as the base year.

Year	NPCE	RPCE
2010	$8 \cdot 4 + 3 \cdot 12 + 5 \cdot 6 = 98$	98
2011	$9 \cdot 5 + 2 \cdot 10 = 65$	$8 \cdot 5 + 3 \cdot 10 = 70$
2012	$8.5 \cdot 4 + 4 \cdot 13 = 86$	$8 \cdot 4 + 3 \cdot 13 = 71$

Then calculate the PCED and the inflation rate. Recall the following formulas:

$$PCED_t = 100 \cdot NPCE_t / RPCE_t$$

$$\text{Inflation in period } t = 100 \cdot (PCED_t - PCED_{t-1}) / PCED_{t-1}$$

Year	PCED	Inflation rate
2010	100	Not available

2011	$100 * 65 / 70 = 92.86$	$100 * (92.86 - 100) / 100 = -7.14\%$
2012	$100 * 86 / 71 = 121.13$	$100 * (121.13 - 92.86) / 92.86 = 30.44\%$

EXERCISE II

The Kingdom of the North has an adult population of 300 million people. 110 million work in the service industry, 20 million work in manufacturing, 2 million work in agriculture, 8 million are self-employed, and the rest of the labor force is unemployed. Service, manufacturing, agriculture, and self-employment are the only industries.

a) (10 POINTS) We know that the labor force participation rate is 50%. How many people are in the labor force? What is the total unemployment rate?

b) (10 POINTS) Suppose that the unemployment rate in the service industry is the same as the one in the manufacturing industry and equal to 6%. There is no unemployment among the self-employed. How many agriculture workers are unemployed and what is the agriculture industry unemployment rate?

PAPER FOR YOUR USE

Solutions:

$$a) \text{ LFPR} = \frac{\text{Labor Force}}{\text{Adult Population}} \times 100 \rightarrow 50\% = \frac{\text{Labor Force}}{300 \text{ million}} \rightarrow \text{Labor Force} = 150 \text{ million}$$

$$\text{Unemployed} = \text{Labor Force} - \text{Employed} = 150 - 110 - 20 - 2 - 8 = 10 \text{ million}$$

$$U - \text{Rate} = \frac{\text{Unemployed}}{\text{Labor Force}} \times 100 = \frac{10 \text{ million}}{150 \text{ million}} \times 100 = 6.67\%$$

$$b) U - \text{Rate Service} = 0.06 = \frac{\text{Unemp S}}{\text{Employed S} + \text{Unemp S}} = \frac{\text{Unemp S}}{110 + \text{Unemp S}} \rightarrow \text{Unemp Service} = 7.02 \text{ million}$$

$$U - \text{Rate Manufacturing} = 0.06 = \frac{\text{Unemp M}}{\text{Employed M} + \text{Unemp M}} = \frac{\text{Unemp M}}{20 + \text{Unemp M}} \rightarrow$$

$$\text{Unemp Manufacturing} = 1.28 \text{ million}$$

$$\text{Total Unemployed} = \text{Unemp S} + \text{Unemp M} + \text{Unemp A} \rightarrow 10 = 7.02 + 1.28 + \text{Unemp A}$$

$$\text{Unemployed Agriculture} = 1.7 \text{ million}$$

$$U - \text{Rate A} = \frac{\text{Unemployed A}}{\text{Labor Force A}} \times 100 = \frac{1.7}{2 + 1.7} \times 100 = 45.95\%$$

YOUR NAME: _____ YOUR TA's NAME: _____

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

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