

Econ 102: Principles of Macroeconomics
Homework 1 (Page 1 out of 5)

Problem 1 (Review of Basic Linear Algebra)

For this problem, you may find the appendix to chapter 1 helpful.

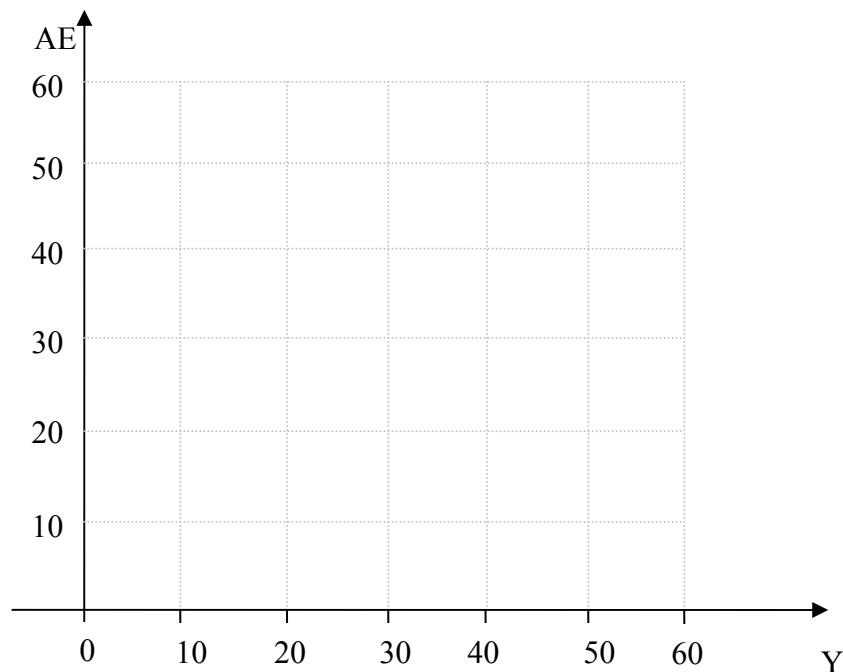
- a. *AE* (aggregate expenditures) and *Y* (output) are related in the following way: $AE = 0.5Y + 10$. Given values of *Y* listed in the table below, compute the corresponding values of *AE* and complete the table.

Your answer:

<i>Y</i>	<i>AE</i>
0	
10	
20	
30	
40	
50	
60	

- b. Using the values from the table above, plot the equation $AE = 0.5Y + 10$. You should have *AE* on the *oy* axis and *Y* on the *ox* axis as shown below.

Your answer (will also include answers to point c and e below)::



Econ 102: Principles of Macroeconomics
Homework 1 (Page 2 out of 5)

- c. Plot the equation $AE = Y$ on the graph above (point b). Indicate the crossing point with the line from point b, and read from the graph the approximate coordinates of this point:

Your answer: $AE = \dots\dots\dots$ $Y = \dots\dots\dots$

- d. Solve algebraically the system of equations from point b and c, i.e. solve:

$$AE = 0.5Y + 10$$

$$AE = Y$$

Your answer: $AE = \dots\dots\dots$ $Y = \dots\dots\dots$

(To get credit, your answer must be similar to the answer you gave in point c.)

- e. Suppose now AE and Y are related in a different way: $AE = 0.5Y + 20$ (note that it has the same slope, but the *intercept* with *oy* axis has changed from 10 to 20). Plot this new relationship on the graph in point b, and make it a different color (preferably not red). Read from the graph the crossing point between this new line and the line from point c (equation: $AE = Y$):

First part of your answer: $AE = \dots\dots\dots$ $Y = \dots\dots\dots$

Solve algebraically the system of equations:

$$AE = 0.5Y + 20$$

$$AE = Y$$

Second part of your answer: $AE = \dots\dots\dots$ $Y = \dots\dots\dots$

(To get credit, your answer must be similar to the one above.)

What is the difference in Y between the two crossing points you found in point d and e?

Third part of your answer: $\dots\dots\dots$

Econ 102: Principles of Macroeconomics
Homework 1 (Page 3 out of 5)

Note that the intercept with *oy* axis has gone up by 10, but *Y* at the crossing point with $AE=Y$ line has increased by much more. Give the reason why. (HINT: when would the change in *Y* be exactly equal to change in the *intercept*? Think of horizontal line instead of $AE=0.5Y+20$.)

Fourth part of your answer:

Problem 2 (Growth Rate)

a. Suppose real GDP in Poland was 250 in year 1995 and 267.5 in year 1996. What was the growth rate of real GDP between year 1995 and year 1996 (our convention will be to call it the growth rate that occurred in year 1996).

Growth rate in 1996 was:

b. The growth rate of real GDP in Poland was 6% in year 1997 (means: growth rate between year 1997 and 1996), 6.8% in year 1998, 4.8% in year 1999, and 4.1% in year 2000. Assuming the real GDP was 267.5 in year 1996, fill out the table below:

Your answer:

Year	GDP	Growth rate of GDP
1995	250	--
1996	267.5	Answer to point a
1997		6%
1998		6.8%
1999		4.8%
2000	X	4.1%

c. Suppose from 2000 on the growth rate of Polish real GDP is constant at the level 4% per annum. When will the Polish real GDP double (use rule of 70)?

In year:

Problem 3 (Calculating GDP per Capita)

In 1973, real GDP (at year 2000 prices) was \$4,342 billion. In 2000, it was \$9,817 billion. During the same time period, the US population rose from 212 million to 281 million.

Econ 102: Principles of Macroeconomics
Homework 1 (Page 4 out of 5)

a. What was the total percentage increase in real GDP from 1973 to 2000?

Your answer:

b. What was the total percentage increase in the US population during this period?

Your answer:

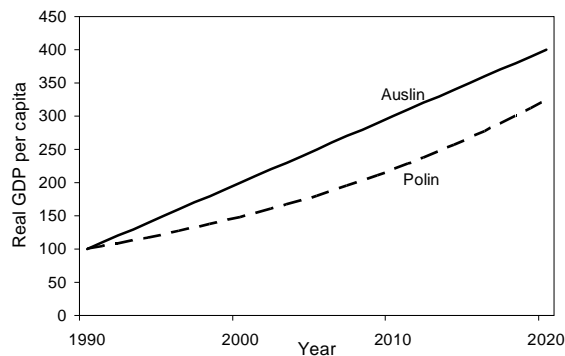
c. Calculate real GDP per person in 1973 and in 2000. By what percentage did output per person grow over this period?

Your answer:

Problem 4 (Reading the Graphs)

The following two panels illustrate the time series of real GDP per capita of two countries: *Auslin* and *Polin* (both on Mars). In one of these countries the real GDP per capita increases at a constant (growth) rate per annum. Which one is it?

Your answer:



Econ 102: Principles of Macroeconomics
Homework 1 (Page 5 out of 5)

Problem 5 (True/False)

For each of the following statements, circle T if the statement is True or F if it is false.

- T F When economists study output, employment or inflation in small countries like Estonia, or Bahamas, they are practicing *microeconomics*.
- T F In any period during which real GDP rises, output per person and the average standard of living automatically rise as well.
- T F Unemployment rate in the United States has never actually reached zero, even when the economy was doing extremely well.

Problem 6 (Definitions)

Give the key word that best fits the statement or definition.

- Increase in production of goods and services that occurs over long periods of time.
- Fluctuations in the real GDP around its long-term growth trend.
- A period of a significant decline in the real GDP (half a year or longer).
- An unusually severe instance of the above.
- The process of combining different things into a single category.