1. ***Consider each of the following statements and comment on whether there is another side to the story (hint: Beware of simplistic answers to complicated macroeconomic questions.).***
    a. There is a simple solution to the problem of high European unemployment: reduce labour market rigidities.
    b. What can be wrong about joining forces and adopting a common currency? Adoption of the euro is obviously good for Europe.
2. ***Chinese economic growth is the outstanding feature of the world economic scene over the past two decades.***
    a. In 2014, US output was $17.4 trillion, and Chinese output was $10.4 trillion. Suppose that from now on, the output of China grows at an annual rate of 6.5% per year, whereas the output of the United States grows at an annual rate of 2.2% per year. These are the values in each country for the period 2010–14 as stated in the text. Using these assumptions and a spreadsheet, calculate and plot US and Chinese output from 2014 over the next 100 years. How many years will it take for China to have a total level of output equal to that of the United States?
    b. When China catches up with the United States in total output, will residents of China have the same standard of living as US residents? Explain.
    c. Another term for *standard of living* is *output per person.* How has China raised its output per person in the last two decades? Are these methods applicable to the United States?
    d. Do you think China's experience in raising its standard of living (output per person) provides a model for developing countries to follow?
3. ***The rate of growth of output per person was identified as a major issue facing the United States. Based on the 2015*** **Economic Report of the President** ***(table titled 'Productivity and Related Data' Table B-16). Address the issues below:***
    a. The level of output per hour worked of all persons in the nonfarm business sector was represented as an index number equal to 100 in 2009 and 103.2 in 2010. Calculate the percentage increase in output per hour worked from 2009 to 2010. What does that value mean?
    b. Now the average percentage increase in output per hour worked are presented in table below:

Time period	1970-1979	1980-1989	2000-2009	2010-2014
Growth rate	1.9%	1.5%	2.1%	2.6%

How does productivity growth in the last decade compare with the other decades?

4. ***Suppose you are measuring annual EU GDP by adding up the final value of all goods and services produced in the European economy. Determine the effect on GDP of each of the following transactions.***
    a. A seafood restaurant buys :100 worth of fish from a fisherman.
    b. A family spends :100 on a fish dinner at a seafood restaurant.
    c. Delta Air Lines buys a new jet from Airbus for :200 million.
    d. The Greek national airline buys a new jet from Airbus for 200 million.
    e. Delta Air Lines sells one of its jets for :100 million.
5. **During a given year, the following activities occur:**

- **A silver mining company pays its workers:200,000 to mine 75 kilos of silver. The silver is then sold to a jewellery manufacturer for:300,000.**
- **The jewellery manufacturer pays its workers:250,000 to make silver necklaces, which the manufacturer sells directly to consumers for:1,000,000.**
    a. Using the production-of-final-goods approach, what is GDP in this economy?
    b. What is the value added at each stage of production? Using the value-added approach, what is GDP?
    c. What are the total wages and profits earned? Using the income approach, what is GDP?

6. ***An economy produces three goods: cars, computers and oranges. Quantities and prices per unit for the years 2013 and 2014 are as follows:***

	2013		2014	
	Quantity	**Price**	**Quantity**	**Price**
Cars	**10**	**2000**	**12**	**3000**
Computers	**4**	**1000**	**6**	**500**
Oranges	**1000**	**1**	**1000**	**1**

    a. What is nominal GDP in 2013 and in 2014? By what percentage does nominal GDP change from 2013 to 2014?
    b. Using the prices for 2013 as the set of common prices, what is real GDP in 2013 and in 2014? By what percentage does real GDP change from 2013 to 2014?
    c. Using the prices for 2014 as the set of common prices, what is real GDP in 2013 and in 2014? By what percentage does real GDP change from 2013 to 2014?
    d. Why are the two output growth rates constructed in (b) and (c) different? Which one is correct? Explain your answer.

7. ***Consider the economy described in Problem 6.***
    a. Use the prices for 2013 as the set of common prices to compute real GDP in 2013 and in 2014. Compute the GDP deflator for 2013 and for 2014 and compute the rate of inflation from 2013 to 2014.
    b. Use the prices for 2014 as the set of common prices to compute real GDP in 2013 and in 2014. Compute the GDP deflator for 2013 and for 2014 and compute the rate of inflation from 2013 to 2014.
    c. Why are the two rates of inflation different? Which one is correct? Explain your answer.

8. ***Consider the economy described in Problem 6.***
    a. Construct real GDP for the years 2013 and 2014 by using the average price of each good over the two years.
    b. By what percentage does real GDP change from 2013 to 2014?
    c. What is the GDP deflator in 2013 and 2014? Using the GDP deflator, what is the rate of inflation from 2013 to 2014?
    d. Is this an attractive solution to the problems pointed out in Problems 4 and 5 (i.e. two different growth rates and two different inflation rates, depending on which set of prices is used)?

9. ***Using macroeconomic relations address following issues:***
    a. If output growth is positive, the unemployment rate will decline. Discuss.
    b. Consider two years, one in which output growth is 2% and one in which output growth is -2%. In which year will the unemployment rate rise more?
    c. The Phillips curve is a relation between the change in the inflation rate and the level of the unemployment rate. So only when the unemployment rate is equal to zero is inflation stable. Discuss.
    d. The Phillips curve is often represented as a line with a negative slope. Consider whether the economy is 'better' when the slope is -1.2 or when it is equal to -1.6. Consider also a smaller slope, say -0.8?

10. Hedonic pricing

It is difficult to measure the true increase in prices of goods whose characteristics change over time. For such goods, part of any price increase can be attributed to an increase in quality. Hedonic pricing offers a method to compute the quality-adjusted increase in prices.

    a. Consider the case of a routine medical check-up. Name some reasons why you might want to use hedonic pricing to measure the change in the price of this service. *Now consider the case of a medical check-up for a pregnant woman. Suppose that a new ultrasound method is introduced. In the first year that this method is available, half of*

doctors offer the new method and half offer the old method. A check-up using the new method costs 10% more than a check-up using the old method.

b. In percentage terms, how much of a quality increase does the new method represent over the old method? (Hint: Consider the fact that some women *choose* to see a doctor offering the new method when they could have chosen to see a doctor offering the old method.) *Now, in addition, suppose that, in the first year the new ultrasound method is available, the price of check-ups using the new method is 15% higher than the price of check-ups in the previous year (when everyone used the old method).*

c. How much of the higher price for check-ups using the new method (as compared with check-ups in the previous year) reflects a price increase of check-ups and how much represents a quality increase? In other words, how much higher is the quality-adjusted price of check-ups using the new method as compared with the price of check-ups in the previous year?

In many cases, the kind of information we used in parts (b) and (c) is not available. For example, suppose that, in the year when the new ultrasound method is introduced, all doctors adopt the new method, so the old method is no longer used. In addition, continue to assume that the price of check-ups in the year the new method is introduced is 15% higher than the price of checkups in the previous year (when everyone used the old method). Thus, we observe a 15% price increase in check-ups, but we realise that the quality of check-ups has increased.

d. Under these assumptions, what information required to compute the quality-adjusted price increase of check-ups is lacking? Even without this information, can we say anything about the quality-adjusted price increase of checkups? Is it more than 15%? Less than 15%? Explain.

11. Measured and true GDP

Suppose that instead of cooking dinner for an hour, you decide to work an extra hour, earning an additional :12. You then purchase some (takeaway) Chinese food, which costs you :10.

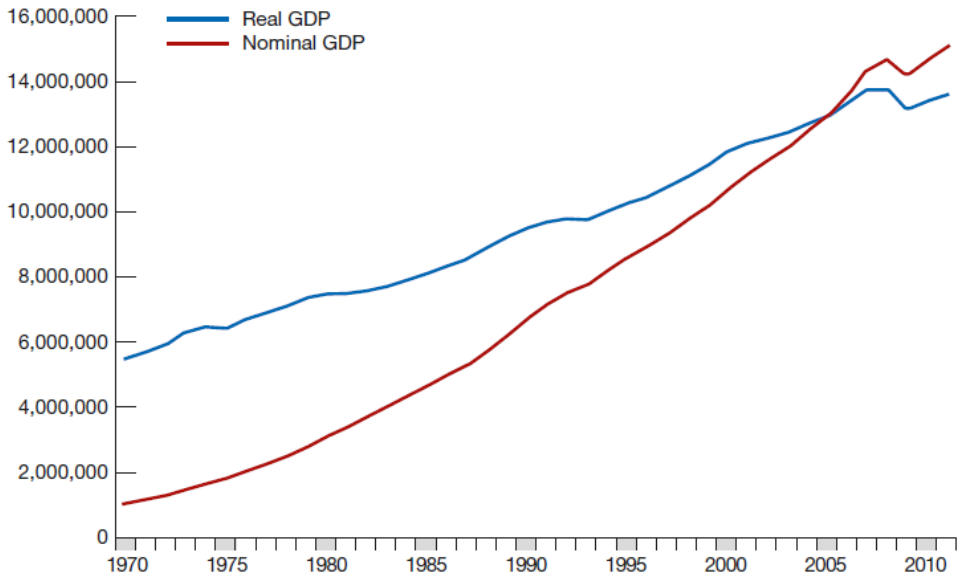
a. By how much does measured GDP increase?

b. Do you think the increase in measured GDP accurately reflects the effect on output of your decision to work? Explain.

ADDITIONAL QUESTIONS:

Label each of the following statements true, false or uncertain. Explain briefly.

a. EU15 GDP was 13 times higher in 2014 than it was in 1970.



Nominal and real EU15 GDP, 1970–2014

From 1970 to 2014, nominal GDP in the EU15 increased by a factor of 13. Real GDP increased by a factor of 2.5.

Source: http://stats.oecd.org

b. When the unemployment rate is high, the participation rate is also likely to be high.

c. The rate of unemployment tends to fall during expansions and rise during recessions.

d. If the Japanese CPI is currently at 108 and the US CPI is at 104, then the Japanese rate of inflation is higher than the US rate of inflation.

e. The rate of inflation computed using the CPI is a better index of inflation than the rate of inflation computed using the GDP deflator.

f. Okun's law shows that when output growth is lower than normal, the unemployment rate tends to rise.

g. When the economy is functioning normally, the unemployment rate is zero.

h. The Phillips curve is a relation between the level of inflation and the level of unemployment.