

## Quiz 2 - Answers

### Question 1

GDP price deflator and CPI price index are (select all that apply)

- A. Generally very different because they involve very different formulas
- B. Generally very different because they refer to different baskets of goods
- C. Generally very close to each other because they refer to the same baskets of goods
- D. Generally very close to each other because they involve very similar computations
- E. Generally very close to each other despite the fact that they refer to different baskets of goods
- F. A and C only
- G. B and C only
- H. C and D only
- I. C and E only
- J. D and E only

**Both CPI and GDP deflator adjust prices by weighting them for the relevance of the relative good. Each good's weight depends on its weight in a particular basket of goods. The difference is that CPI uses a basket of goods that reflects households consumption, while the GDP deflator uses a basket of goods that reflects all goods produced in the economy, including (for instance) goods that are to be exported as primary sources. For this reason, the formulas used to compute the two types of inflation are very similar and they generally provide similar results, despite the fact that they use different baskets of goods.**

**See textbook, p.141**

### Question 2

A typical resident of the state of Ellessee consumes a simple basket of goods composed of life's essentials: 100 ibuprofen tablets, 200 coffees, 300 sandwiches in 2013. They changed the basket to 50 ibuprofen tablets, 300 coffees, 200 sandwiches in 2014. The price patterns of these goods are as follow:

	Price ibuprofen	Price coffee	Price sandwich
2013	0.5	2	3.5
2014	0.5	3	4
2015	1.5	4	4.5

What was the year-on-year inflation rate in 2015, using 2013 as the base year?

- A. 24.3%
- B. 26.7%
- C. 30.0 %
- D. 53.3%

**Explanation:**

	Price ibuprofen	Price coffee	Price sandwich	Yearly expenditure	CPI (2013)	y-o-y inflation
2013	0.5	2	3.5	1500	100	
2014	0.5	3	4	1850	123.33	23.33
2015	1.5	4	4.5	2300	153.33	24.32

**This is mostly an exercise in getting familiar with CPI computations.**

Question 3

Comparing GDP using exchange rate, as opposed to PPP, will most likely

- A. underestimate the income of poor countries
- B. overestimate the income of poor countries
- C. provide an accurate reflection of affluent countries
- D. overestimate the income of affluent countries
- E. A and B only
- F. A and C only
- G. A and D only**
- H. B and C only
- I. B and D only

**Discuss Penn-Balassa-Samuelson effect: prices higher in richer countries.**  
**Handout 3, page 13**

For Questions 4 and 5 refer to the following graphs:

Question 4

Countries A and B's production functions can be represented through the following graphs:



Which of the following are true?

- A. The two graphs plot output against capital stock, holding efficiency units of labour constant
- B. The two graphs plot output against capital stock, accounting for the latter's effect on efficiency units of labour
- C. An increase in the stock of capital increases output in A
- D. An increase in the stock of capital increases output in B
- E. A, C and D only**
- F. B and D only
- G. B, C and D only
- H. A and D only
- I. B and C only

**Discuss aggregate production function. Answer A comes directly from handout 3, slide 29. Both graphs represent increasing functions (hence, C and D are correct).**

Question 5

Look at the two countries represented in Question 4. Which of the following are true?

- A. A experiences diminishing marginal product of capital
- B. B experiences diminishing marginal product of capital
- C. In macroeconomics we assume production functions behave as in A
- D. In macroeconomics we assume production functions behave as in B
- E. A, C and D only
- F. B and D only**
- G. B, C and D only

- H. A and D only
- I. B and C only

**In macroeconomics we posit the law of diminishing marginal product (handout 3, slide 28), which is satisfied only if the function is concave. The questions aims at understanding the graphical implications of diminishing marginal product.**

#### Question 6

Assume that the aggregate production function is  $Y = A K^{1/2} H^{1/2}$ . In the country of Ellessee  $K=900$ ,  $H=400$ ,  $Y=900$ . In the country of Yussielle  $K=400$ ,  $H=100$ ,  $Y=300$ . Which of the countries has better technology?

- A. They have the same level of technology**
- B. Ellessee
- C. Yussielle

**Technology is  $A = Y / (K^{1/2} H^{1/2}) = 1.5$  in both countries.  
Notice Cobb-Douglas production function (handout 3, slide 41).**

#### Question 7

Countries A and B have the same production function,  $Y = A K^{1/2} H^{1/2}$ . In both countries  $A=100$  and  $H=400$ . However, capital in country A is  $K_A=50$ , and capital in country B is equal to  $K_B=10$ .

Assume (you will see why this matters very soon) that capital has the same depreciation rate in both countries.

If you have 1 pound to invest, in which country would you rather invest it?

- A. A because it has a larger economy.
- B. B because investment has higher returns.**
- C. It does not matter because the production function is the same.

**This is a direct consequence of the law of diminishing marginal product: holding the production function constant, in a country with higher capital investment has lower returns.**

#### Question 8

How do increases in technology affect the aggregate production function?

- A. As technology increases, diminishing marginal product sets in such that each unit of technology produces less output.
- B. With better technology, the aggregate production function shifts down because fewer workers are needed.

- C. Even with technology increases, the aggregate production function will remain constant unless the technology increases are matched by increases in the physical capital stock.
- D. With increases in technology, the aggregate production function shifts up, indicating more output is produced from the same amount of inputs.**

**Handout 3, slide 32.**

Question 9

Which of the following determinants of productivity does the aggregate production function **directly** depend on?

- A. human capital.
- B. geography.
- C. technology.
- D. religion and culture.
- E. the capital stock.
- F. A, B and D only
- G. A, C and D only
- H. A, C and E only**
- I. A, B, C, D and E
- J. B, C and E only

**Chapter 6.2 explains how factors of production and technology enter the production function. Note that geography, religion and culture might have an effect on output only by affecting technology or the other factors of production. The production function does not take them directly into account.**

Question 10

Which of the following countries will be relatively better off in the long run?

- A. Country A with \$20,000 annual GDP per capita and a constant 5 percent annual growth rate.
- B. Country B with \$20,000 annual GDP per capita and a constant 6 percent annual growth rate.**
- C. Country C with \$40,000 annual GDP per capita and a constant 2 percent annual growth rate.
- D. Country D with \$60,000 annual GDP per capita and a constant 1 percent annual growth rate.

**Exponential growth, discussed in section 7.1, implies that long run income differences depend on growth rates and not on starting levels, so the country with the highest growth rate will eventually be richer than the others.**

### Question 11

How long will it take a country with an average growth rate of 7% to double its income?

- A. approximately 10 years**
- B. approximately 10 years, but only if we assume a Cobb-Douglas production function
- C. We can't tell, as we don't know the initial income level
- D. We can't tell, as the mathematical computations are too convoluted

**You might believe that in 10 year the country will have grown by 70%, but the question aims at showing how compound growth speeds things up: in 10 year we will have**

$$Y_{t+10} = 1.07 \times 1.07 \times 1.07 \times 1.07 \times 1.07 \times 1.07 \times 1.07 \times 1.07 \times 1.07 \times 1.07 \times Y_t = 1.97 \times Y_t$$

**The general rule is that the time needed to double is approximately  $70/(\text{growth rate in percentage points})$ . Of course this does not depend on the production function but on the properties of exponential growth.**