

## Week 2 Tutorial Solution

ECON203: Macroeconomics 2

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### Multiple Choice Questions

**Question 1.** A mathematical expression relating the amount of output produced to quantities of capital and labour utilized is the

- (a) real interest rate.
- (b) productivity relation.
- (c) production function.
- (d) marginal product.

**Answer:** C

**Question 2.** In the production function  $Y = AF(K, N)$ , total factor productivity is

- (a)  $Y/A$ .
- (b)  $A$ .
- (c)  $K/N$ .
- (d)  $Y/N$ .

**Answer:** B

**Question 3.** Suppose the economy's production function is  $Y = AK^{0.3}N^{0.7}$ . If  $K = 2000$ ,  $N = 100$ , and  $A = 1$ , then  $Y = 246$ . If  $K$  and  $N$  both rise by 10%, and  $A$  is unchanged, by how much does  $Y$  increase?

- (a) 5%
- (b) 10%
- (c) 15%
- (d) 20%

**Answer:** B

**Question 4.** If  $Y = A \times N \times (75 + K/N)$ , where  $K = 1000$ ,  $N = 20$ , and  $A = 10$ , what happens if  $K$  doubles and  $N$  doubles?

- (a)  $Y$  is unchanged.
- (b)  $Y$  increases 50%.
- (c)  $Y$  doubles.
- (d)  $Y$  quadruples.

**Answer:** C

**Question 5.** The two main characteristics of the production function are

- (a) it slopes downward from left to right, and the slope becomes flatter as the input increases.
- (b) it slopes upward from left to right, and the slope becomes steeper as the input increases.
- (c) it slopes upward from left to right, and the slope becomes flatter as the input increases.
- (d) it slopes downward from left to right, and the slope becomes steeper as the input increases.

**Answer:** C

**Question 6.** If the marginal product of capital doesn't change as the amount of capital increases, a figure showing the relationship between output and capital

- (a) is a straight line with constant upward slope.
- (b) is a straight line with a slope of zero.
- (c) is a vertical line.
- (d) slopes upward with a slope that declines as the amount of capital increases.

**Answer:** A

**Question 7.** The marginal product of capital is the increase in

- (a) capital needed to produce one more unit of output.
- (b) output from a one-unit increase in capital.
- (c) labor needed to accompany a one-unit increase in capital.
- (d) output from a one-dollar increase in capital.

**Answer:** B

**Question 8.** An adverse supply shock would

- (a) shift the production function up and decrease marginal products at every level of employment.
- (b) shift the production function down and decrease marginal products at every level of employment.
- (c) shift the production function down and increase marginal products at every level of employment.
- (d) shift the production function up and increase marginal products at every level of employment.

**Answer:** B

**Question 9.** An invention that speeds up the Internet is an example of

- (a) an income effect.
- (b) an increase in labour.
- (c) a substitution effect.
- (d) a supply shock.

**Answer:** D

**Question 10.** Economists often treat the economy's capital stock as fixed because

- (a) labour is a more important factor of production than capital, so economists ignore capital.
- (b) it takes a long time for new investment and the scrapping of old capital to affect the overall quantity of capital.
- (c) there is very little capital in the economy compared to the amount of labour.
- (d) unless the interest rate changes, the capital stock doesn't change.

**Answer:** B

## Problem Solving Questions

**Question 11.** How would each of the following affect the current level of full-employment output? Explain.

a. A large number of immigrants enter the country.

**An increase in the number of immigrants increases the labour force, increasing employment and increasing full-employment output.**

b. Energy supplies become depleted.

**If energy supplies become depleted, this is likely to reduce productivity, because energy is a factor of production. So the reduction in energy supplies reduces full-employment output.**

c. New teaching techniques improve the educational performance of high school seniors.

**Better education raises future productivity and output, but has no effect on current full-employment output.**

d. A new law mandates the shutdown of some unsafe forms of capital.

**This reduction in capital stock reduces full-employment output (although it may very well increase welfare).**

**Question 12.** Suppose the marginal product of labour in the economy is given by  $MPN = 0.002 \times (16000 - N)$ , while the supply of labour is  $1000 + 1000w$ .

a. Find the market-clearing real wage rate and level of employment.

**The market-clearing real wage rate equates the demand and supply of labour. Setting  $w = MPN = 0.002(16000 - N)$ , we get  $w = 32 - 0.002(1000 + 1000w) = 32 - 2 - 2w$ . Using algebra gives  $3w = 30$ , so  $w = 10$ . Plugging into the labour supply equation gives  $N = 1000 + (1000 \times 10) = 11000$ .**

b. What happens to the wage rate and employment if wealth rises, reducing the supply of labor to  $500 + 1000w$ ?

**Setting  $w = MPN = 0.002(16000 - N)$ , we get  $w = 32 - 0.002(500 + 1000w) = 32 - 1 - 2w$ . Using algebra gives  $3w = 31$ , so  $w = 10.333$ . Plugging into the labour supply equation gives  $N = 500 + (1000 \times 10.333) = 10833$ .**

c. What happens to the wage rate and employment if after wealth has risen as in part (b), there is a productivity shock that increases the marginal product of labour to  $MPN = 0.0025 \times (16000 - N)$ ?

**Setting  $w = MPN = 0.0025(16000 - N)$ , we get  $w = 40 - 0.002(500 + 1000w) = 40 - 1.25 - 2.5w$ . Using algebra gives  $3.5w = 38.75$ , so  $w = 11.071$ . Plugging into the labour supply equation gives  $N = 500 + (1000 \times 11.071) = 11571$ .**