**Microeconomics VII.-VIII.**

1. We have the following table:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **L** | 0 | 1 | 2 | 3 | 4 | 5 |
| **Q** | 0 | 4 | 7 | 9 | 10 | 10,5 |

This is a table of one-factor (short-term) production functions, the level of other used inputs is fixed.

a) determine the TPP, APP, MPP of the work factor

b) draw the relevant curves.

1. The company has the option of choosing between the following combinations of labor and capital, while knowing the MPP ratios for individual technological combinations:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| combination | A | B | C | D | E |
| MPPL/MPPK | 5 | 4 | 3 | 2,5 | 2 |

The price of labor is 5 CZK, the price of capital is 2 CZK.

a) determine the optimal combination of inputs (we assume that the company maximizes profit and minimizes costs)

b) draw the isocost for the given prices when TC = CZK 100 (total costs = total volume of expenditure on factors). Next, write the equation of this isocost.

1. Assume that the law of decreasing returns always applies. Which of the following statements is then correct?

a) If AP> MP, then AP must grow.

b) The AP curve is always "above" the MP curve.

1. Can TP be positive and MP negative at the same time? If so, draw the relevant graphs and clarify.
2. The producer of restaurant tables produces in a short period. If the number of workers gradually increases from 1 to 7, the number of tables produced evolves as follows: 10, 17, 22, 25, 26, 25, 23. Calculate the marginal and average (physical) product of labor.
3. The cost for each worker is 50 CZK / hour, the rent for each machine is 100 CZK / hour. The marginal physical product of the machine is 200 units of output per hour. Calculate the size of the marginal physical product of labor if this firm maximizes profit.
4. Isocost corresponds to the total costs of CZK 200. The price of capital is CZK 10, the price of labor is CZK 20. At what point does the isocost intersect the horizontal axis? We give the labor on the x-axis.

a) 10

b) 15

c) 20

d) 30

e) 200

f) does not intersect it.

1. Suppose that the production function is given by an equation Q = 600K2L2 - K3L3:

a) determine the MP and AP of the labor by K = 10

b) determine the amount of labor at which the MP is maximum and how this is reflected in the development of the overall product

c) determine at which amount of labor is the maximum of average labor productivity.

d) how the increase of K from 10 to 11 affects the TP function and the maximum of MPL and APL.

1. A short-term production function is in the form: Q = 144L + 30L2 - 2L3

a) write the equation of MPL

b) write the equation of APL

c) determine the MPL value for the seven units of labor

d) determine at which volume of labor the decreasing returns from variable labor input begin.

1. The production process in the just completed production hall can be described by the following production function: Q = 10L + 6L2 - L3

where: Q is the number of hammers produced during the day and L is the number of workers employed in the hall. There are two assembly equipments in the hall (ie two fixed production factor units).

a) characterize TP, AP and MP of the hall.

b) Determine the TP if the hall employs 3 workers.

c) Determine the MP if the hall employs 2 workers.

d) Determine the point (amount of production) from which the AP decreases.

e) Determine the point (amount of production) where the MP of the labor will be at maximum and the number of workers employed in the production of hammers.

f) Determine from which point (number of employed workers) start the decreasing revenues from variable input.

1. In the long run, we assume that both factors (L and K - in the two-factor production model) are variable. The two-factor production function then shows the decreasing returns to scale. Another feature of the long-term production function is the possibility of distribution of production factors. What is the graphical image of this two-factor production function?
2. What does the slope of isoquants and isocosts express?
3. The production function of bread produced in a small bakery is described by the function: Q = 2L1/2. K1/2

where: Q is the number of breads produced per week, L is the weekly number of labor hours and K then the number of machine hours per week.

a) A bakery normally needs 100 breads of 100 labor hours and 100 machine hours for its weekly production of 150 loaves. How would you rate the work of management if you owned a bakery?

b) Find five combinations of inputs that are suitable for producing 200 breads per week and draw the isoquant.

1. Assume that the company produces 200 units of goods X, which is produced using inputs A, B and C. Further data are given in the following table:

|  |  |  |  |
| --- | --- | --- | --- |
|  | A | B | C |
| amount | 10 | 30 | 20 |
| CZK | 2 | 1 | 3 |
| MP | 2 | 3 | 1 |

a) determine the TC

b) is the rule of cost minimization met?

Then consider only inputs B and C (A is fixed)

c) how much does the TP increase if we add other unit B?

d) how much does the production of goods X increase when we add the last unit of input C?

e) how much does each of the additionally acquired production units cost, if we consider the price B in the amount of CZK 1?

f) how much will the additionally acquired unit X cost if we add input C, which price is equal to CZK 3?

g) what the output would be if C was reduced by 3 units and B was increased by 1 unit? Assume that MPB and MPC are constant.

h) let MPB = 1 and MPC = 3. Prices do not change. Is the rule of cost minimization now met?