

Computer problems 01

1. Develop a model of consumer behavior that buys two goods (X and Y) for 10 periods. Prices: $P_x = 5$ coins, $P_y = 10$ coins, income – 1000 coins, utility $U = X * Y$. In the first period, the consumer buys $X = 10$, $Y = 5$, and in the following ones adjusts purchases: if U increases, adds 1 to X and reduces 1 in Y, and vice versa. Using VBA, calculate X, Y, U and costs for all periods, write in a table and build a graph of the change in U. Analyze how the consumer adapts.
2. Model a firm with a function $Q = 10L$, where L is labor, for 10 periods. Costs $C = 20L$, price of the product $P = 5$ coins. In the 1st period $L = 5$, then the firm adds 1 employee if profit increases, and reduces it if it decreases. In VBA, calculate Q, C, profit, output in a table and plot the change in profit. Describe how a firm seeks the optimal level of labor.
3. A monopolist has $C = 100 + 3Q$, demand $P = 200 - 2Q$. In the 1st period, $Q = 30$, then adds or decreases Q by 5 depending on profit. In VBA for 10 periods, calculate Q, P, profit, write in a table, build a graph of P. Analyze how the monopolist adjusts production.