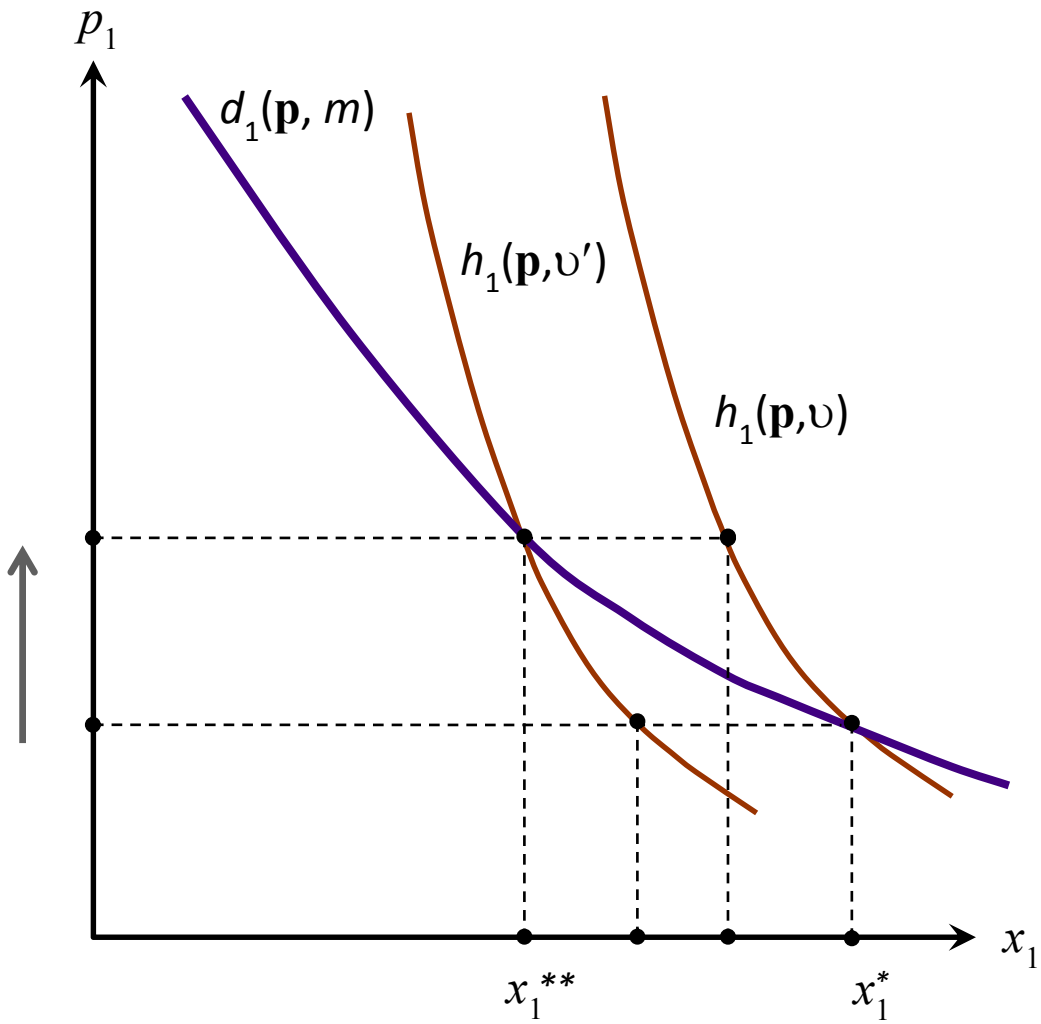
Admission Test (Sample Problem Set)

1. The graph presents uncompensated (Marshallian) and compensated (Hicksian) demand curves for good 1, denoted respectively h_1 and d_1, where **p** is the price vector: $\mathrm{p} = (p_1, p_2)$, and m is consumer income. Suppose that the price of good 1 increases while the other prices, p_2, and income, m, remain unchanged: **p'** is new price vector. Denote the constrained utility in expenditure minimization problem as $\upsilon = V(\mathbf{p}, m)$, and the maximal utility in utility maximization problem as $\upsilon' = V(\mathbf{p'}, m)$. Show the areas corresponding to the compensating variation *CV*, equivalent variation *EV*, and changes in consumer surplus ΔCS.



2. Consider a consumer whose preferences are represented by the utility function $u(x_1, x_2) = \sqrt{x_1} + 4$. He could buy two goods whose prices are $p_1 = 2$ and $p_2 = 1$, and his income is $m = 12$.

(a) Will the consumer spend his income completely?

(b) Is it possible to assert without calculations that the consumer will choose the bundle with a positive quantity of good 1? With a positive quantity of the good 2?

(c) Find the optimal choice of the consumer.

3. Consider an intertemporal choice model. It is known that the rates of interest on loans and deposits are the same and equal to 10%. Consumer's income in the current period is m_0, and in the future period m_1. The only source of consumer's income is his wage. It is also known that consumer's preferences in both periods are strictly monotone, and strictly convex.

(a) The employer proposes to change the system of remuneration. Under the new scheme the wage in the current period will increase by 16,000 rubles. And in the future period it will be reduced by 17,000 rubles. Would the agent agree to changes in the system of remuneration, if $m_1 > 17{,}000$, and the rates of interest on loans and deposits remain at 10%?

(b) How will the consumer's consumption in the current and future periods change, if the payment for his work will be carried out under the new scheme, and consumptions in both periods are normal goods?

(c) How will the answer to the question in point (a) change, if the interest rate on loans is 15% and the deposit rate is 5%?

4. Suppose that there are two industries, one producing good X and the other good Y, both using capital K and labor L as inputs in the production process. The marginal rate of technical substitution in the industry Y is $MRTS^Y = \frac{4K_Y}{3L_Y}$, and in the industry producing good X it equals $MRTS^X = \frac{7K_X}{2L_X}$.

(a) Define Pareto efficiency and determine the relationship between the capital-labor ratios in the two industries when production is efficient.

(b) Draw the contract curve for efficient production and explain the relationship of the contract curve to the production possibilities frontier.

5. Consider production function given by $Y = \sqrt{K}L$. The current stock of capital is 4. The labor supply function is $L^S = \frac{8}{w}$, where w is the real wage rate.
Determine the equilibrium output in this economy with flexible prices and wages.

6. A closed economy is described by the Keynesian consumption function, $C = C_0 + cY$, and the standard investment function, $I = I_0 - bi$, where где i is interest rate. The money demand function is characterized by finite positive income elasticity and a finite negative elasticity with respect to interest rate. C_0, I_0 and b are positive and finite, $0 < c < 1$.
What will happen to consumption and investment in case the government purchases are reduced?

7. In the neoclassical growth model with constant returns to scale Cobb-Douglas production function the labor elasticity of output equals 0.4.
If the use of labor remains at the same level while the amount of capital is raised by 10%, by how much will the output increase?

8. Assume that a country produces only three goods, A, B and C:

Goods	2013		2014	
	price, rub.	quantity, units	price, rub.	quantity, units
A	4	30	5	28
B	8	10	8	10
C	40	5	40	7

2013 is a base year. Define:

(a) nominal and real GDP in 2013;

(b) nominal and real GDP in 2014;

(c) the consumer price index, the GDP deflator and the index of Fisher in 2014;

(d) the rate of inflation in 2014, calculated according to the GDP deflator;

(e) the rate of change in the cost of living in 2014 calculated using the consumer price index.