

Tentin päivämäärä / Date of exam: 12.6.2015
Opintojakson koodi, nimi ja tentin numero / The code and the name of the course and number of the exam: 721345S, Intermediate microeconomics, Summer Exam
Tentaattori(t) / Examiner(s): Hannu Huuki
Sallitut apuvälineet / The devices allowed in the exam: <input checked="" type="checkbox"/> Laskin (ei graafinen/ohjelmoitava) / Calculator (not graphic, programmable) <input type="checkbox"/> Sanakirja/Dictionary <input type="checkbox"/> Muu materiaali, tarkennettu alla/Other material, specified below
Tenttiin vastaaminen / Please answer the questions <input checked="" type="checkbox"/> suomeksi/ in Finnish <input checked="" type="checkbox"/> englanniksi/ in English
Kysymyspaperi on palautettava / Paper with exam questions must be returned: <input type="checkbox"/> Kyllä/Yes <input checked="" type="checkbox"/> Ei/No

1.

Consumer has Cobb-Douglas preferences: $U(x_1, x_2) = x_1^a x_2^b$,
where x_1 and x_2 are the amounts of consumed goods 1 and 2.

The price of good 1 is p_1 and the price of good 2 is p_2 . Consumer's income is m .

- Write down the budget constraint. What is the slope of the budget line? 2p
- What does the marginal rate of substitution (MRS) measure?
Calculate the marginal rate of substitution for the consumer. 2p
- Solve the optimal consumption bundle (x_1^*, x_2^*) . 2p

2.

Jimmy has utility function $U(m) = \sqrt{m}$ over his income m .

- What are Jimmy's preferences towards risk. Is he risk loving, risk averse or risk neutral?
Explain your answer by studying the shape of the utility function analytically and/or graphically. 3p

Jimmy travels to city center every day, and has to spend money on subway ticket. Jimmy's daily income is 100€. The subway ticket costs 7,84€. If he does not buy the subway ticket, he knows there is a probability π of being caught in a given day. The fine for traveling without the ticket is 64€.

- What is Jimmy's expected utility if he buys the subway ticket? 1p
- Write down Jimmy's expected utility if he does not buy the subway ticket. 1p
- Assume that Jimmy is an expected utility maximizer.
Solve the probability of being caught π , that would make Jimmy indifferent between paying for the ticket and taking the risk of riding without the ticket. 1p

3.

A competitive firm has the following production cost function: $c(y) = y^3 - 8y^2 + 30y$.

- a) What is the marginal cost function $MC(y)$? 1p
- b) What is the average variable cost function $AVC(y)$? 1p
- c) At what output y does marginal cost equal average variable costs? 1p
- d) Below what price, will the firm produce zero output? Explain. 2p
- e) At what price would the firm produce 5 units of output? 1p

4.

- a) What is meant by price elasticity of demand ϵ ?
Calculate the elasticity of demand ϵ_1 for the linear demand curve: $D_1(p) = a - bp$.
Calculate the elasticity of demand ϵ_2 for the demand curve: $D_2(p) = ap^{-b}$.
Here a and b are parameters, p is price and $D(p)$ is quantity demanded. 3p
- b) What is meant by returns-to-scale?
Take a production function: $f(K, L) = K^\alpha L^\beta$.
Here K is the amount of capital and L is the amount of labor the firm can use.
Use scaling factor $k > 1$, and solve which values for parameters α and β are associated with constant returns to scale? 3p

5.

Demand for petroleum is given by the equation $Q(P) = 200 - 2P$, where Q is the quantity in barrels and P is the price in dollars.

Petroleum is produced by only one firm. The firm's production cost function is $c(Q) = 0.1Q^2 + 500$.

- a) Write down equations for revenue $R(Q)$, marginal revenue $MR(Q)$ and marginal cost $MC(Q)$. 3p
- b) What is the profit maximizing output choice Q^m ? What is the market price P^m ? 2p
- c) What is the monopoly's profit? 1p