

YLIOPISTOTENTTI - UNIVERSITY EXAM

Opiskelijan nimi / Student name:	Opiskelijanumero / Student number:
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Opettaja täyttää / Lecturer fills in:

Opintojakson koodi and nimi / The code and the name of the course: 721345A Intermediate Microeconomics	
Tiedekunta / Faculty: Oulu Business School	
Tentin pvm / Date of exam: 22.1.2018	Tentin kesto tunteina / Exam in hours: 3 h
Tentaattori(t) / Examiner(s): Mikko Vaaramo	Opintopistemäärä / Credit units: 6
	Sisäinen postios. / Internal address: 6 OyKKK
Sallitut apuvälineet / The devices allowed in the exam: <input checked="" type="checkbox"/> Funktiolaskin / Scientific calculator <input type="checkbox"/> Ohjelmoitava laskin / Programmable calculator <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 Suomenkielisessä tutkinto-ohjelmassa olevalla opiskelijalla on oikeus käyttää arvioitavassa opintosuorituksessa suomen kieltä, vaikka opintojakson opetuskieli olisi englanti. Tämä ei koske vieraan kielen opintoja. (Kts. <u>Koulutuksen johtosäntö 18 §</u>) In a Finnish degree programme a student has a right to use Finnish language for their study attainment, even though the language of instruction is English, (excluding language studies) even when the language of instruction is other than Finnish. (See <u>the Education Regulations 18 §</u>)	
Kysymyspaperi on palautettava / Paper with exam questions must be returned: <input checked="" type="checkbox"/> Kyllä / Yes <input type="checkbox"/> Ei / No	

Please answer all 5 questions (6 points each).

Question 1.

Donald enjoys commodities x and y according to the utility function

$$U(x, y) = x^2 + y^2.$$

The prices of the commodities are $p_x = 3$ € and $p_y = 4$ €. Donald has $m = 50$ € to spend.

- a) Write down Donald's budget constraint. What is the slope of the budget line? (1p)
- b) What does the marginal rate of substitution (MRS) measure? Calculate the marginal rate of substitution for Donald. (1p)
- c) Which affordable consumption bundle (x^*, y^*) maximizes Donald's utility? (2p)
- d) Draw some of Donald's indifference curves and his budget constraint. Mark also the optimal consumption bundle. Did you find the true maximum? (1p)
- e) How would you describe Donald's preferences? (1p)

Question 2.

Ms. Fogg is planning an around-the-world trip on which she plans to spend 10000 €. The utility from the trip is a function of how much she actually spends on it (Y), given by

$$U(Y) = \ln Y.$$

- a) If there is a 25 percent probability that Ms. Fogg will lose 1000 € of her cash on the trip, what is the trip's expected utility? (1p)
- b) Suppose that Ms. Fogg can buy full insurance against losing the 1000 € (say, by purchasing traveler's checks) at an actuarially fair premium of 250 €. What is her expected utility if she purchases this insurance? (2p)
- c) Does Ms. Fogg buy the insurance or face the chance of losing the 1000 € without insurance? Is she risk loving, risk averse, or risk neutral? Why? (2p)
- d) What is the maximum amount that Ms. Fogg would be willing to pay to insure her 1000 €? (1p)

Question 3.

- a) What does it mean if two goods are perfect complements? What if they are perfect substitutes? Give examples for both. (2p)
- b) Explain what does consumer surplus mean? How is it used and why? Illustrate your answer with a graph. (2p)
- c) What is meant by returns-to-scale in production? Give an example using an arbitrary production function of your choice. (2p)

Question 4.

Suppose the demand curve $D(p)$ and the supply curve $S(p)$ for the market are given by the following equations:

$$D(p) = 300 - p$$
$$S(p) = 1/2p - 30$$

- a) What is the equilibrium price and quantity in this market? Calculate consumer and producer surplus. (2p)
- b) Suppose that government imposes a quantity tax $t = 15$ on firms. Solve the new market equilibrium. (2p)
- c) Calculate the effect of the tax on the consumer and producer surplus. (1p)
- d) Calculate the social welfare deadweight loss due to the tax policy. (1p)

Question 5.

In a small town there are two bakeries, A and B, baking identical breads. Denoting the amount of bread with b the cost function for both bakeries is $c(b) = 4b$. The inverse market demand curve for bread is $p(b) = 100 - 2b$. The output of bakery A is denoted with b_A and the output of bakery B with b_B .

First, assume that the two bakeries play a Cournot game (quantity competition).

- a) Calculate the reaction functions for both firms: $R_A(b_B)$ and $R_B(b_A)$. Draw a graph illustrating these functions, where output b_A is on the horizontal axis and output b_B is on the vertical axis. Solve the Cournot-Nash equilibrium (b_A^*, b_B^*) , and plot it on your graph. How much will bakery A produce? How much will bakery B produce? (3p)

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Now, suppose the producers follow a Stackelberg market model. Bakery A begins early, and acts as a Stackelberg leader. Bakery B is a Stackelberg follower.

- b) Write down bakery A's profit maximization problem. (2p)
Solve the leader's Stackelberg output b_A^S .
Solve the follower's Stackelberg output b_B^S .

Finally, suppose the producers operate as in a Bertrand game (price competition).

- c) What is the Nash equilibrium price p^* in this framework? (1p)
Explain the adjustment process of price setting.