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UNIVERSITÄT
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FACULTY OF ECONOMICS
AND MANAGEMENT

Course: Microeconomics (11062/5024)
Term: Summerterm 2010
Examiner: Dr. Sönke Hoffmann, VWL3
Date: 19.07.2010

Final Exam

Version A

First name: ....

Last name: ....

Matr.–No.: ....

- **Available time:** 120 minutes
- **Achievable points (max.):** 120 points
- **Permitted aid:** Pocket calculator (non–programmable)
- **General information:**

1. You have 30 questions all together. Answer all questions. In all questions *one out of three* answers is correct.
2. In each question points are given as follows:

	You mark...		
	...(only) correct	...(only) wrong	...correct and wrong/nothing
points	+4	-2	0

3. Feel free to use the empty space on the present exam for your personal calculations or notes. But note that **whatever you write on these pages will be ignored during correction!** Only the answer sheet will be evaluated.
4. Return *all* the paper you received (without exception).

GOOD LUCK!

Note: Problems which can be answered within a few seconds are marked with a ☺. The rest is not hard either but might take a little longer.

1. Consumer Theory

1. ☺ A and B allocate their consumption between hats and bats. The prices are $p_h = \$4$ and $p_b = \$8$. For A, the marginal utility of the last hat consumed was 8 and of the last bat it was 24. For B the marginal utility of the last hat was 6 and of the last bat it was 12. Which consumer is not maximizing his/her utility and how should he/she change their allocation? (Hint: Have a look at utility gains of last \$ spent!)

   (a) A should increase expenditure on bats and decrease expenditure on hats.
   (b) B should increase expenditure on hats and decrease expenditure on bats.
   (c) Both are maximizing utility.

2. ☺ Suppose a consumer has income of \$120 per period, and faces prices $p_1 = 2$ and $p_2 = 3$. If both prices rise by 50% what is her new budget line? (Hint: Have a look at the prices and "see" the solution immediately)

   (a) $x_2(x_1) = 26.67 - 0.67x_1$
   (b) $x_2(x_1) = 27.67 - 0.77x_1$
   (c) $x_2(x_1) = 16.67 - 1.5x_1$

3. Suppose Carmela has well–behaved preferences. Her income is \$100 per week, which she allocates between books (x_1) and sandwiches (x_2). Books cost \$10 each, sandwiches cost \$2 each. If she purchases *more* than 5 books in a week, the price falls to \$5 for all subsequent books (assume that books are perfectly divisible). What is her budget line? (Hint: Draw it.)

   (a) $x_2(x_1) = \begin{cases} 50 - 5x_1 & x_1 \in [0,5] \\ \frac{75}{3} - \frac{5}{3}x_1 & x_1 > 5 \end{cases}$
   (b) $x_2(x_1) = \begin{cases} 50 - 5x_1 & x_1 \in [0,5] \\ \frac{75}{2} - \frac{5}{2}x_1 & x_1 > 5 \end{cases}$
   (c) $x_2(x_1) = \begin{cases} 25 - 5x_1 & x_1 \in [0,5] \\ \frac{75}{3} - \frac{5}{2}x_1 & x_1 > 5 \end{cases}$

4. Consider Carmela's situation in Problem 3. How many utility maxima *can* occur?

   (a) One.
   (b) One or two.
   (c) Infinitely many.

5. Given the utility function $u(x_1, x_2) = \sqrt{x_1} + 2\sqrt{x_2}$ what is/are Carmela's optimal bundle/s in Problem 3?

   (a) $x_1^* = \frac{10}{21}, x_2^* = \frac{1000}{21}$
   (b) $x_1^* = \frac{10}{21}, x_2^* = \frac{100}{21}$ and $x_1^* = \frac{11}{12}, x_2^* = \frac{6}{7}$
   (c) $x_1^* = \frac{10}{21}, x_2^* = \frac{10}{21}$

6. ☺ What is the indifference curve given the utility function in Problem 5 at a utility level of 1?

   (a) $x_2(x_1) = x_2 - 4\sqrt{x_2} + 4$
   (b) $x_2(x_1) = \frac{1}{4}x_2 - \sqrt{x_2} + 1$
   (c) $x_2(x_1) = \frac{1}{4}x_1 - \frac{1}{2}\sqrt{x_1} + \frac{1}{4}$

7. A consumer has the utility function $u(x_1, x_2) = \sqrt{x_1 x_2}$. What is the Marshall–demand function given a price vector p and a budget m?

   (a) $x^*(m,p) = \begin{pmatrix} \frac{m}{p_1^2} \\ \frac{m}{p_2^2} \end{pmatrix}$
   (b) $x^*(m,p) = \begin{pmatrix} \frac{m}{2p_1} \\ \frac{m}{2p_2} \end{pmatrix}$
   (c) $x^*(m,p) = \begin{pmatrix} \frac{2m}{p_1} \\ \frac{2m}{p_2} \end{pmatrix}$

8. Let the budget be $m = 100$ and prices $p = (1,1)$ in the previous Problem 7. What are the demanded quantities and the utility level?

   (a) $x_1^* = x_2^* = u^* = 50$
   (b) $x_1^* = x_2^* = 50,\ u^* = 30$
   (c) $x_1^* = x_2^* = 30,\ u^* = 50$

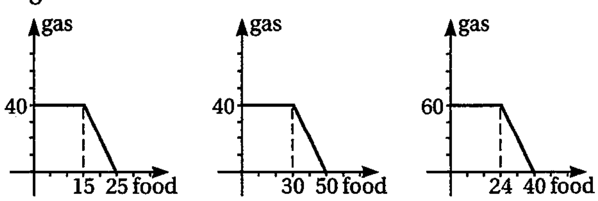
9. Let the price for the second good rise to $p_2' = 2$ in previous Problems 7 – 8. What are the demanded quantities and what is the utility level now?

   (a) $x_1^* = 50,\ x_2^* = 20,\ u^* = 20\sqrt{2}$
   (b) $x_1^* = 30,\ x_2^* = 20,\ u^* = 30\sqrt{2}$
   (c) $x_1^* = 50,\ x_2^* = 25,\ u^* = 25\sqrt{2}$

10. Given the price change in previous Problems 7 – 9, what is the income compensation necessary to put the consumer back to his original utility level after the price change (Hint: Set two utilities equal, before price change and after compensated price change, and solve for compensated income m')?

    (a) $\Delta m = \sqrt{20000} - 100$
    (b) $\Delta m = \sqrt{10000} - 100$
    (c) $\Delta m = \sqrt{5000} - 100$

11. ☺ A consumer allocates \$200 between food which costs \$4 per pound and gasoline which costs \$2 per gallon. With gasoline rationing (40 gallons per person) the budget line looks like . . .



(a) (b) (c)

12. A consumer's demand for a good is $x(p,m) = \frac{m}{p}$ where x is the demanded quantity, p is the price and m is the

income. The current price is $p=4$, the current income $m=100$. What are the income and substitution effect (Slutsky) if the price rises to $p'=5$? (Hint: Calculate the total effect on demand Δx, and the compensation $\Delta m=(p'-p)\cdot x(p,m)$. Then figure out how much would be demanded at a compensated income m')

(a) $SE=0$ and $IE=-5$

(b) $SE=5$ and $IE=-5$

(c) $SE=5$ and $IE=0$

2. Preferences

13. ☺ Given well behaved preferences and two goods, indifference curves ...

(a) ... are always convex and never slope upward.

(b) ... are always convex and have a given thickness.

(c) ... are always *strictly* convex and are "infinitely thin".

14. ☺ In a 2–goods space neutrals are ...

(a) ... consumers without preference.

(b) ... goods without taste.

(c) ... goods with either a horizontal or a vertical indifference curve.

15. Let $A=\{1,2,3\}$ and $R=\{(1,2),(2,1),(3,1),(1,3)\}$ be a binary relation on A, then R is ...

(a) ... transitive and reflexive.

(b) ... transitive and symmetric.

(c) ... not transitive.

16. ☺ A rational consumer consumes two goods which are perfectly complementary (but not necessarily in 1 : 1 ratio). Consider the following quantities of three bundles A, B and C.

	good 1	good 2
A	10	100
B	60	40
C	20	40

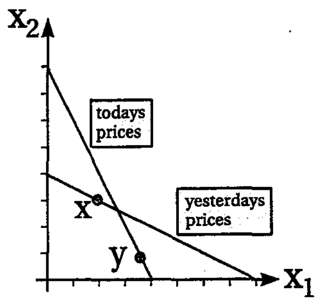
If the consumer is indifferent between bundle A and B, which bundle will he choose?

(a) C

(b) A or B

(c) All bundles are equally good.

17. ☺ Consider the following observed choices x (chosen yesterday) and y (chosen today) given yesterday's and today's prices



The choices...

(a) ... satisfy WARP.

(b) ... violate WARP.

(c) ... violate WARP but satisfy SARP.

3. Markets, Endowments and Welfare

18. The market demand is $X^D(p)=10-2p$ and the market supply $X^S(p)=3p$. The market price increases 50% starting from its equilibrium price. The loss of welfare is

(a) $\frac{2}{3}$

(b) $\frac{5}{3}$

(c) $\frac{7}{3}$

19. ☺ Let the demand function be given by $x(p)=Ap^{-\alpha}$, where A and α are positive constants. What is the price elasticity of demand? (Hint: During calculation keep an eye on $x(p)$)

(a) $-\alpha$

(b) $-\frac{\alpha}{x}Ap^{\alpha}$

(c) $-\frac{Ap^{\alpha}}{x}$

20. ☺ Is the good in the previous question 19 a Giffen good?

(a) Yes.

(b) No.

(c) Can't be determined without further information.

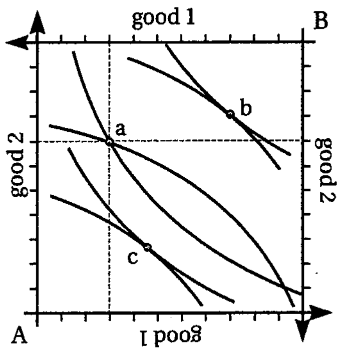
21. ☺Consider two goods where at least good i is a normal good. If i becomes cheaper, then a net buyer...

(a) ... demands more of good i and can not become a net seller.

(b) ... demands more of good i and becomes a net seller.

(c) ... demands more of good i and can become net seller.

22. ☺ Consider the following Edgewoth–Box. Starting at allocation a then by free trade...



(a) ... b and c can be reached because they are on the contract curve.

(b) ... neither b nor c can be reached because they are both blocked.

(c) ... b can be reached but not c as b lays above a.

23. ☺ Which statement is correct?

(a) Inside the core a pareto–optimal allocation is unique if the initial endowment is given.

(b) The position of the core does not depend on the initial endowment of the actors.

(c) The position of the contract curve does not depend on the initial endowment of the actors.

24. Let the inverse market demand be $p(y) = 5 - y$ and let the cost function of the *only* supplier in the market be $c(y) = \frac{1}{3}y^2$. What is the change in *producer surplus* from a fully competitive market to the monopoly? (Hint: Draw the corresponding functions, (including inverse supply and marginal revenue!) and find the areas to be calculated)

(a) $+\frac{17}{11}$

(b) $+\frac{27}{16}$

(c) $+\frac{61}{15}$

25. Reconsider Problem 24. What is the change in *total welfare* from a fully competitive market to the monopoly? (Hint: You do not necessarily need to compute consumer surplus! Check your graphic for that.)

(a) $-\frac{135}{128}$

(b) $-\frac{153}{128}$

(c) $-\frac{135}{182}$

4. Production and profit maximization

26. A firm has the cost function $c(y) = y^2 + 1$ and can sell its output at price p. What is the maximum profit as a function of p?

(a) $\pi^*(p) = \frac{1}{4}p^2 - 1$

(b) $\pi^*(p) = \frac{1}{2}p^2 + 1$

(c) $\pi^*(p) = \frac{1}{4}p^2 + 1$

27. The producer surplus in the previous Problem 26 is for $p = 100$... (Hint: Derive the producer suplus from revenue and total variable costs)

(a) ... 1500

(b) ... 2000

(c) ... 2500

28. A monopolist faces two separate markets with the demand curves given as

$$D_1(p_1) = y_1 = 100 - p_1$$
$$D_2(p_2) = y_2 = 100 - 2p_2$$

where p_1 and p_2 denotes the price on the respective market. Let the monopolist's costs be given by $C(y) = 20y$. Assume that the monopolist can price discriminate by charging a different price in each market. What are the *profit maximizing quantities* and *prices* on the two markets?

(a) Market 1: $(y_1, p_1) = (40, 60)$ Market 2: $(y_2, p_2) = (20, 40)$

(b) Market 1: $(y_1, p_1) = (30, 50)$ Market 2: $(y_2, p_2) = (30, 35)$

(c) Market 1: $(y_1, p_1) = (40, 60)$ Market 2: $(y_2, p_2) = (30, 35)$

29. Assume the monopolist in Problem 28 is unable to price discriminate. Thus, he faces the aggregate demand $y = D(p)$ of both markets. What is the optimal quantity and price for the non–discriminating monopolist? (Hint: Calculate the aggregate demand and its inverse, then use the profit maximizing formula of monopolists.)

(a) $(y, p) = \left(70, \frac{140}{4}\right)$

(b) $(y, p) = \left(70, \frac{130}{3}\right)$

(c) $(y, p) = \left(40, \frac{150}{5}\right)$

5. Game Theory

30. ☺ Find all Nash–Equilibria in pure strategies in the following game:

		B			
	Strat.	B_1		B_2	
	A_1	1	2	2	1
A	A_2	2	1	1	2

(a) (A_1, B_2)

(b) $(A_1, B_2), (A_2, B_2)$

(c) There is none.