

ECON 2030:E

Intermediate Microeconomics II: Consumers

Midterm # 1

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You have one hour and twenty minutes for the exam. You may use a calculator. The term marginal refers as always to very small units, so you can use derivatives. Please indicate your multiple choice answers on this exam copy, write your name and student ID on it, and place it inside your answer booklet when handing it in. Good luck!

1 Multiple Choice (10 points, 2 each)

1. There are many utility functions that can represent the same preferences. Which of the following utility functions does NOT represent the same preferences as $U(x, y) = x^3y^4$?
 - (a) $1/(x^3y^4)$
 - (b) $77.5x^3y^4$
 - (c) $x^{3/7}y^{4/7}$
 - (d) $5,000 + x^3y^4$
2. There are three main assumptions we make about preferences. Which of the following is NOT one of them?
 - (a) Transitivity.
 - (b) Non-satiation.
 - (c) Completeness.
 - (d) Additivity.

3. Ernesto Hammockway likes both wine and rum. He prefers the bundle (5, 14) over (15, 6) and the bundle (12, 10) over (8, 12). His preferences also satisfy our regular three assumptions about preferences. Which of the following statements is *necessarily* true (others *might* be true)?
- (a) $(21, 9) \succ (8, 11)$
 - (b) $(7, 12) \succ (13, 11)$
 - (c) $(13, 25) \succ (14, 11)$
 - (d) $(6, 15) \succ (14, 6)$
4. Paulo Toelho likes books and food (and does not consume anything else). At first he has a monthly income of \$3600 and spends \$2000 on books and \$1,600 on food. When his income decreases to \$3200, he spends \$2100 on books and \$1100 on food. Which of the following statements is true for Paulo in that income range?
- (a) Food is a luxury and books are an inferior good.
 - (b) Books are a necessity and food is a luxury good.
 - (c) Food and books are both necessities.
 - (d) Food is a necessity and books are a luxury.
5. If leisure is a normal good, then a wage decrease will
- (a) definitely result in an increase in labor supply;
 - (b) have a positive substitution, but negative income effect on labor supply;
 - (c) have a negative substitution, but positive income effect on labor supply;
 - (d) definitely result in a decrease in labor supply.

2 Consumer Choice (10 points)

Laura is on a tight budget, but loves to spend her income on going to the cinema (C) and hockey games (H). Her preferences are represented by the utility function

$$U(C, H) = (2C^{1/2} + 4H^{1/2})^2.$$

Laura has \$210 per month to spend on these two pastimes; a ticket for the cinema is \$10 and a game is \$30. [As usual, you can also buy fractions of a ticket.]

- (a) What is the budget constraint? How many times less does Laura have to go to the cinema to afford one more game of hockey? (2)
- (b) If her current consumption is $C = 8, H = 2$, how much additional utility does Laura get from an additional (small) unit of C ? How much additional utility does Laura get from an additional (small) unit of H ? (2)
- (c) If her current consumption is $C = 8, H = 2$, how many more (small) units of C does she need if she reduces H by two (small) units to keep utility constant? (2)
- (d) If her current consumption is $C = 8, H = 2$, by how much would utility change if Laura skipped one (small fraction of a) game of hockey and spent the money on cinema instead? (2) [Do not assume this ($C = 8, H = 2$) any further.]
- (e) In order to maximize utility, how often should she go to the cinemas and to hockey games? (2)

3 Demand (10 points)

Mario and Luigi both have the utility function $U(x, y) = (1/3)^{4/3}x^{2/3}y^{4/3}$. They each spend their income I on goods x and y . See the hint at the end of the test!

- (a) Mario and Luigi only differ in their incomes, which are \$324 for Mario and \$450 for Luigi. What is the aggregate demand function for good x in terms of its price p_x ? (2)
- (b) Now forget about Luigi. Initially, prices are $p_x = 4/3$ and $p_y = 3$. Then the price of good x increases to $p_x = 9/2$. What is the total effect of the price change on Mario's consumption (remember that Mario's income is \$324)? (2)

- (c) What is the utility Mario obtained under the old prices? (2)
- (d) What is the income Mario would need to be as well off after the price increase as before? (2)
- (e) What are the income and substitution effects of that price change for Mario's consumption of good x ? (2)

4 Consumer welfare (10 points)

- (a) The inverse demand function for taxi-apps is estimated to be $p = 100 - 2Q$. If the price increases from 20 to 30, then by how much does consumer surplus change? (2)
- (b) John's expenditure function is $E(p_x, p_y, U) = U^{1/2}(p_x + p_y)^2$. What is his compensated demand of good y ? (2)
- (c) Both goods are normal. If the price compared to the reference point is lower, is compensated demand greater or smaller than uncompensated demand? (2)
- (d) If John's initial maximum utility had been 36 and prices $p_x = 3$ and $p_y = 2$, then how much income must he have had to finance it? (2)
- (e) Now that the price of good x has increased to $p_x = 4$, how much additional income would John need so that he is as well off as before the price change? (2)

Hint

For a Cobb-Douglas utility function $U(x, y) = Zx^a y^b$, where Z is some positive number, the uncompensated demands for goods x and y are given by

$$x = \frac{a}{a+b} \frac{I}{p_x}$$

$$y = \frac{b}{a+b} \frac{I}{p_y},$$

where I is the income and p_x and p_y are the prices of goods x and y , respectively.