Intermediate Microeconomics - Spring 2016

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Practice Midterm

NOTICE, THIS IS DESIGNED TO GIVE YOU PRACTICE ON THE TYPES OF QUESTION YOU WILL FACE.

IT IS NOT INTENDED TO BE THE SAME LENGTH AS THE ACTUAL MIDTERM (WHICH WILL BE SHORTER)

Question 1 Consider a consumer who is choosing between Donald Trump Leatherwear (l) and Minature American Flags (m) Their utility function is given by $x_l(x_m)^2$. Initially their income is $y = 10$, and prices are given by $p_l = 2$ and $p_m = 4$

1. Draw the consumer's budget constraint and sketch their indifference curves

2. Solve for the consumer's demand functions for l and m, and calculate their demand at the prices given above

3. Following Super Tuesday, the price of Donald Trump Leatherwear increases to 4. Calculate the consumer's demand at these new prices

4. Calculate the income and substitution effect of this price change on demand for Leatherwear

5. Solve the consumer's dual problem: i.e. calculate their compensated demand for each good as a function of prices and the desired level of utility u.

6. Verify that the Slutsky equation holds for this consumer for good l at $y = 10$, $p_l = 2$ and $p_m = 4$ i.e. show that

$$\frac{\partial x_l(p_l, p_m, y)}{\partial p_l} = \frac{\partial x_l^h(p_l, p_m, u)}{\delta p_l} - \frac{\partial x_l(p_l, p_m, y)}{\partial y} x_l(p_l, p_m, y)$$

When evaluated at $y = 10$, $p_l = 2$ and $p_m = 4$ and with u equal to the utility that the consumer can achieve in this problem

Question 2 Consider an economy consisting of two goods: Leeks and Magnesium. Felicity has 8 leeks and 9 pounds of magnesium. Gwendolyn has 4 leeks and 14 pounds of magnesium

1. Draw the Edgeworth box for this economy. Put the allocation in the Edgeworth box. Assume (for the rest of the question) that the price of magnesium is $1 per pound. Draw the price line through the Edgeworth box if the price of leeks is $1

2. Felicity has preferences described by the utility function $u^F(x_L^F, x_M^F) = \ln x_L^F + \ln x_M^F$ (note that these are natural logarithms). Calculate Felicity's demand for leeks as a function of the price of leeks. Sketch Felicity's indifference curve through the endowment.

3. Gwendolyn has preferences described by the utility function $u^G(x_L^G, x_M^G) = \min(2x_L^G, x_M^G)$ (NOTE that these are not quite the same as standard perfect compliments - there is a 2 in there!). Sketch her indifference curve through the endowment. Show that her demand for leeks is given by
$$x_L^G = \frac{4p_L + 14}{p_L + 2}$$
where p_L is the price of leeks.

4. Is the initial endowment a Pareto optimum? If not, give a bundle that Pareto dominates it.

5. Does the price of $1 for leeks support an equilibrium? If not, why not?

6. What is the total demand for leeks from Gwen and Felicity as a function of the price of leeks? Is the total demand curve downward sloping?

7. Find an equation for the equilibrium price of leeks (note that this equation may be a quadratic, so you will not be able to solve for it explicitly).

8. In the Edgeworth box, sketch what the market equilibrium must look like (i.e., will it be a tangency point? A corner solution? - do not worry about solving for exact allocations)

Question 3 Cleopatra's preferences over asses milk and biscuits are given by $u(x_a, x_b) = x_a^2 + 2x_b^2$. Find Cleopatra's demand for asses milk and biscuits when prices are $p_a = 1$, $p_b = 1$ and income $M = 10$

Question 4 Eliza's preferences over mackerel and Dickens novels are given by $u(x_m, x_d) = (x_m^\rho + x_d^\rho)^{\frac{1}{\rho}}$ where $\rho < 1$

1. Assume that the optimal consumption bundle is an interior point. Show that Eliza's demand function for mackerel is given by

$$x_m = \frac{p_m^{\frac{1}{\rho-1}}}{\left(p_m^{\frac{\rho}{\rho-1}} + p_d^{\frac{\rho}{\rho-1}}\right)} M$$

2. Calculate the income elasticity and cross elasticity of demand. If you have finished the exam and you are bored, calculate the price elasticity demand for a special bonus prize (which will not affect your grade)

Question 5 Alfredo is selfish, but Bennie cares passionately about Alfredo. You have to decide how to distribute 10 walnuts between them. Alfredo's preferences are described by the utility function $u^A = w^A$, where w^A is the number of walnuts that Alfredo gets. Bennie's preferences are described by $u^B = w^B + 1.5w^A$, where w^B is the number of walnuts that Bennie gets. Is it pareto optimal to give all the walnuts to Alfredo in this economy? Is it pareto optimal to give them all to Bennie? What is the set of pareto optimal allocations in this economy?

Question 6 Let $\succeq$ be a set of complete, tranistive preferences. Define $\succ$ as $x \succ y$ if and only if $x \succeq y$ but not $y \succeq x$

1. Is $\succ$ complete?

2. Is $\succ$ transitive?

3. We say that a binary relation is asymmetric if it is never the case that $x \succ y$ and $y \succ x$. Is $\succ$ asymmetic?

4. We say that a binary relation is negatively transitive if, for any x and y such that $x \succ y$, then for any other z, either $x \succ z$ or $z \succ y$ or both. Is $\succ$ negatively transitive?