

Intermediate Microeconomics - Spring 2016

Mark Dean

Homework 2

Due Wednesday 10th February

Question 1 (Indifference Curves) For each of the following set of preferences sketch the indifference curves. Also explain whether the preferences satisfy weak monotonicity, strict monotonicity, weak convexity and strict convexity

1. The two goods in the commodity space are plants and plant pots. The consumer will put 3 plants in every plant pot. They will not use plant pots with more or less than three plants. All they care about is the number of pots with three plants that they can make
2. The two goods in the commodity space are cats and dogs. The consumer loves cats but hates dogs. Their preferences are determined by the number of cats minus the number of dogs (i.e. one bundle is preferred to another if it has more cats minus the number of dogs)
3. The two goods in the commodity space are bananas for the consumer and bananas for the consumer's friend. The consumer is selfish, and all the consumer cares about is the number of bananas they have
4. Now the consumer is a utilitarian. All they care about is the total number of bananas
5. The two goods in the commodity space are chicken nuggets and fries. The consumer wants exactly 6 chicken nuggets and 50 fries, and all they care about is how close they are to this ideal bundle.
6. The consumer has Cobb-Douglas utility - specifically $u(x_1, x_2) = x_1^{\frac{1}{3}}x_2^{\frac{2}{3}}$

Question 2 (Optimal Consumption and Cobb Douglas) Two economics professors are having an argument. They both want to model how Ermintrude chooses between bundles of spam and chocolate. Professor Hirst claims that Ermintrude maximizes the utility function $u(x_s, x_c) = (x_s)^{\frac{1}{3}}(x_c)^{\frac{2}{3}}$. Professor Nilsson claims that Ermintrude maximizes the utility function $v(x_s, x_c) = 2 \ln x_s + 4 \ln x_c$ (so you can assign utility to the whole commodity space, you can assume that $\ln 0 = -\infty$)

1. Calculate the marginal utility with respect to spam and chocolate according to each professor (as a function of x_s and x_c)
2. Calculate Ermintrude's MRS according to each professor (as a function of x_s and x_c)
3. For any budget constraint $p_s x_s + p_c x_c = M$, find the points of tangency with the indifference curve according to each professor
4. Find Ermintrude's optimal consumption bundle according to each professor. Use this to conclude that Professors Hirst and Nilssen are idiots and their debate was pointless
5. Explain why the fact that $v(x_s, x_c) = 6 \ln(u(x_s, x_c))$ could have saved you a lot of trouble

Question 3 (Optimal Consumption and Quasi-Linear Preferences) Ezekiel has preferences between guns and banjos that are described by the utility function $u(x_g, x_b) = x_g + (x_b)^{1/2}$.

1. Write down the equation for an indifference curve (i.e. for some utility u , write down the number of guns that give that level of utility as a function of the number of banjos)
2. Write down an equation for the marginal rate of substitution
3. Show that, for a budget constraint $p_b x_b + p_g x_g = M$, at any point of tangency it must be the case that $x_b = 1/4(p_g/p_b)^2$
4. What is the optimal consumption bundle if $p_g = 2$, $p_b = 1$ and $M = 8$?
5. What is the optimal consumption bundle if $p_g = 5$, $p_b = 1$ and $M = 4$?