Intermediate Microeconomics - Spring 2016

Mark Dean

Homework 3

Due Wednesday 17th February

Question 1 (Strong and Weak Monotonicity) Here are some questions which may help you sort out the difference between strong and weak monotonicity

1. Give an example of preferences which are weakly monotonic but not strictly monotonic
2. Show that, if preferences are strictly monotonic, they must be weakly monotonic
3. We said in class that if preferences are strictly monotonic then it will be optimal for the consumer to consume all their income (i.e. be on the budget line). Is this still true if preferences are weakly monotonic?

Question 2 (Optimal Choice) Here are some questions about optimal choice. They require more thinking than those from last week, so don't be fooled!

1. The consumer has \$10. The price of Coldplay CDs is \$2. The price of Beyonce CDs is \$3 if they buy 2 or less, or \$1 if they buy more than 2. The consumer treats Coldplay and Beyonce CDs as perfect substitutes. What is their optimal bundle?
2. The consumer again has \$10. The price of Cam Newton (x_c) t-shirts is \$3. The price of Payton Manning (x_p) golf shirts is \$1. Preferences are given by $u(x_c, x_p) = x_c^2 + x_p^2$. What is the optimal bundle
3. The Consumer has \$10. Apples are \$1, bananas are \$1 and cantaloupes are \$2. Preferences are given by $u(x_a, x_b, x_c) = \ln x_a + 2 \ln x_b + 3 \ln x_c$ (note, for this question you can assume that the optimal bundle is at a tangency point)

Question 3 (Homothetic Preferences) Here are some questions on homothetic preferences

1. Show that if a utility function has the property that $u(kx_1, kx_2) = ku(x_1, x_2)$ for $k > 0$ then the preferences it represents are homothetic
2. Show that, for such a utilty function, the MRS at (x_1, x_2) is the same as the MRS at (kx_1, kx_2)
3. Use this fact to argue that, if optimal behavior is described by a tangency point, and if x_1, x_2 is the optimal choice when income is equal to y and prices are equal to p_1 and p_2, then kx_1, kx_2 is the optimal choice when income is equal to ky and prices are equal to p_1 and p_2
4. Use this fact to conclude that the Engel curves for homothetic preferences are linear

Question 4 For each of the following two preferences, calculate the demand function for each good, the income elasticity of demand, the price elasticity of demand (for their own price and the price of the other good) and determine whether the goods are normal or inferior, compliments or substitutes, and if they are giffen goods

1. $u(x_1, x_2) = x_1^2 x_2^2$
2. $u(x_1, x_2) = x_1 + x_2$