Homework 1

due Wednesday, September 14 by 9am

Instructions: Complete all 6 problems. Answers may be handwritten or typed. Students may work together, but must independently formulate their own answers. Failure to do so will result in a grade of zero.

Problem 1 Devin buys five new college textbooks during his first year at school at a cost of \$80 each. Used books cost only \$50 each. When the bookstore announces there will be a 10% increase in the price of new books, and a 5% increase in the price of used books, Antonio's father offers him \$40 extra.

a. What happens to Antonio's budget line? Illustrate the change with new books on the vertical axis, and used books on the horizontal axis.

b. Is Antonio worse or better off after the price change? Explain.

Problem 2 Pauly allocates \$100 per week to two goods: hair gel (H), and fake tan spray (F). One unit of hair gel costs \$5, while one unit of fake tan spray costs \$10. Pauly's preferences over these two goods are given by the utility function $u(H, F) = 5 * H * F$.

a. On a graph with H on the y-axis and F on the x-axis, sketch the indifference curve that gives Pauly utility of 100. Label at least 3 distinct points. Then, do the same for a utility of 500.

b. On a similar graph, plot Pauly's budget line. Based on your graph, when Pauly maximizes his utility, will he get more or less utility than 100? Than 500?

c. Pick at least three points on Pauly's budget line, and calculate Pauly's marginal utility of fake tan spray and hair gel at each of those points. For each point, state whether or not Pauly is maximizing his utility at that point, and, if not, whether he should buy more hair gel and less fake tan spray, or vice-versa.

Problem 3 Arthur spends his income on bread and chocolate. He likes chocolate, but is neutral towards bread, in that he doesn't care if he consumes it or not. Sketch Arthur's indifference curve map over bread and chocolate

Problem 4 Suppose that Boston consumers pay twice as much for avocados as for tangerines, whereas San Diego consumers pay half as much for avocados as for tangerines. Assuming that consumers maximize their utility, which city's consumers have a higher marginal rate of substitution of avocados for tangerines? Explain your answer.

Problem 5 One can of Coke is a perfect substitute for one can of Pepsi for Islay.

a. Which of the following utility functions best represents her preferences? Support your answer (possibly by plotting out indifference curves for each of the three options).

1. $u(P, C) = 3PC$

2. $u(P, C) = P + C$

3. $u(P, C) = \sqrt{P} + \sqrt{C}$

b. Suppose that a can of Coke costs \$.75, while a can of Pepsi costs \$.80 at Islay's preferred vending machine. Obviously, she will purchase only Cokes. Draw a picture of the corresponding indifference curve/budget line graph, and indicate Islay's utility-maximizing bundle on your graph.

Problem 6 For Broderick, beer and pizza are perfect complements: he never drinks a beer without a slice of pizza, and vice-versa.

a. Try to write down a utility function representing Broderick's preferences. For example, assign him a utility of 10 if he has 10 slices of pizza and 10 beers. Note that he would also have utility of 10 if he had 10 slices and 15 beers, since he would just throw the excess beer away. (hint: the easiest way to write down a utility function for Broderick is to use the min function).

b. Suppose the price of a slice of pizza is \$2, and the price of a beer is \$3. Broderick has \$30 to spend. What is his utility-maximizing bundle?

c. Now suppose the price of a slice of pizza changes, to p. Can you write down Broderick's demand function for pizza, as a function of p?