# Homework 1

due Monday, January 30 in class

Instructions: Complete all 7 problems. Answers may be handwritten or typed. Students may work together, but must independently write their own answers. Failure to do so will result in a grade of zero.

Problem 1.   A consumer chooses a bundle of two kinds of Scotch: Lagavulin 16-year Scotch (L) and Caol Ila 12 year (C). Suppose that $P_L = \$10$ and $P_C = \$7$. Suppose the consumer has $140 to spend on Scotch.

a. Draw the consumer's budget line. Be sure to label its intercepts.

b. Suppose the price of L increases to $14. Redraw the budget line.

c. Now suppose that P_C and P_L both double (to $P_C = \$14$ and $P_L = \$28$), but her Scotch budget also doubles, to $280. How does her budget line change from part b.?

2.   Brock is contemplating consuming Bundle A in the figure below:
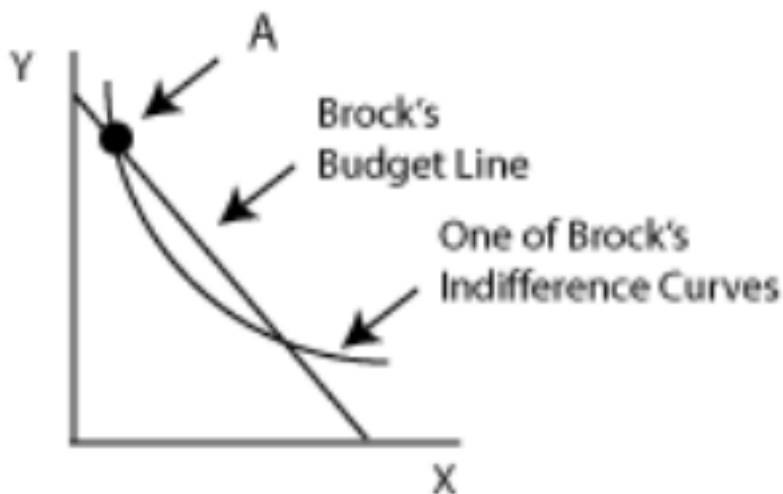
Given the information in the figure and that Brocks preferences are well well-behaved, what must be true?

    a.   Point A is Brocks optimal bundle since the indifference curve intersects the budget line at Point A.

    b. At Point A, the MRS equals the slope of the budget line.

    c. Brock is not using all of his income at Point A.

    d. Brock can find another point that he can afford such that the new point is on a higher indifference curve than the indifference curve given in the figure.

    e. Brock should consume more of Good Y since his MRS exceeds the price ratio at Point A.

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 Molly has utility function $u(C, L) = C * L$ where C equals the number of chicken kebobs she eats each week, while L is the numer of lamba and been schwarma meals she eats each week. Molly has $100 to spend on Mediterranean food each week. The price of a chicken kebob meal is $5. The price of a lamb and beef schwarma meal is $10.

a.   List three (C, L) points that give Molly utility of 10. For each, say whether it is on her budget line, below her budget line, or abover her budget line.

b.   List three (C, L) points that are on Molly's budget line. For each, say whether her utility is at that point.

c.   Pick the highest utility point from part b. At that point, what is Molly's marginal utility per dollar of a chicken kebob meal? What is her marginal utility per dollar of a lamb and beef schwarma meal?

d.   At the point in part c, is Molly maximimizing her utility? If not, say whether or not Molly should consume more C or more L.

e.   What is the economic intuition behind the condition $\frac{MU_X}{p_X} = \frac{MU_Y}{p_Y}$?

Problem 5 Spencer 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, Spencer's father offers him $40 extra.

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

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

Problem 6 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 7 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?