

Problem Set 1

1. For lunch, Ada prefers to eat soup and bread in fixed proportions. When she eats X pints of soup, she prefers to eat \sqrt{X} ounces of bread. If she has X pints of soup and more than \sqrt{X} ounces of bread, she eats all the soup along with \sqrt{X} ounces of bread, and throws the extra bread away. If she has X pints of soup and fewer than \sqrt{X} ounces of bread (say Y ounces), she eats all the bread along with Y^2 ounces of soup and throws the extra soup away.
 - a) Draw Ada's indifference curves between soup and bread.
 - b) Assume she spends all her income on soup and bread. Plot her income-consumption curve, her Engel curve for soup, and her Engel curve for bread.
 - c) Derive her demand function for the two goods. [Note that demand function is a function of prices and income].
2. Gary has two children, Kevin and Dora. Each one consumes "yummies" and nothing else. Gary loves both children equally. For example, he is equally happy when Kevin has two yummys and Dora has three, or when Kevin has three yummys and Dora has two. But he is happier when their consumption is more equal.
 - a) Draw Gary's indifference curves.
 - b) What would they look like if he loved one child more than the other?
 - c) Suppose that Kevin starts out with two yummys and Dora with eight yummys, and that Gary can redistribute their yummys. Draw a "budget line" that shows his available choices and indicate his best choice by adding indifference curves.
 - d) How would your answer differ if Kevin started out with six yummys and Dora with four?
3. Assume that a utility function is given by $\min(2X_1 + X_2, 2X_2 + X_1)$, where \min is the minimum of the two values. What is the Slutsky equation that decomposes the change in the demand for X in response to a change in its price? What is the income effect? What is the substitution effect?
4. Consider a consumer who purchases two goods, x and y . The consumer's utility function is $U(x, y) = x^2 y^3$. The prices are p_x and p_y , and the consumer's income is I .
 - a) Derive the demand function for x and y .
 - b) Assume initially $I = 30$, $p_x = 1$, $p_y = 8$. Now assume the price of y decreases to 2, compute the initial optimal bundle A before price change, and new optimal bundle C after price change.
 - c) Identify the substitution effect and income effect. What is the direction of the substitution effect? Is good y a normal, inferior or Giffen good? Explain.

5. Ashley spends all her income on gasoline and food. At first she earns \$100, buys 25 gallons of gasoline at \$2 per gallon, and purchases 10 pounds of food at \$5 per pound.
- a) Her income later rises to \$200, but the price of gasoline increases to \$5 per gallon, and the price of food rises to \$7 per pound. Is she better or worse off? Why? Draw Ashley's budget constraint before and after the change in income, and identify her best choice before the change.
 - b) If the price of food rises to \$8 instead of \$7. Can you say whether Ashley is better or worse off? What if she purchases 11 pounds of food after the change in prices and income? What if she purchases 15 pounds of food after the change? In each case, draw Ashley's budget constraint.