EC 3204: Introduction to Consumer Theory
Homework 2

Due: 2/13

Problem 1: Soda Preferences

Suppose that your utility from the consumption of Coke (C) and Pepsi (P) can be expressed as:

$$U(C, P) = C \cdot P$$

Where C is the number of units of Coke consumed and P is the number of units of Pepsi consumed.

a.) Draw indifference curves for $U = 100$ and $U = 400$.

b.) If you have \$100 to spend on these two goods, and Coke costs \$2 per unit while Pepsi costs \$2 per unit, draw your budget constraint.

c.) Calculate the utility-maximizing quantities of Coke and Pepsi. Show this solution in your diagram above. What is the marginal utility of Coke (MU_C) at this point? The marginal utility of Pepsi (MU_P)? What is the consumer's total utility?

d.) Suppose a price war drives the price of Pepsi down to \$1. Calculate the impact of this event on the utility-maximizing quantities. Show this new solution in your diagram. What happens to your total utility? Why?

e.) Suppose that the government decides to tax your income enough to return you to your *original* utility level (from part c). How much money would they have to take away? Explain your answer carefully, touching on income and substitution effects.

Problem 2: Heating vs. Soup

Suppose that a typical family spends \$1,200 on either heating oil (H) or soup (S). Their utility function is given by:

$$U(H, S) = H \cdot S$$

Assume the price of heating oil (P_H) is \$10 per unit and the price of soup (P_S) is \$2 per unit.

a.) If the family is maximizing their utility, how much of its income of \$1,200 will be spent on heating oil? How many units of soup will they purchase?

b.) The government decides to lift this family's level of satisfaction by subsidizing soup. By allowing the family to purchase soup at half the market price (\$1), with the other half paid by the government, how many more units of soup will be purchased?

c.) What would be the total cost of this program to the government per typical family?

d.) The government could also achieve this same level of utility (the level reached in part b) by giving a cash subsidy instead. How large must this cash subsidy be? Is it more or less expensive than the price subsidy in part c?

Problem 3: Student Life

Consider a student's consumption of two goods: Books (B) and Coffee (C). The utility derived is represented by:

$$U(B, C) = B^{0.75}C^{0.25}$$

a.) Sketch the indifference curves for $U = 10$ and $U = 20$.

b.) Given a budget of \$80, with each book costing \$10 and each cup of coffee costing \$2, illustrate the budget constraint.

c.) Determine the utility-maximizing quantities of Books and Coffee. Indicate this solution on your graph.

d.) If a promotional event reduces the price of books to \$5, compute the new utility-maximizing quantities. How does this affect the total utility?

e.) If the university decides to tax students to bring them back to their original utility level after the promotional event, how much should they tax? Justify your answer.