

# Econ306 – Intermediate Microeconomics

## Problem Sets 1 and 2

Due: Thursday, October 11

### Question 1

Jane consumes two commodities, food and other goods. The price of food is \$30 per unit and the price of other goods is \$10.

- (i) Draw Jane's budget line, assuming she has a budget of \$300.
- (ii) Her marginal utility from food consumption at her optimal point is 5 utils. Calculate her marginal utility from the consumption of other goods.

### Question 2

TransContinental airlines offers the following frequent flyer program to its customers: For the first 30,000 miles flown each year, customers pay full fare. For the next 20,000 miles flown during the year, the fare is reduced by 20 percent; for all flights beyond that, the fare is reduced by 50 percent. An individual with a budget of \$5,000 considers miles flown against other goods. If the full price of a mile is \$0.1 and the price of other goods is \$0.1, draw the budget constraint faced by the individual (plotting miles flown on the horizontal axis).

### Question 3

Assume that Andrew, a sports fan, derives utility from attending football games and basketball games. The price of each football ticket is \$5 and the price of a basketball game is \$10. Each football game takes 3 hours and each basketball game takes 2 hours.

- (i) Assume that Andrew has \$50 per month to spend on game tickets and that he has more than enough time to attend all the games he wants. Sketch Andrew's budget constraint.
- (ii) Now assume that Andrew can only spend 18 hours per month at sporting events, but he has more than enough money to attend all the games he wants. Sketch the budget constraint. (Hint: the constraint will now be in terms of hours, not dollars, and the "prices" will be the duration of each type of game.)
- (iii) (*extra credit*) Now suppose that Andrew has only \$50 per month to spend *and* only 18 hours per month available. Sketch the budget constraint, and explain why it can be characterized as having a kink. If the optimal choice of Andrew occurs at the kink, what can you say about his marginal rate of substitution? How about if the optimal choice does not occur at the kink?

### Question 4

For Jones, X and Y are perfect substitutes. Specifically, he is always willing to substitute 3 units of X for 2 units of Y. The price per unit of X is \$5, the price per unit of Y is \$8, and Jones's income is \$40.

- (i) Sketch Jones's indifference map and budget constraint.
- (ii) How much X does Jones consume?
- (iii) Suppose the price of X increases to \$6 and everything else stays the same. How much X does Jones consume?

### Question 5

According to Pommerehne and Kirchgassner (1987), the price elasticity of demand for theater tickets in Germany is 1.73. Suppose that the price of theater tickets falls by 10 percent. What happens to the quantity demanded? What happens to total expenditure (price times quantity demanded) on theater tickets?

### Question 6

The price of apples is \$5 per unit and the quantity demanded at that price is 300 apples.

- (i) Suppose that when the price fell to \$4.95, quantity demanded rose to 305 apples. Calculate the point elasticity of demand.
- (ii) Now suppose that because of a hurricane, many orchards were destroyed, leading to an increase in the price of apples from \$4 to \$5. At this point, quantity demanded fell from 300 to 200 apples. Calculate the arc elasticity of demand.
- (iii) Finally, suppose that when the price of oranges rose from \$5 to \$5.05 per pound, the quantity of apples demanded increased from 300 to 305. Calculate the point elasticity of demand with respect to the price of oranges. Are apples and oranges complements or substitutes?

### Question 7

In Japan, restrictions on the import of rice keep the price of rice at about 10 times the world level. Suppose that these restrictions were relaxed. Show how this change would affect the price of rice and hence the equilibrium bundle of a Japanese consumer (consider the consumption of rice against "all other goods"). Decompose this change into substitution and income effects.

### Question 8

Teddy can work as many hours each year as he wants to at a wage rate of \$12 per hour.

- (i) Sketch Teddy's budget constraint in a leisure-consumption framework.
- (ii) Suppose that Teddy has a rich uncle who always gives him \$1,000 a year, regardless of how much Teddy earns. Sketch the associated budget constraint
- (iii) Use an indifference curve diagram to show how the income from his uncle affects Teddy's hours of work.