

Intermediate Microeconomics

Fall 2025 - M. Chen, M. Pak, and B. Xu

Problem Set 2: due in class, the week of Oct. 22

1. Consider a consumer with income $I = 10$ and utility function:

$$u(x_1, x_2) = x_1 + 2x_2^{\frac{1}{2}}.$$

- (a) Suppose prices are $p_1 = 2$ and $p_2 = 1$. Find the consumer's demand.
- (b) Suppose now that the prices are $p'_1 = 4$ and $p_2 = 1$. Find the consumer's demand.
- (c) Interpret this result.

2. A consumer who lives for two periods has a standard Cobb-Douglas utility function:

$$u(c_1, c_2) = c_1^\alpha c_2^\beta,$$

where c_t = consumption in period t and $\alpha + \beta = 1$. Her income in period one is $I_1 = 500$ and $I_2 = 400$, and she can lend or borrow at interest rate $r = 0.2$.

- (a) Find the optimal consumption demand.
- (b) What values of α , if any, makes the consumer a borrower? Interpret this result.
- (c) Suppose now that $\alpha = \frac{4}{7}$ but that r is no longer 0.2. What values of r , if any, makes the consumer a borrower? Interpret this result.

3. Let $u(x) = \min \{2x_1, x_2\}$.

- (a) Find the Hicksian demand.
- (b) Expenditure function $e(p_1, p_2, u)$ is the minimum amount of money needed to achieve utility level u when prices are p_1 and p_2 . Find the expenditure function this utility function.

4. Consider a leisure-consumption model in which an individual is deciding her daily consumption of leisure and the composite consumption good. Her utility is $u(L, Y) = a \ln L + Y$, where L and Y denote the amount of leisure and the composite good, respectively. The individual has 24 hours of time in total. The hourly wage is w , and the price of the consumption good is p .
 - (a) Find the individual's (Marshallian) demand for leisure and the consumption good.
 - (b) For what values of a , if any, will the individual not work? Explain this result.
 - (c) Suppose the hourly wage increases from $w = 2$ to $w' = 4$ while the price of the composite good remains fixed at $p = 1$. Find the substitution, the income, and the total effects on leisure.

5. Consider an individual whose utility function over money is $u(w) = w^{\frac{1}{2}}$. The individual is facing a risk of losing ¥100 with probability $\frac{1}{2}$ and nothing with probability $\frac{1}{2}$.
 - (a) Suppose the individual's current wealth is ¥1,000. What is the maximum amount of money that she is willing to pay to avoid this risk?
 - (b) Suppose the individual's current wealth is ¥10,000. What is the maximum amount of money that she is willing to pay to avoid this risk?
 - (c) Now, suppose the individual's current wealth is again ¥1000, but now the individual is facing the prospect of gaining ¥100 with probability $\frac{1}{2}$ and nothing with probability $\frac{1}{2}$. What is the maximum amount of money that she is willing to pay to take on this risk?
 - (d) Interpret these results.