Microeconomics In-class Quiz 4
Fall 2025

Student ID:

Name:

Instructions

1. Do NOT flip over this page until every student receives this quiz. Your TA will let you know when you can start.
2. During this closed-book quiz, you cannot consult any materials.
3. If you are unable to explain your reasoning in English, it is okay to write in Korean.
4. [**IMPORTANT**] Make your answers legible. Clearly delineate your scratches from your answers. Deducted points due to illegible writing cannot be the reason for reevaluation.

Honor Code: Cheating on exams or quizzes, plagiarizing someone else's answers as one's own, or any other instance of academic dishonesty violates the standards of academic integrity.

Confidentiality Code: Sharing the information of the exam or quiz contents with other students in any form and medium is strongly prohibited, as it raises information inequity.

I, _____, consent to the Honor Code and the Confidentiality Code.
(write your name)

1. Bert and Ernie work on a joint project. The joint revenue is $4b + 4e + 2be$, where where b is Bert's effort, and e is Ernie's effort. Bert's cost of effot is b^2, and Ernie's cost of effort is e^2. The joint revenue is equally split. Thus, the payoff of Bert is $2b + 2e + be - b^2$, and that of Ernie is $2b + 2e + be - e^2$.

(a) [1 point] Given Ernie's effort level e, find the best response function of Bert.

(b) [2 points] Describe a Nash equilibrium when two decide their effort levels simultaneously.

(c) [2 points] When Bert decides the effort level first, and then Ernie's effort decision follows, what would be the aggregate effort level in the Subgame-Perfect Equilibrium?

2. Steve is a farmer. His utility function is given by $U = \sqrt{I}$, where I is his income. Steve's weekly income is \$900, but if bugs harm his crops, he will only earn \$400. There is a 50% chance his crops are harmed in any given week.

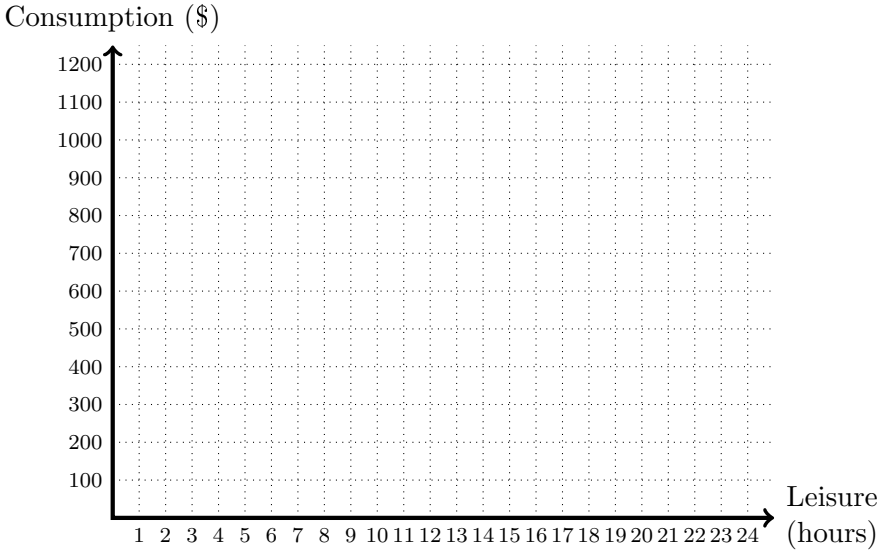
(a) [1 point] Calculate Steve's expected income and expected utility.

(b) [1 point] Suppose that Steve considers an alternative job that pays a constant weekly payment. What weekly income would make Steve enjoy the same utility he expected to earn as a farmer?

(c) [2 points] Suppose that an insurance company offers Steve an insurance product that eliminates the risk of crop damages. What is the largest insurance premium Steve would be willing to pay to obtain this insurance?

3. Suppose Nick decides how much to work per day. Assume that labor market is perfectly competitive, and the hourly wage is \$50. He can choose 0 to 24 hours of work per day. Whatever the remainder of the working hours is the leisure hours. The entire labor income is used for consumption.

(a) [1 point] If Nick works for h hours, his income is $50h$, and leisure hours are $24 - h$. Draw his budget constraint on leisure–consumption plane.



(b) [2 points] Nick's utility is $U = \min\{C, 30L\}$, where C is Consumption and L is Leisure. Draw two or more indifference curves on the graph above. What's his optimal working hours?

4. A firm's short-run production function is given by $Q = 2\sqrt{L}$, and the associated marginal product of labor is $MP_L = \frac{1}{\sqrt{L}}$.

(a) [1 point] If the firm's marginal revenue is 100, what's the marginal revenue product of labor?

(b) [2 points] If this firm can hire workers for w, how many workers would this firm demand?

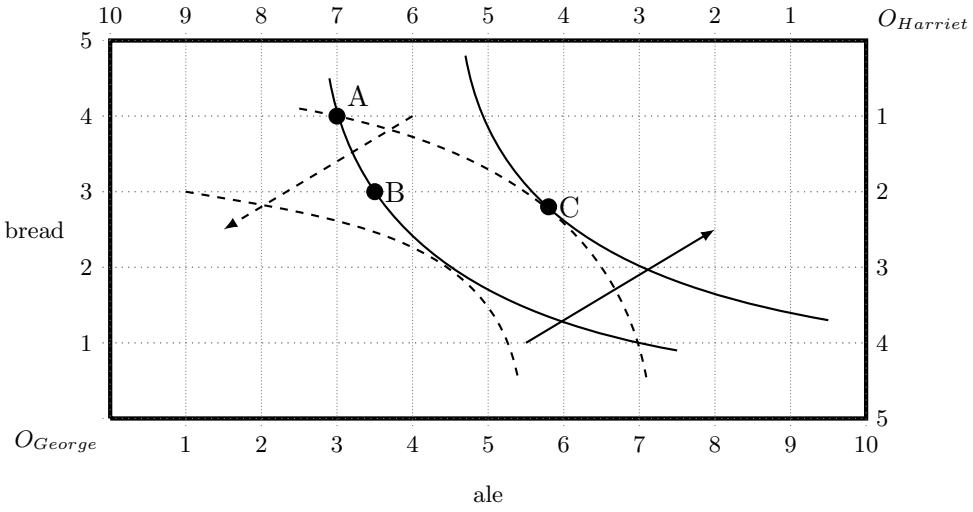
5. A classmate offers to play the following game: Once you pay the participation fee of $\$p$, he will toss a fair coin; if it lands heads, he will pay you \$10; if it lands tails, he will pay you \$30.

(a) [1 point] If you are risk-neutral, what is the largest participation fee you will pay to play this game?

(b) [2 points] Your classmate Risa has a utility function $U = W^2$, where W is the monetary outcome. If Risa bases her decisions on expected utility, would she play if the participation fee is \$22?

(c) [1 point] Is Risa risk-averse, risk-neutral, or risk-loving?

6. The Edgeworth box below describes an exchange economy of George and Harriet with two goods—ale and bread. Arrows indicate the direction of utility increases. Dashed lines are for Harriet.



(a) [1 point] Suppose the resources are allocated at point A. How many units of ale and bread do George and Harriet have?

(b) [2 point] Is moving from point A to point B Pareto improvement? Explain.

(c) [2 point] Is moving from point B to point C Pareto improvement? Explain.