

Midterm1

EC201

Instructions

- There are 10 questions on the midterm plus a bonus.
- Each question is worth 10 points
- Partial credit will be awarded based on the quality of the explanation
- Because I did not adequately prepare you to solve problems with the assistance of the computer, I am crediting you with a complete answer for problems 1 and 2. You do not have to write anything for problems 1 and 2.
- The midterm is “open Google”. That is, you can search the web if you think that might be helpful. You **cannot** communicate, though, with anyone inside or outside of this class.
- When you are instructed that time is up, stop typing. Anyone who continues to type after the allotted time will be deducted points. Let me be clear, it is **not** in your best interest to continue to type after time is up, even if you are in the middle of a sentence.
- Please write all answers in this notebook. Please save a copy and share the notebook with **pharringtonp19@gmail.com**

Problems

Problem 1. Consider the following Utility Function:

$$U(x_1, x_2) = 2x_1^{0.5}x_2^{0.5}$$

At the bundle (2,3), a consumer with the above utility function is approximately willing to trade-off one additional units of x_1 for how many units of x_2 ?

Problem 2. Given the following utility function, and the following budget constraint, find the optimal bundle

$$U(x_1, x_2) = 2x_1^{0.5}x_2^{0.5}$$
$$2x_1 + 3x_2 \leq 21$$

Problem 3. True/False: A random variable is a function

Problem 4. True/False: Consider the following endowment: $(m_1, m_2) = (6, 3)$, where m_1 represents the endowment in the first period and m_2 represents the endowment in the second period. Given borrowing rates of 0.15 and a savings rate of (0.01), the **future value** of the bundle is the following:

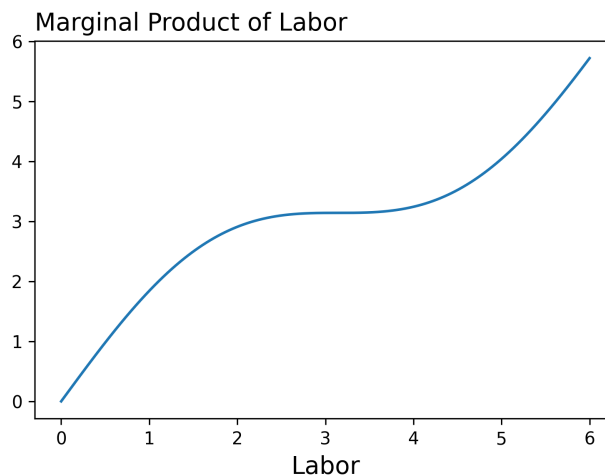
$$m_2 + m_1(1 + r_{\text{savings}}) = 3 + 6(1 + 0.01) = 9.06$$

Problem 5. True/False: For any consumer with complete and consistent preferences, there are multiple utility functions which represent the consumer's preferences

Problem 6. When modeling consumers, we represent the fact that consumers are different by allowing the parameters of which **functions** to differ across consumers? [Please be specific in your response.](#)

Problem 7. In what sense can this course be thought of as the study and application of implicit functions? Why are implicit functions central to modeling economic phenomena?

Problem 8. Provide a brief economic explanation for why the graph of the marginal product of labor may have the following form in some contexts.



Problem 9. Consider the following hypothetical choice problem:

- Consumers spends some fraction of their income on consumption and the rest on a car
- There are two types of consumers: lower-income and higher-income consumers

- Lower-income consumers are more likely to finance the purchase of a car via a loan which carries an interest rate
- Higher income consumers have more wealth in the stock market, which is adversely affected when interest rates increase

Given this information, explain how a rising interest rate affects the feasible set differently for these two types of consumers. [Please be specific in your response.](#)

Problem 10. Let's consider the situation where the consumer can choose some amount of good 1, some amount of good 2 and some amount of leisure. If the following problem is equivalent to the consumer's optimal choice problem over these elements, what is the interpretation of $x^*(l)$? [Please be specific in your response.](#)

$$\underset{l \in [0, 24]}{\text{maximize}} \ U(l, x^*(l))$$

Problem Bonus. Google provides some services, such as Search, for free. Considering the down stream consequences, how might this decision harm consumers in the form of higher prices or limited choice?