ECON 360: Intermediate Microeconomics

Homework 1

- Define any variables you need to answer the problems.
- Use any materials to help you with these questions. That includes others in this course!
- Please write your answers in the space provided.
- Keep your answers short but clear. Your goal is to convince a skeptical grader that you understand the relevant concepts well enough to answer the question you are given.
- The questions on this homework sum to 61 points. But you get a 100 for completing/attempting the majority of the questions.
- Remember to write down the names of anyone you worked with on this homework!
- Bring any and all questions to office hours!

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1. (4 points) What is your name?
2. (4 points) Who did you work with on this homework?

1 True/False Questions

Indicate "T"rue or "F"alse for each of the following statements or claims. For each false statement, if you explain why it is false I will give you a bonus point.

3. (2 points) You are an econ professor, and you notice more than half your class does not show up to lectures. **Claim**: Making attendance part of your students' grade would likely **NOT** increase attendance in class.

4. (2 points) Suppose there are two goods. Prices of goods x_1 and x_2 are p_1 and p_2. Now the price of good 1 doubles and the price of good 2 triples. **Claim**: The budget constraint becomes steeper after the price change. **Assumption**: The graph is such that x_1 is on the x-axis and x_2 is on the y-axis.

5. (2 points) **Claim** Your MRS between \$1 bills and \$20 bills is 20 assuming \$1 bills were the good on the y-axis and \$20 bills were the good on the x-axis.

6. (2 points) **Claim**: A typical college student has a larger budget set than Bill Gates.

7. (2 points) Suppose Bill likes both tea (t) and cereal (c). Bill's utility over tea and coffee is given by $U(t, c) = tc + 42$. **Claim**: The bundle (3,4) is **strictly preferred** to the bundle (4,3).

2 Multiple Choice Questions

Circle the best answer to each question. There is only one answer for each question. No explanation necessary.

8. (2 points) Consider the relation "strictly shorter than". Which axiom of rational preferences, if any, would this preference relation violate?

   A. Reflexivity

   B. Transitivity

   C. Completeness

   D. This relation satisfies all 3 axioms.

9. (2 points) Suppose $U(x_1, x_2, x_3) = 3x_1^3 + 2x_2 + \sqrt{x_3}$. Calculate MU_1.

   A. 2

   B. $\frac{1}{2}x_3^{\frac{-3}{2}}$

   C. $9x_1^2$

   D. $3x_1^2$

10. (2 points) Bill likes Starbucks coffee and Dunkin coffee, but he still prefers Dunkin to Starbucks. In fact, Bill is always willing to trade 2 Starbucks coffees for 1 Dunkin coffee. Which best describes Bill's preferences over coffee?

    A. Well-behaved preferences.

    B. Perfect substitutes preferences.

    C. Perfect complements preferences.

    D. Quasi-linear preferences.

3 Short Answer Questions

These questions all require an explanation. Remember you are trying to convince me you understand the why and the how of what you are doing, not simply getting the answer correct. Cite specific concepts from class in your answers for full credit.

11. Katara walks up to a market stall that sells clothes c and food f. She has 1 gold coin (worth \$10) and 2 silver coins (worth \$5). The price of clothes is \$4 and the price of food is \$5. Katara's preferences are well-behaved and therefore can be modeled with a Cobb-Douglas utility function. To make it simpler, assume the exponents on c and f are both equal.

    (a) (2 points) Write 2 utility functions that represent Katara's preferences.

    (b) (2 points) Pick one of your utility functions and explain why your utility function represents Katara's preferences.

    (c) (2 points) Explain how you know that your second utility function also explains Katara's preferences.

(d) (4 points) Would Katara prefer the bundle (4,4) or the bundle (3,5)? Why?

(e) (2 points) Write down Katara's budget constraint in dollar terms. Show your work.

(f) (5 points) Find Katara's optimal bundle of clothes and food using your work from the parts above. Show your work.

12. Suppose that I gave you a choice about how your final grade was calculated. In Option 1, I take the average of your grades on your two exams. For Option 2, I multiply your midterm exam by 0.8, and your final exam by 0.7. I then take the larger of those two numbers. For notation, use m to denote a student's score on my midterm and f to denote a student's score on my final.

    (a) (4 points) For each option, write down a utility function that might represent a student's preferences. No explanation necessary.

    (b) (4 points) Suppose a student knew they would score an 70 on the midterm and an 80 on the final. Which grading scheme would they prefer?

(c) (4 points) Would the student's preferred option change if they knew they would score an 80 on both the midterm and the final?

(d) (4 points) For Option 1, draw 2 indifference curves. One indifference curve showing all combinations of scores that give the same utility as scoring an 80 on both exams., and one other indifference curve of your choosing.

(e) (4 points) Suppose instead there is a third option, Option 3, where your final grade is the higher of your two exam scores. Draw an indifference curve showing all combinations of scores that would give the same utility as scoring an 80 on both exams using this third option, and a second indifference curve of your choice.