ECON 360: Intermediate Microeconomics

Homework 3

- 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 71 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) Two friends, Anita and Barb, are haggling over baseball cards after they both purchased a pack of baseball cards from the store. Upon opening their respective packs of cards, both Anita and Barb have baseball cards from the Kansas City Royals and the Washington Nationals. Anita's marginal utility of a Kansas City Royal baseball card is 0, and she has a positive marginal utility of a Washington Nationals baseball card. Barb has a zero marginal utility of a Washington Nationals baseball card, and a positive marginal utility of a Kansas City Royal baseball card. **Claim**: Since Anita and Barb have 0 marginal utilities for 1 type of card, there is no Pareto Improvement possible relative to the cards Anita and Barb receive in their pack.

4. (2 points) **Claim**: In the context of trade between two people, it is possible that one person is better off at a non-Pareto Optimal allocation than at a Pareto Optimal allocation.

5. (2 points) **Claim**: In the context of trade between two people, it is possible that both people are better off at a non-Pareto Optimal allocation than at a Pareto Optimal allocation if both people have positive marginal utilities for both goods.

6. (2 points) Daria, a perfectly rational economic agent, walks into the grocery store because she wants to make eggs for breakfast before class this week because that is her most preferred breakfast. She walks out of the grocery store with a box of cereal and milk to have for breakfast instead **Claim**: Had Daria chosen to buy eggs, her consumer surplus would have been negative.

7. (2 points) Suppose you are in a cooking competition and are competing against another chef who specializes in a different cuisine than you. For example, suppose you specialize in southern comfort food, and the other chef specializes in South-Asian cuisine. The challenge for each of you is to make a dish from the *other* person's cuisine, so you are making a South-Asian dish and your opponent is making a southern dish. There are 10 minutes remaining. The host announces that if both of you agree, you can swap stations and finish the other person's dish and present it as your own. **Claim**: Assuming rational behavior, if both of you agree to swap, it must be that swapping stations is a Pareto Improvement.

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) Bill's willingness to pay for chipotle is $10 per bowl. When the price of a chipotle bowl is $8, Bill purchases 5 bowls. Then chipotle raised the price of bowls to $9 and Bill purchased 4 bowls after the price change. **What is the reduction in Bill's consumer surplus due to the price change?**

    A. $2.

    B. $6.

    C. $0.

    D. $1.

9. (2 points) Tommy and Zoya are two toddlers who are friends and the same shoe size. Tommy has 1 pair of blue shoes and 1 pair of green shoes. Zoya has 2 pairs of red shoes and 1 pair of orange shoes. Tommy and Zoya both think it would be better to wear non-matching right and left shoes, and are trying to figure out how best to trade shoes according to these non-matching preferences. Assume that both Tommy and Zoya have the same marginal utility of a sneaker, it is only the differences in color that affect their utility over a given pair of shoes.**Question**: Given this endowment, which of the options below would we **not** expect to describe the shoes Tommy has after the trade?

    A. 1 left blue shoe, 1 right red shoe, 1 green left shoe, 1 right orange shoe.

    B. 1 left blue shoe, 1 right orange shoe, 1 green left shoe, 1 right red shoe.

    C. 1 left blue shoe, 1 green left shoe, 2 right orange shoes

    D. 1 left blue shoe, 1 right red shoe, 1 green left shoe, 1 right red shoe, 1 left red shoe, 1 right orange shoe.

10. (2 points) You walk into a farmers market with 24 Brussels sprouts and 2 heads of broccoli. Call this bundle (24,2) The price of 1 Brussels sprout is $0.25 and the price of 1 head of broccoli is $2. What other bundle of Brussels sprouts and heads of broccoli is *just barely* affordable for you?

    A. (16, 3)

    B. (16,2)

    C. (24, 3)

    D. (24,1)

11. (2 points) We can think about categories of allocations, where each category contains a number of bundles. Which of the categories below contains the fewest bundles?

A. The set of all allocations.

B. The contract curve (set of all Pareto Optimal allocations).

C. The core.

D. The set of feasible allocations.

12. (2 points) Suppose your demand curve is given by $Q^D(p) = 8 - p$. If the price is \$4, you buy _____ units and your consumer surplus is \$_____.

A. 2,16.

B. 4,8.

C. 2,8.

D. 4,16.

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.

13. **Environmental Economics**. Suppose New York State has opened a new state park with hiking trails, and wants to figure out how much to charge for visitors to access the park. Currently park entry is free, but people "pay" in the sense that traveling to the park from a person's home is costly (in terms of time, fuel, etc.). The funds will be used to maintain and improve the trails. Using surveys and other methods, New York State has determined the following relationship between travel cost and visits to the park for a given person.

    - At a cost of $20, a person takes 8 trips per year to the park.
    - At a cost of $40, a person takes 6 trips per year to the park.
    - At a cost of $60, a person takes 4 trips per year to the park.
    - At a cost of $80, a person takes 2 trips per year to the park.

    Assume that demand for hiking trips can be represented by a straight line.

    (a) (4 points) Using the above information, graph an individual's demand for trips to the park as a function of the price.

(b) (4 points) You determine that 50,000 people will take an average of four trips a year to the park. If all consumers are identical, what is an individual's consumer surplus per year currently, when there is no entry fee to the park? Derive this answer numerically and on the graph you drew in part a.

(c) (2 points) What is total consumer surplus per year of the park?

(d) (4 points) Suppose instead New York State decided to give out some sort of pass where an individual could pay a one time fee to access the park as many times as they wanted per year. What is an individual's maximum willingness to pay for such a pass?

14. **Macroeconomics**. Often in macroeconomics, we use barter-based models because then we don't have to worry about prices. These are also called "Robinson Crusoe" models. Suppose Bill and Dave are on this island, and decide to go into the woods on the island to see what they can find. Bill comes back to their shelter with 5 coconuts which are safe to eat and 10 liters of fresh water that are safe to drink. Dave comes back to the shelter with only 5 liters of fresh water but 15 coconuts.

    Assume both Bill and Dave have the same preferences over coconuts c and water w where $U_B = U_D = cw$.

    (a) (10 points) Draw the Edgeworth Box that represents the set of all feasible allocations given Bill and Dave's endowments. Your Edgeworth Box must clearly depict:

        1. Which good is on which axis.
        2. The total amounts of each good available.
        3. Which person is at which origin.
        4. The endowment point, including the endowment of each good for each person.
        5. Each person's indifference curve through the endowment.

(b) (6 points) On your Edgeworth box, indicate the area of Pareto Improvements given the endowment point. Then, indicate the Pareto Optimal point and draw any additional curves required to illustrate that the point you have picked is the Pareto Optimal point. Explain.

(c) (1 point) Now suppose instead Bill's utility for coconuts and water is given by $U_B = 4c + 2w$ and Dave's utility is given by $U_D = 2c + 4w$. Draw a new Edgeworth Box with the same information as you included in your Edgeworth Box in part a.

(d) (6 points) To the Edgworth Box from part c, find the area of Pareto Improvements and the Pareto Optimal point(s) (again drawing additional indifference curves as needed) and explain why the point you claim is Pareto Optimal is indeed Pareto Optimal. I highlight the areas of Pareto Improvements in green.

The Pareto Optimal allocation is for Bill to keep trading 1 liter of water to Dave for 1 cocunut until Bill runs out of waters to trade or Dave runs out of conuts. Dave also increases his utility each time one of these trades is made. Bill will run out of waters to trade (10) before Dave runs out of coconuts (15) so Bill will trade 10 waters for 10 coconuts.

Thus the Pareto Optimal allocation for Bill is 0 water, 5+10=15 coconuts. Dave's final allocaton will be 5+10=15 liters of water, and 15-10=5 coconuts.

(e) (6 points) Compare your answers between part d and part b. How are they different? Does it make sense? Why?