Microeconomic Analysis - Problem Set #3

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Concepts and Critical Thinking

Please answer the following questions briefly (1-3 sentences). Use examples as necessary. Be sure to label graphs fully, if appropriate.

1. How can we use utility functions, which have actual numbers that can be measured and compared, to model preferences and still say with a straight face that preferences are subjective? Hint: what does it mean for a utility function to be ordinal or cardinal? Why can multiple utility functions describe the same preferences?

2. Describe, in your own words, what happens at the optimum consumption point. Why is it the optimum? What does the equality of the slope of the indifference curve and the slope of the budget constraint *mean*, in English?

3. Sketch *two* indifference curves for each of the following pairs of goods. Indicate which one has higher utility (call it U_2) and which one has lower utility (call it U_1). Put the first good on the horizontal axis and the second good on the vertical axis.

(a) Carlene likes pizza and shoes.

(b) Paul likes pencils and pens, but views each as equally useful for writing.

(c) Rhonda likes carrots and hates broccoli.

(d) Michael only likes wearing 2 cuff links with every dress shirt.

(e) Emile hates both sauerkraut and anchovies.

(f) Kendra likes food and, as a non-smoker, is completely indifferent towards cigarettes.

(g) Li likes having either ice cream and anchovies, but never both at the same time.

4. Juan gets satisfaction from both music and fireworks. Juan's income is $240 per week. Music costs $12 per CD, and fireworks cost $8 per bag.

   (a) Graph the budget constraint Jose faces, with music on the vertical axis and reworks on the horizontal axis.

   (b) If Juan spends all his income on music, how much music can he afford? Plot a point that illustrates this scenario.

   (c) If Juan spends all his income on fireworks, how many bags of reworks can he afford? Plot a point that illustrates this scenario.

   (d) If Juan spends half his income on fireworks and half his income on music, how much of each can he afford? Plot a point that illustrates this scenario.

   (e) Connect the dots to create Juan's budget constraint. What is the slope of the budget constraint?

   (f) Divide the price of fireworks by the price of music. Have you seen this number before and, if so, where?

   (g) Suppose that a holiday bonus raises Juan's income temporarily to $360. Draw Juan's new budget constraint.

   (h) Now suppose that during the holiday, with his holiday bonus, the price of fireworks increases to $12 and the price of CDs increases to 18. If he spends all of his income on fireworks, how many can Juan buy? How about CDs? What happens to his budget constraint, and why?

5. Kelly's utility function for drinking Coke (C) and Pepsi (P) is given by $u(C, P) = 5C + 2P$, where $MU_C = 5$ and $MU_P = 2$. Let Coke be on the horizontal axis and Pepsi be on the vertical axis.

  (a) Can she get utility by consuming *only* Coke or *only* Pepsi?

  (b) What is $MRS_{C,P}$?

  (c) Are the bundles $(C = 2, P = 5)$ and $(C = 4, P = 0)$ on the same indifference curve?

  (d) What is $MRS_{X,Y}$ when $C = 1$ and $Y = 5$?

  (e) What is $MRS_{X,Y}$ when $X = 2$ and $Y = 2.5$?

  (f) Given your answers, what is the relationship between Coke and Pepsi for Kelly?

  (g) Draw a few sample indifference curves.

6. A consumer has the following utility function:

$$U = \sqrt{XY}$$

(a) Copy and/or fillin the following table by calculating the utility for each bundle of X and Y. Round to two decimal places.

		Y					
		0	1	2	3	4	5
	0						
	1						
X	2						
	3						
	4						
	5						

(b) Graph three indifference curves on the same graph below: the first showing the bundle(s) that yield a utility level of 1; the second showing the bundle(s) that yield a utility level of 2; the third showing the bundle(s) that yield a utility level of 3.
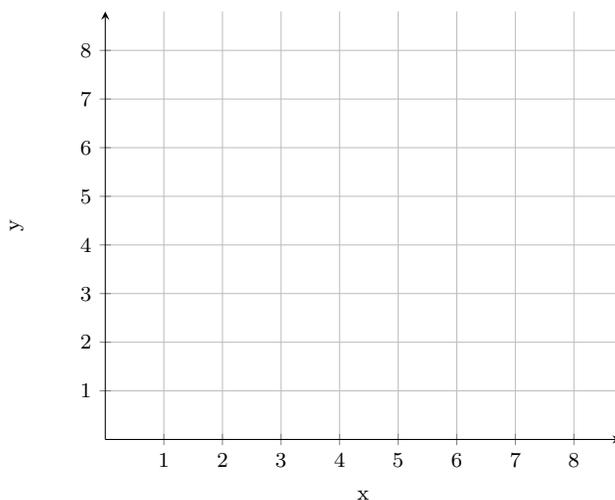
(c) The marginal utilities are given by:

$$MU_X = 0.5X^{-0.5}Y^{0.5}$$

$$MU_Y = 0.5X^{0.5}Y^{-0.5}$$

write an equation for $MRS_{X,Y}$.

(d) Suppose this consumer has an income of $10, the price of X is $2.50, and the price of Y is also $2.50. Write an equation for the budget constraint (in graphable form, in terms of Y), and put it on the same graph above.

(e) Find the optimal combination of X and Y where the consumer maximizes utility subject to income. Label this point A on the graph.

(f) How much utility does the consumer earn at the optimum?

(g) Now let the price of good X fall to \$1.25. Draw the new budget constraint on the original graph.

(h) Find the new optimal bundle of (X^*, Y^*) (Hint: The MRS equation hasn't changed). Plot it on the graph above, and label it point B. How much utility does this bundle bring? Plot an indifference curve on the graph indicating this.