Homework #5

This set of questions requires you to derive a consumer's demand function. Remember that the demand curve shows the relationship between the price of one good and the quantity of that good demanded when the consumer's income and the price of other goods are held fixed.

Specifically, we'll look at how a certain economics professor's consumption of beer is affected when the price of beer falls from $2 to $1.

The economics professor spends his entire income on two goods: beer and pizza. The cruel university only pays him $30 per week. The initial price of beer is $2 and the initial price of a slice of pizza is $1.

If he were to spend all of his income on beer, how many beers could he buy? If he were to spend all of his income on pizza, how many slices of pizza could he buy? Placing pizza on the Y-axis and beer on the X-axis, draw the professor's initial budget constraint. (When drawing the graph, do yourself a favor by drawing it very large).

Draw the professor's indifference curve by assuming that he initially buys 10 beers and 10 slices of pizza. (When drawing the indifference curve, do yourself a favor by drawing the indifference curve with a very small degree of curvature).

Now, let's examine a substitution effect. Assume that the price of beer falls to $1 and the professor's income falls to $20 (while the price of pizza remains constant at $1). If he were to spend all of his income on beer, how many beers could he buy (after the income and price changes)? If he were to spend all of his income on pizza, how many slices of pizza could he buy (after the income and price changes)? Could he continue to consume 10 beers and 10 slices of pizza?

On the same graph that you drew the initial budget constraint and initial indifference curve, draw the new budget constraint. What do you notice about the position of the new budget constraint in relation to the initial indifference curve? Do you think the professor will consume more beer or less? Do you think the professor will consume more pizza or less? Will he be on a higher indifference curve? Draw the new indifference curve.

Next, let's examine an income effect. Assume that the price of beer is $1 and the professor's income is $30 (the price of pizza continues to remain constant at $1). If he were to spend all of his income on beer, how many beers could he buy now? If he were to spend all of his income on pizza, how many slices of pizza could he buy now?

On the same graph, draw the new budget constraint. What do you notice about the position of the new budget constraint in relation to the second indifference curve that you drew? Do you think the professor will consume more beer or less? Do you think the professor will consume more pizza or less? Will he be on a higher indifference curve? Draw the new indifference curve.

Congratulations! You just examined the combined income and substitution effects. Notice that you:

- started at a point where:
    - the professor's income is $30,
    - the price of pizza is $1 and
    - the price of beer is $2.
- ended at a point where:
    - the professor's income is $30,
    - the price of pizza is $1 and
    - the price of beer is $1.

In the end, the only thing that changed was the price of beer. The substitution effect holds the professor's **real** income constant. The income effect holds the relative price of beer constant.

Now, let's examine the professor's consumption of beer before and after the price change. Does the substitution effect allow him to consume more beer? Does the income effect allow him to consume more beer?

On a **new** graph, draw the professor's demand curve by connecting two points – one point should represent initial price of beer and quantity of beer demanded and the other point should represent the new price of beer and quantity of beer demanded.

Finally, let's examine the professor's consumption of pizza before and after the price of beer changes. Does the substitution effect allow him to consume more pizza? Does the income effect allow him to consume more pizza?

Notice that – in the case of beer – the income and substitution effects move in the same direction.
Notice that – in the case of pizza – the income and substitution effects move in opposite directions.

In other words, the professor will consume more pizza (after the price of beer falls), if the income effect dominates the substitution effect. Here beer is a gross complement to pizza and the professor's demand curve for pizza would shift out when the price of beer falls.

On the other hand, the professor will consume less pizza, if the substitution effect dominates the income effect. Here beer is a gross substitute for pizza and the professor's demand curve for pizza would shift in when the price of beer falls.

Cyclones vs. Mets

The scenarios below describe how I alter my purchases of tickets to Brooklyn Cyclones' games and tickets to New York Mets' games when my income changes and/or when the price of a ticket to the games of one or both teams changes. For each scenario, say whether my ticket purchases are affected by:

- an income effect,
- a substitution effect,
- a combined income and substitution effect
- or no effect.

and **explain why!**

Each scenario is independent of the previous ones and independent of successive ones. In each scenario, I initially buy 25 Cyclones' tickets and 25 Mets' tickets. My initial income is $1000. The initial price of a Cyclones' ticket is $20 and the initial price of a Mets' ticket is $20.

1. The price of a Cyclones' ticket falls to $10. I increase my purchases to 40 Cyclones' tickets and 30 Mets' tickets.
2. The price of a Cyclones' ticket and the price of a Mets' ticket both fall to $10. I increase my purchases to 50 Cyclones' tickets and 50 Mets' tickets.
3. The price of a Cyclones' ticket and the price of a Mets' ticket both fall to $10. My income falls to $500. I continue to purchase 25 Cyclones' tickets and 25 Mets' tickets.
4. The price of a Cyclones' ticket falls to $10. The price of a Mets' ticket rises to $30. I increase my purchases of Cyclones' tickets to 40 tickets and decrease my purchases of Mets' tickets to 20 tickets.

(continued on the next page)

Demand Curves for Mets' Tickets and Cyclones' Tickets

For the scenario above where my purchases of Mets' tickets and Cyclones' tickets are affected by a combined income and substitution effect:

5. Draw the initial budget constraint and indifference curve. Place Mets' tickets on the vertical axis and Cyclones' tickets on the horizontal axis.
6. Draw the substitution effect. Be sure to LABEL that substitution effect.
7. Draw the income effect. Be sure to LABEL that income effect.
8. Are Cyclones' games (tickets) a gross substitute for Mets' games? OR are Cyclones' games a gross complement to Mets' games?
9. Draw the demand curve for Mets' tickets and the demand curve for Cyclones' tickets. If a demand curve shifts, then illustrate that shift. If there is movement along a demand curve, then illustrate that movement.