

## Homework Set 2

- (10%) The data on the following table show the prices of X and Y, the annual income of the consumer and the quantities of X consumed during the last 6 years.
  - What pair of years would you use to calculate the price elasticity of the demand for X? Explain why you selected this pair? What is the arc price elasticity of demand for X?
  - The calculation of the price elasticity of the demand for X is biased because of a change in preferences for X and Y if you use which two years to calculate the price elasticity.
  - Given your answer to the question above, which two years would you use to determine if X and Y are complements or substitutes.
  - What pair of years would you use to calculate the price elasticity of the demand for Y? Explain why you selected this pair of years.

Year	P <sub>X</sub>	Q	P <sub>Y</sub>	Income
1987	100	80	50	20,000
1988	110	90	40	18,000
1989	90	100	40	18,000
1990	100	100	50	20,000
1991	100	90	40	20,000
1992	100	110	40	25,000

- (10%) Suppose the demand function for a product is  $Q = 150 - 12p$ . Compute the point elasticity of demand at  $Q = 30$ . Then compute the arc price elasticity of demand over the interval  $Q = 40$  to  $Q = 30$ ; over the interval  $Q = 31$  to  $Q = 30$ ; over the interval  $Q = 30.1$  to  $Q = 30$ . Comment on the pattern of these price elasticities.

$$\eta = \text{Slope} \frac{\text{Price}}{\text{Quantity}} = -12 \frac{10}{30} = -4$$

Q-High	Q-Low	P-High	P-Low	Eta
40.0	30	9.17	10	-3.28571
31.0	30	9.92	10	-3.91803
30.1	30	9.99	10	-3.99168

- (5%) Two restaurants in town serve similar menus. One takes no reservations; one does. At which one would be more likely to find students? Faculty?

4. (5%) Where would you expect to find the shorter lines, at a McDonalds in a suburb or in an inner city?
  
5. (5%) It takes 10 hours to read a novel. Assuming that hardbacks are more durable and appealing than paperbacks, can you explain why a higher-wage reader prefers a hardback book and a lower-wage reader prefers a paperback?
  
6. (10%). Explain whether you agree or disagree with each of the following statements:
  - a. If  $MRS_a/MRS_b \neq p_a/p_b$ , the consumer is not maximizing utility.
  - b. For a consumer whose indifference curves do not cross, it is impossible for their preferences to be intransitive.
  - c. The only way a consumer can choose to purchase no units of a good, is if the indifference curves are straight lines.
  - d. The composite good theorem implies that a consumer gets utility from money.
  
7. (10%) The demand per household for a product is given by  $q = 12 - 3p$ .
  - Compute consumer surplus assuming that the product is given away freely.
  - Compute consumer surplus assuming that the product is sold at a price of \$1 per unit.
  - Now suppose the government imposes a tax of \$1 on each unit of the product that is consumed. The proceeds of the tax are distributed to individuals in the community, *independent of how much of the product they consume*. What is the deadweight loss?
  
8. (10%) Mylan Labs has just begun marketing WonderDrug, which is even better than Viagra. Suppose that, for each potential user of the product, the demand curve for pills each year is

$$Q = 200 - 10p$$

Assume that the drug cost \$200 million to develop, and \$200 million to do the testing required to obtain FDA approval to sell the drug. But assume that manufacturing costs are negligible (in fact, they are pretty low and this will simply make the problem easier to handle). Mylan is charging \$10 a pill.

- a. How much consumer surplus will each user get each year from using the drug?
  - b. Assume it was possible for Mylan to offer each customer a deal where for a fixed annual fee, he could obtain as many pills as he wanted. What price would they charge for a year's unlimited supply? Show your work.
  - c. Can you think of reasons why Mylan might not want to adopt this pricing system?
9. (10%) East Wolcott is justly famous for its Limburger Cheese. The price in that cheese is reflected by the fact that each of its citizens now spends \$400 a year on Wolcott Limburger Cheese. However the Chamber of Commerce has decided that the town could best promote its cheese if the citizens increased their consumption. To that end, it is considering two proposals

Each citizen who consumes more than \$200 a year of Wolcott Limburger Cheese will get a bonus of \$100 a year.

Each citizen who consumes more than \$450 a year of Wolcott Limburger Cheese will get a bonus of \$100 a year.

Show what effects each of these schemes will have on domestic consumption. In each case answer two questions:

	Plan 1	Plan 2
Will Consumption of Wolcott Limburger Cheese Increase?		
And if so, will it go up by more than \$100?		

Provide a clear graphical explanation and defense of your answers. (You may assume that all residents of Wolcott have the same income and the same preferences for Cheese and other goods. You may also initially assume that the program is financed by a special grant from Santa Claus.)

10. (5%) If the wage rate of an individual increases by 15% and a consumer purchases just goods X and Y, the consumer will substitute toward Y if it takes fewer minutes to consume Y than X. Explain why you agree or disagree with this statement.

11. (10%) A new fishing season is coming to the town of Lake Elmore. Every one of the town's 1,000 citizens is an avid fisherman. The town council regards this as good news, for they face a budget deficit and must raise an additional \$35,000 this year. They met secretly at Warren Miller's and agreed to raise the revenue by imposing a fishing tax. Because the citizens of Lake Elmore feel themselves overtaxed, the town council has decided to disguise the purpose of the tax as a "conservation measure" to keep the lake from getting over-fished. (In fact, this is a foolish worry).

A team of eminent econometricians from the local State University has determined that the number of fish each person will catch this year is

$$Q = 10 - p$$

where  $p$  is the price in (dollars) charged for each fish caught. Two plans are under consideration. One is to charge a price for an "unlimited license"; the second is to charge a price for each fish caught. (Some of you might worry about how such a license will be monitored. Don't).

- a. What is the maximum amount the town could charge each inhabitant for a license and still get customers? If the town goes this route, how many fish will each resident catch this year? *Explain your answers.*
- b. If the town decides to charge by the fish, it wants to cut the number of fish caught by half of your answer to part A. What license fee per fish caught would do the job? How much revenue would be raised? *Explain your answers.*
- c. As you can see, the revenue raised from "B" does not meet the town's revenue objective. An alternative is to charge \$ $X$  for the first fish caught and \$ $Y$  for each fish thereafter. What values of  $X$  and  $Y$  would you recommend to meet the dual objectives of cutting the catch in half and meeting the revenue objective? *Explain your answers.*
- d. George Renzi, an unsuccessful candidate for town council, and known troublemaker, has taken some economics courses. The town council knows that he will compute the dead weight loss of proposals "B" and "C", as well as the deadweight cost of a simple \$5 per year fishing license. To be prepared, they have asked you to compute the answers before he does.

12. (10%) In Smallville, a fierce election campaign is about to take place over a proposed new swimming pool. The town is divided into “Pros” and “Antis”. The pros hope to win and win big. The bigger their margin, the better. The antis just want to stop it. In short,

- For the “Anti’s”, a win is a win.
- For the “Pro’s”, the size of the win or loss matters. They would rather win by many votes than few votes (and similarly would rather lose by few votes than by many votes)

Draw indifference curves for the Pros and the Antis for the number of votes each gets. Label your axes clearly. Defend your answers. WARNING. These indifference curves are not exactly standard. Don’t draw them blindly. Think through the problem.