Short Questions

1. Suppose that there are two types of consumers: the Rich, who consist 20% of the population, and the Poor, who consist the remaining 80% of the population. Sushi is a "luxury" for the poor but a "necessity" for the rich (luxury and necessity are used here in terms of their formal economic definitions).

Suppose **aggregate** income goes up by exactly 1%. Furthermore, the income of both types of consumers increases, but not necessarily by the same percentage.

a. Is it possible for aggregate (market) demand for sushi to go up by more that 1%. If so, explain how. (You can use a numerical example, but a precise verbal explanation would also be sufficient.)

b. Conversely, is it possible for aggregate (market) demand for sushi to go up by less than 1%. If so, explain how. (Again, you can use a numerical example, but a precise verbal explanation would also be sufficient.)

2. Consider the statement:

"A linear demand with slope $\beta_1 = -1$ has a lower price elasticity, $e_{P,Q}$, than a linear demand with a slope $\beta_2 = -2$."

Is this statement true or false? Discuss and justify your answer, using a diagram or algebra as you deem appropriate.

3. Consider the statement:

"A constant price elasticity demand curve with price elasticity of demand, $e_{Q,P}$, equal to -1 has a steeper slope than a constant price elasticity demand curve with price elasticity of demand equal to -0.5."

Is this statement true or false? Discuss and justify your answer, using a diagram or algebra as you deem appropriate.

4. “A linear demand curve is more elastic than a constant elasticity demand curve.”

Briefly discuss the validity (or lack thereof) of the above statement.

5. Consider two individuals, A and B who are the only consumers of a product X in a given town. Individual B buys good X in bulk, so he always pays a lower price for it than individual A (who buys it retail). Moreover, when supply conditions change, the bulk and retail prices do not move up and down in lock step.

Suppose the demand function for individual A is

$$X_A = 20 - P_A$$

and that of individual B is

$$X_B = 10 - P_B$$

Can we refer to the demand of the two individuals as the market demand for X in this town ? Why or why not ?

6. What is the income elasticity of demand for a good ?

Problems

1. A market consists of 10 consumers; 4 men and 6 women. A woman's demand for the product is by:

$$Q_w = 100 - 2P$$

for $P \leq 50$. For $P > 50$, $Q_w = 0$. A man's demand for the product is given by:

$$Q_m = 150 - 5P$$

for $P \leq 30$. For $P > 30$, $Q_m = 0$. Using this information, answer the following:

a. Graph a woman's and a man's demand curve with price on the vertical axis and quantity on the horizontal axis. Label all intercepts.

b. How much of the product is demanded by a member of each gender at $P = 35$? At $P = 0$?

c. What is the market demand for the product at each of the prices specified at part (b)?

d. Use the individual demand curves to derive and graph the total market demand curve for the product with price on the vertical axis and quantity on the horizontal axis. Label all the important points (slopes and intercepts) in the graph.

2. All consumers' utility functions for gasoline, *G*, and consumption of other goods, *Y*, are given by the utility function $U(G,Y) = G^{\alpha} Y^{1-\alpha}$. All consumers have income that equals 2,000. The current price of gasoline is 2 and the price of other goods is normalized to 1.

a. What is the budget constraint of the consumers?

b. Derive the consumers' optimal choice of *G* and *Y*.

c. The government decides to discourage gasoline consumption in order to reduce CO_2 emissions. To do so, it imposes a 20% tax on gasoline, so its price increases to 2.40. All the proceeds from this tax are distributed equally to the consumers in the form of a rebate. Write the budget constraint that the consumers now face. Derive the consumers' optimal choice of *G* under this tax-plus-rebate environment.

d. How would your answer in part (iii) differ if the money collected from the gas tax was spent overseas as foreign aid rather than being rebated to the consumers?

3. A country consists of 1,000 individuals. Half of these have no car: they take public transport wherever they go. This group of consumers consumes no gasoline. The other half of the population has a car and consumes 1 unit of gasoline, G, for every 10 dollars they spend on other goods, Y. The price of gasoline is 2. The price of other goods is normalized to 1. Every individual in this country has an income of 100.

a. What is the consumption of gasoline, G, for the individuals who have a car? What is the total consumption of gasoline in this country?

b. The government wants to discourage driving because it creates too much traffic. For this reason, it imposes a 50% tax on gasoline, the price of which now increases to 3. The government collects the tax revenue and returns it equally to all the consumers as a rebate, whether or not they have a car (that is, each consumer gets the same rebate regardless of how much gasoline he or she consumes). What is the consumption of gasoline under this tax-plus-rebate environment for the individuals who have a car? What is the total consumption of gasoline in this country?

c. Which of the two groups (if any) is better off with the tax, excluding any positive effects from the reduction in traffic? Justify your answer with rigorous reasoning or using algebra?