

Problem Set Three Solutions

Chapter 4

4. Is the demand for a particular brand of car, like a Chevrolet, likely to be more or less price-elastic than the demand for all cars? Explain.

Answer: The price elasticity of a good generally increases with the number of substitutes it has. It is easier to substitute a Ford or Toyota for a Chevrolet than it is to substitute a motorcycle or a skateboard for a car. Thus the market demand curve for cars is likely to be less elastic with respect to price than the market demand curve for Chevrolets.

5. Among the following groups – senior executives, junior executives, and students – which is likely to have the most and which is likely to have the least price-elastic demand for membership in the Association of Business Professionals?

Answer: The more income a person has, the smaller a given expenditure will be as a proportion of her overall budget, and hence the less likely she will be to respond dramatically to a price change. Thus senior executives, the most highly paid of the three groups, should have the least price-elastic demand curves. Students, the least well paid, should have the most price-elastic demand curves.

6. A 2 percent increase in the price of milk causes a 4 percent reduction in the quantity demanded of chocolate syrup. What is the cross-price elasticity of demand for chocolate syrup with respect to the price of milk? Are the two goods complements or substitutes?

Answer: The cross-price elasticity is $(\text{percent change in } Q_{\text{syrup}} / \text{percent change in } P_{\text{milk}}) = -4/2 = -2$. Since this cross elasticity is negative, the two are complements.

8. Suppose that the ingredients required to bring a slice of pizza to market and their respective costs are: paper plate, 2 cents, flour 8 cents, tomato sauce 20 cents, cheese 30 cents, and labor 60 cents (3 minutes @ \$12/hour). If these proportions remain the same no matter how many slices are made, and the inputs can be purchased in any quantities at these stated prices, draw the supply curve of pizza slices and compute its price elasticity.

Answer: The inputs required to produce each slice of pizza cost a total of \$1.20, and this marginal cost is constant. The supply curve of pizza is thus a horizontal line at $P = \$1.20$. Horizontal supply curves are perfectly elastic (price elasticity of supply infinite).

Chapter 5

2. You are having lunch at an all-you-can-eat buffet. If you are rational, what should be your marginal utility from the last morsel of food you swallow?

Answer: Since the marginal cost of an additional morsel of food is zero, a rational person will continue eating until the marginal benefit of the last morsel (its marginal utility) falls to zero.

3. Martha's current marginal utility from consuming orange juice is 75 utils per ounce and her marginal utility from consuming coffee is 50 utils per ounce. If orange juice costs 25 cents per ounce and coffee costs 20 cents per ounce, is Martha maximizing her total utility from the two beverages? If so, explain how you know. If not, how should she rearrange her spending?

Answer: Martha is currently receiving $(75 \text{ utils/ounce})/(\$0.25/\text{ounce}) = 300$ utils per dollar from her last dollar spent on orange juice, but only $(50 \text{ utils/ounce})/(\$0.20/\text{ounce}) = 250$ utils per dollar from her last dollar spent on coffee. Since the two are not equal, she is not maximizing her utility. She should spend more on orange juice and less on coffee.

5. Sue gets a total of 20 utils per week from her consumption of pizza and a total of 40 utils per week from her consumption of yogurt. The price of pizza is \$1 per slice, the price of yogurt is \$1 per cup, and she consumes 10 slices of pizza and 20 cups of yogurt each week. Is Sue maximizing her utility? If so, explain how you know. If not, how should she rearrange her spending?

Answer: The information given enables us to conclude that Sue's average utility per dollar is the same for both pizza and yogurt. But this information does not enable us to say whether her current combination of the two goods is optimal. To do that, we must be able to compare their respective values of marginal utility per dollar.

7. For the demand curve shown, find the total amount of consumer surplus that results in the gasoline market if gasoline sells for \$2 per gallon. Find the total amount of consumer surplus if gasoline sells for \$3 per gallon and the change in consumer surplus.

Answer: If gasoline sells for \$2 per gallon, consumer surplus is $(1/2)(80,000 \text{ gal/yr})(\$8/\text{gal}) = \$320,000/\text{yr}$. If gasoline sells for \$3 per gallon, consumer surplus is $(1/2)(70,000 \text{ gal/yr})(\$7/\text{gal}) = \$245,000/\text{yr}$. Consumer surplus has fallen by \$75,000/yr.

