

# ECONOMICS : Handout # 4

## PROBLEMS

1. The Acme Paper Company lowers its price of envelopes (1,000 count) from \$6 to \$5.40. If its sales increase by 20 percent following the price decrease, what is the elasticity coefficient?
2. The demand function for a cola-type soft drink in general is  $Q = 20 - 2P$ , where  $Q$  stands for quantity and  $P$  stands for price.
  - a. Calculate point elasticities at prices of 5 and 9. Is the demand curve elastic or inelastic at these points?
  - b. Calculate arc elasticity at the interval between  $P = 5$  and  $P = 6$ .
  - c. At which price would a change in price and quantity result in approximately no change in total revenue? Why?
3. The equation for a demand curve has been estimated to be  $Q = 100 - 10P + 0.5Y$ , where  $Q$  is quantity,  $P$  is price, and  $Y$  is income. Assume that  $P = 7$  and  $Y = 50$ .
  - a. Interpret the equation.
  - b. At a price of 7, what is price elasticity?
  - c. At an income level of 50, what is income elasticity?
  - d. Now assume that income is 70. What is the price elasticity at  $P = 8$ ?
4. Mr. Smith has the following demand equation for a certain product:  $Q = 30 - 2P$ .
  - a. At a price of \$7, what is the point elasticity?
  - b. Between prices of \$5 and \$6, what is the arc elasticity?
  - c. If the market is made up of 100 individuals with demand curves identical to Mr. Smith's, what will be the point and arc elasticity for the conditions specified in parts a and b?
5. The Teenager Company makes and sells skateboards at an average price of \$70 each. Over the past year they sold 4,000 of these skateboards. The company believes that the price elasticity for this product is about -2.5. If it decreases the price to \$63, what should be the quantity sold? Will revenue increase? Why?
6. The ABC Company manufactures AM/FM clock radios and sells on average 3,000 units monthly at \$25 each to retail stores. Its closest competitor produces a similar type of radio that sells for \$28.
  - a. If the demand for ABC's product has an elasticity coefficient of -3, how much will it sell per month if the price is lowered to \$22?
  - b. The competitor decreases its price to \$24. If cross-elasticity between the two radios is 0.3, what will ABC's monthly sales be?
7. The Mesa Redbirds football team plays in a stadium with a seating capacity of 80,000. However, during the past season, attendance averaged only 50,000. The average ticket price was \$30. If price elasticity is -4, what price would the team have to charge in order to fill the stadium? If the price were to be decreased to \$27 and the average attendance increased to 60,000, what is the price elasticity?
8. The Efficient Software Store had been selling a spreadsheet program at a rate of 100 per month and a graphics program at the rate of 50 per month. In September 1990, Efficient's supplier lowered the price for the spreadsheet program, and Efficient passed on the savings to customers by lowering its retail price from \$400 to \$350. The store manager then noticed that not only had sales of the spreadsheet program risen to 120, but the sales of the graphics program increased to 56 per month. Explain what has happened. Use both arc price elasticity and arc cross-elasticity measures in your answer.

## Appendix 4A

# Applications of Supply and Demand

K173827

Section D

Essam Khan

The last two chapters laid the foundation for the student's knowledge of supply and demand and elasticity. Knowing these elements is essential for any further study of economics and is a necessary prerequisite for all the chapters that follow.

Before we discuss the various building blocks that will complete the study of managerial economics, this appendix will endeavor to reinforce the concepts of supply and demand and of elasticity in two ways:

1. Some specific applications of supply and demand will be discussed, including the effects of price controls, excise taxes, and agricultural policies.
2. Various actual situations as reported in the press will be introduced and discussed, and it will be shown that the materials we have just learned can be applied to analyze these situations.

## INTERFERENCE WITH THE PRICE MECHANISM

In chapter 3, we discussed the movement toward equilibrium in both the short and long run. A change in demand or supply will call forth actions that will cause equilibrium to occur at a new supply-demand intersection. It was shown that in the short run, price changes will eliminate shortages or surpluses. In the long run, resources in the economy shift from the production of one product to another in response to changes in demand. The shift away from one equilibrium and the move to a new equilibrium will proceed when these movements are permitted to occur freely and are not impeded by any outside interference. Thus, when the supply of corn decreased and price rose so the market cleared at this new price—that is, at the new intersection of supply and demand—there was nothing inhibiting this change from taking place.

However, with present economic institutions, free movement of prices is not always allowed. At least three times in the last 60 years,<sup>24</sup> price controls were imposed in the United States. Prices on various products were set (or fixed at existing levels), and these products could not be sold at prices higher than those prescribed by government. Such a policy is usually referred to as setting a price ceiling. If the price ceiling for a product is set at the prevailing equilibrium level, then the ceiling

<sup>24</sup>During World War II, the Korean War, and again in 1971.

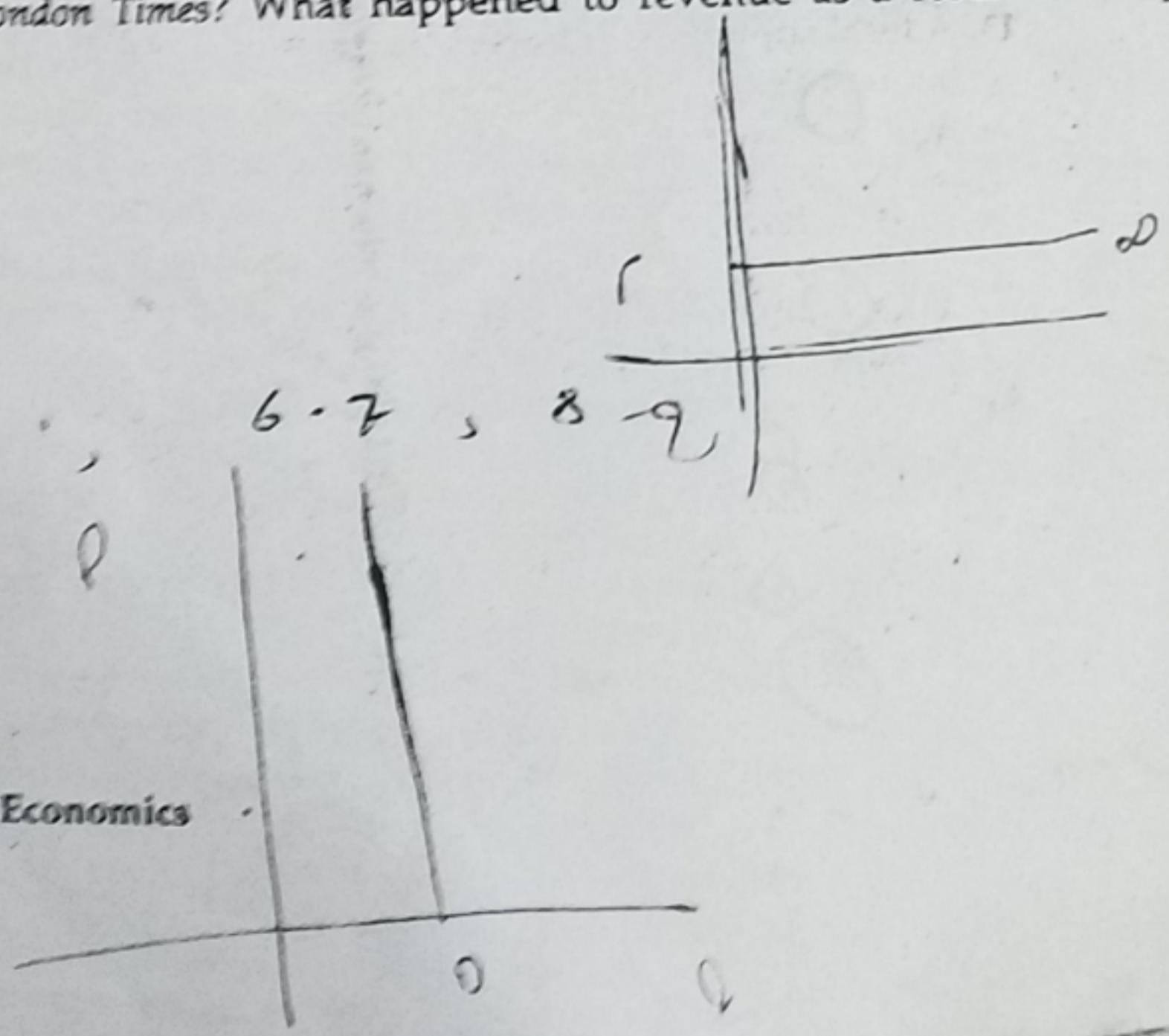
MONTHS	PRICE ACWORD	QUANTITY ACWORD	FAMILY INCOME	PRICE
				GOODWRITE
1 2 3 4 5 6 7 8 9 10	120	200	4000	130
	120	210	4000	145
	120	220	4200	145
	110	240	4200	145
	114	230	4200	125
	115	215	4200	125
	115	220	4400	125
	105	230	4400	125
	105	235	4600	125
	105	220	4600	115

- (15) The demand curve for product X is given as  $Q = 2000 - 20P$ .
- (a) How many units will be sold at \$10?
  - (b) At what price would 2,000 units be sold? 0 units? 1,500?
  - (c) Write equations for total revenue and marginal revenue (in terms of Q).
  - (d) What will be the total revenue at a price of \$70? What will be the marginal revenue?
  - (e) What is the point elasticity at a price of \$70?
  - (f) If price were to decrease to \$60, what would total revenue, marginal revenue, and point elasticity be now?
  - (g) At what price would elasticity be unitary?
- (16) The Transportation Authority in Anytown, U.S.A. raised bus fares from \$1 to \$1.15 on January 1, 2002. The Authority's statistics show that the number of passengers riding buses decreased from 672,000 in 2001 to 623,000 in 2002.
- (a) How much did revenue change?
  - (b) What is the arc elasticity for bus travel in Anytown?
  - (c) The answer to b. above would be correct if all conditions (except price) remained the same between 2001 and 2002. Can you think of any other changes that would have affected the result?
17. (Read the section called "A French newspaper and its demand elasticity" in Appendix 4A before answering the question.) What is the arc demand elasticity for the London Times? What happened to revenue as a result of the price decrease?

income

2 - 3

6 - 7 , 8 - 9



9. Given the demand equation  $Q = 1,500 - 200P$ , calculate all the numbers necessary to fill in the following table:

P	Q	ELASTICITY		TOTAL REVENUE	MARGINAL REVENUE
		POINT	ARC		
\$7.00	100	-14	-9	700	600
6.50	200	-6.5	-5	1300	500
6.00	300	-4		1800	100
5.50	400	-2.75		2200	300
5.00	500	-2		2500	200
4.50	600	-1.5		2700	100
4.00	700	-1.14		2800	0
3.50	800	-0.835	0 -1	2800	-100
3.00	900	-0.666	0.7697	2700	-200
2.50	1000	-0.5		2500	

10. Would you expect cross-elasticity between the following pairs of products to be positive, negative, or zero?

- a. Television sets and VCRs
- b. Rye bread and whole-wheat bread
- c. Construction of residential housing and furniture
- d. Breakfast cereal and men's shirts

Explain the relationship between each pair of products.

11. According to Houthakker and Taylor, the price elasticity of shoes in the United States is 0.7, and the income elasticity is 0.9.

- a. Would you suggest that the Brown Shoe Company cut its prices to increase its revenue?
- b. What would be expected to happen to the total quantity of shoes sold in the United States if incomes rise by 10 percent?

12. A book store opens across the street from the University Book Store (UBS). The new store carries the same textbooks but offers a price 20 percent lower than UBS. If the cross-elasticity is estimated to be 1.5, and UBS does not respond to its competition, how much of its sales is it going to lose?

13. A local supermarket lowers the price of its vanilla ice cream from \$3.50 per half gallon to \$3. Vanilla ice cream (unit) sales increase by 20 percent. The store manager notices that the (unit) sales of chocolate syrup increase by 10 percent.

- a. What is the price elasticity coefficient of vanilla ice cream?
- b. Why have the sales of chocolate syrup increased, and how would you measure the effect?

- c. Overall, do you think that the new pricing policy was beneficial for the supermarket?

14. The Compute Company store has been selling its special word processing software, Aceword, during the last ten months. Below are shown monthly sales and the price for Aceword. Also shown are the prices for a competitive software, Goodwrite, and estimates of monthly family income. Calculate all the appropriate elasticities, keeping in mind that you can calculate an elasticity measure only when all other factors do not change.