

Econ 211  
Problem Set 3

1. What three factors determine the size of the elasticity of demand for a particular commodity?
2. Elasticity Questions:
  - a) In August, 1990, East German taxicab drivers were on strike demanding lower cab fares. What must the drivers have believed about the price elasticity of demand for taxi rides?
  - b) In 1977 Brazil was supplying about one-third of the world's coffee exports. When a frost wiped out about 75 percent of Brazil's 1976-77 crop, the price of green (unroasted) coffee rose 400 percent. What was the approximate price elasticity of demand for coffee? Why was it so low?
  - c) An athletic director at a college recently raised ticket prices from \$8 to \$10 per game. Sales went down 10 percent. The director said "... with the 25 percent increase in ticket prices, dollar volume has increased about 12 percent." Is this claim consistent with what you know about demand elasticity? Find the elasticity of demand in this case, assuming the demand schedule is stable.
  - d) According to recent studies at M.I.T. and the University of Michigan, a 10 percent increase in the price of cigarettes leads to a 14 percent drop in sales to teenagers. What is the elasticity of demand for cigarettes among teenagers? Would you expect it to be this high for older smokers? Explain your answers.
  - e) Suppose the price elasticity of demand for rental housing is 0.60 and the average rent increases from \$275 per month to \$325 per month. At \$275 per month, 100,000 rental units are rented. What percentage decrease in quantity demanded would you predict from this information. Approximately how many units would be rented at \$325 per month?
  - f) Using the midpoint elasticity of demand formula, find the price elasticity of demand for the following situation: When the price of cellular phones was \$200, total sales in Ohio were 3500. When the price fell to \$180, sales rose to 3800.
3. In Marietta, the price elasticity of demand for bus rides is -0.5, the income elasticity of demand for bus rides is -0.1, and the cross elasticity of demand for bus rides with respect to gasoline is 0.2.
  - a) Is the demand for bus rides elastic or inelastic with respect to the price of a bus ride? Why?
  - b) Would an increase in bus fares increase the bus company's total revenue? Explain your answer.
  - c) Describe the relationship between bus rides and gasoline. Explain your answer.
  - d) If the price of gasoline increases by 10 percent with no change in the price of a bus ride, how will the number of bus rides change?
  - e) If incomes in Marietta increase by 5 percent with no change in the price of a bus ride, how will the number of bus rides change?
  - f) In Marietta, is a bus ride a normal good or an inferior good? Why?
4. Assume that the demand for heroin is inelastic, and assume further that users get the funds to pay for heroin by stealing. Suppose the government increases penalties on heroin suppliers and thereby reduces supply. What will happen to the price of heroin? What will happen to the amount of crime committed by heroin users?
5. If I buy a soda at the movies, I have to pay \$2.75. If I buy a soda at a gas station, I only have to pay about \$1. Use the idea of elasticity and the factors that determine elasticity of demand to explain why the movie theater can charge so much higher of a price. Use the idea of elasticity and total revenue to explain why the movie theater doesn't raise the price even higher, like to \$4.
6. After graduating, you land a plush job advising the president on economic matters. One day the president asks you for your suggestions about products to tax.
  - a) The president asks you to produce a list of items to be taxed that will yield substantial tax revenue to the government and for which consumers pay a large amount of the tax. Without trying to name specific products, what is the general characteristics of the demand for the products that you will suggest be taxed? Why?
  - b) After you discuss this first list with the president, the president realizes that this is an election year. As a result, the president changes your assignment a bit. Now the president asks you for a list of products that will still yield a lot of revenue for the government, but whose tax will fall more heavily on producers. Again, without trying to name specific products, what is the general characteristics of the supply of the product that would comprise your second list? Why?
7. Suppose that a young chef opened his own restaurant. To do so, he quit his job, which was paying \$36,000 per year; cashed in a \$6,000 certificate of deposit that was yielding 5% (to purchase equipment); and took over a building owned by his wife which had been rented out for \$3,000 per month. His expenses for the first year amounted to \$60,000 for food, \$40,000 for extra help, and \$7,000 for utilities. The chef is trying to figure out whether he would have been better off not being in business last year. He knows how to calculate his revenues, but he needs help with the cost side of the picture. What were the chef's total economic costs?
8. A business executive claims a company should never hire another worker if the new person causes diminishing returns. Explain why this person is wrong.

9. "My overhead (fixed cost) at this car dealership is \$4,000 per day. So I figure that the best way to make the most money is to sell as many cars as possible, thereby spreading out the overhead so it is only a small part of the cost on each car sold." What is wrong with the reasoning of this person?

10. You are the adviser to President Scott of Marietta College. A wealthy alumnus buys, then gives a plot of land to the college for use as an athletic field. The president says that, as far as the land is concerned, it does not cost the college anything to use the land as an athletic field. What do you say?

11. Several years ago, Congress authorized development of the Z-13 bomber, based on a cost estimate of \$10 billion and a benefit estimate of \$15 billion. The benefit estimate appears to be correct, but costs to date total \$20 billion, and the plane still is not ready. The cost of completing the project, X, is uncertain. Congressman Jones wants to stop now: "Whatever the value of X, it is clear that the Z-13 will yield negative net benefits." Congresswoman Smith wants to continue: "If we stop now, we will have wasted \$20 billion." Comment. How should the decision depend on the value of X?

12. The following table shows some of the long-run costs for the American Production Company. Fill in the missing values.

Output	Total Cost	Average Cost	Marginal Cost
50		\$1000	---
51	\$52,000		
52		\$1038	
53			\$5000

13. What determines the shape of the short run MC curve? Explain.

14. The Preservation Embalming Company's cost data have been partially entered in the table below. Following the sudden and unexpected death of the company's accountant, you are called on to fill in the missing entries.

Bodies Embalmed	TC	FC	VC	ATC	AVC	AFC	MC
0	24						
1							16
2			50				
3	108						
4							52
5					39.2		
6				47			

15. Draw a diagram showing a competitive firm operating at a loss in the short run. Identify the loss. Identify the loss the firm would incur if it shut down and explain why the firm continues to operate.

16. Suppose that you own a house that you are planning to be away from for one year. In a typical month when the house is occupied, you pay \$175 in utility bills and \$125 in taxes. If the house is vacant, the utility bills fall to \$100, but the tax bill remains the same. Somebody wants to rent your house from you while you are away. What is the minimum monthly rent she would have to pay before you would agree?

17. A competitive firm is maximizing profits by producing 250 units of output at the current market price of \$1000 per unit. The firm has AFC of \$300 and total costs of \$300,000 at this output level.

- Draw a graph showing all the relevant cost and demand curves. That is, include the MR, MC, AVC, and ATC curves.
- Calculate FC, VC, ATC, AVC, MC, TR, and MR.
- Calculate and indicate the area of profits on your graph.
- In light of your answer above, does it make sense that this firm is "maximizing profits"? Explain precisely.

18. Your coffee mug company is currently producing at an output level of 200 units per month. Fixed costs are \$500 per month. At the current output level, you know that marginal cost is \$10 and equal to average total cost. At an output level of 150, you have determined that marginal cost would be \$6 and equal to average variable cost. The market price for your coffee mugs is \$8. If your goal is profit maximization, should you continue at  $q = 200$ , increase  $q$  above 200, or reduce  $q$  below 200? Would you do better to shut down? (Hint: It might be useful to sketch the cost curves and demand curve for this firm.)

19. Perfectly Competitive Firm:

q	P	TR	MR	TC	FC	VC	MC	ATC	AVC	$\pi$
0	8		8	300						
100	8			900						
200	8			1300						
300	8			1500						
400	8			1600						
500	8			2000						
600	8			2600						
700	8			3300						
800	8			4400						

a) Using Excel, create a spreadsheet to complete the above table.

b) What is the  $\pi$ -maximizing price and output level? How does MR compare with MC at this output level?

c) Using Excel, plot the following graphs (choose an X-Y chart):

Graph 1: TR, TC, VC, FC on the Y-axis and q on the X-axis.

Graph 2: MR, MC, ATC, AVC on the Y-axis and q on the X-axis.

Graph 3:  $\pi$  on the Y-axis and q on the X-axis.

d) Suppose the market price fell to \$3.00 per unit. What would the new  $\pi$ -maximizing output level be? Why?

20. Differentiate between the factors that give the short-run average cost curve and the long-run average cost curves their shapes.

21. What three conditions must be satisfied for a competitive industry to be in long-run equilibrium? Why is each condition necessary?

22. In the 1960s, hula-hoops were a popular toy, but in a short while, their novelty wore off and prices fell. However, after a few months, they were higher than ever. Given this description, trace out on a graph the fluctuations in supply and demand. What kind of long-run cost industry is this?

23. "Economists are silly to say that profits are competed away in the long run. No firm would operate unless it made profits." Explain.

24. Assume that the domestic beer industry is a constant cost industry. Let society's demand for beer increase. Explain precisely (using graphs and words) the chain of events that must happen for society to have more beer at the same price. (Hint: That is, derive the long run supply curve for a constant cost industry while discussing the market supply and demand curves and the individual firm's decision process assuming we start from a point of zero economic profit.)

25. The market demand schedule for cassettes is given below. The market is perfectly competitive, and each firm has the following cost structure:

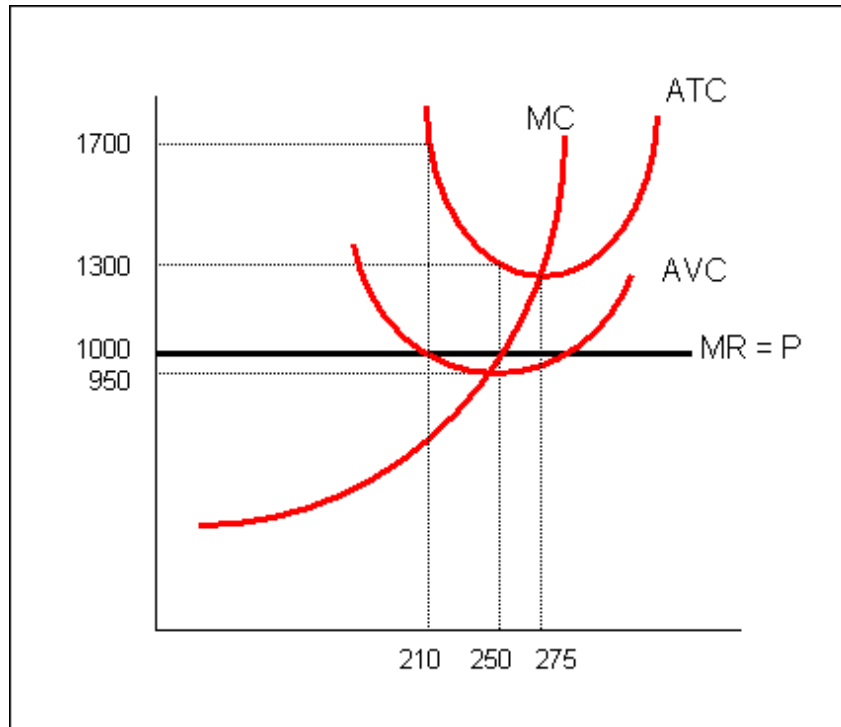
Market Demand		Cost Structure			
Price (dollars per cassette)	Quantity Demanded (thousands per week)	Output (cassettes per week)	MC	AVC	ATC
3.65	500	150	6.00	8.80	15.47
5.20	450	200	6.40	7.80	12.80
6.80	400	250	7.00	7.00	11.00
8.40	350	300	7.65	7.10	10.43
10.00	300	350	8.40	7.20	10.06
11.60	250	400	10.00	7.50	10.00
13.20	200	450	12.40	8.00	10.22
14.80	150	500	12.70	9.00	11.00

There are 1000 firms in the industry.

- What is the market price?
- What is the industry output?
- What is the output produced by each firm?
- What is the economic profit made by each firm?
- Do firms enter or exit the industry?
- What is the number of firms in the long run?

26. The same demand conditions as those in problem 19 prevail, and there are 1000 firms in the industry, but total fixed costs increase by \$980. What now are your answers to the questions in #19?

27. The graph below describes a perfectly competitive industry.



- If the market price is \$1000, what is the profit-maximizing output level?
- What are profits equal to at the profit-maximizing output level?
- If the market price equals \$900, how much output should the firm produce? Why?