

Econ 211
 Problem Set 3

- Suppose that a young chef opened his own restaurant. To do so, he quit his job, which was paying \$46,000 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?
- A business executive claims a company should never hire another worker if the new person causes diminishing returns. Explain why this person is wrong.
- "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?
- 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?
- 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?
- 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

- 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			

8. What determines the shape of the short run MC curve? Explain.
9. 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.
10. 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?
11. 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.
12. 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.)
13. Perfectly Competitive Firm:

q	P	TR	MR	TC	FC	VC	MC	ATC	AVC	π
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						

- Using Excel, create a spreadsheet to complete the above table.
 - What is the π -maximizing price and output level? How does MR compare with MC at this output level?
 - 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: π on the Y-axis and q on the X-axis.
 - Suppose the market price fell to \$3.00 per unit. What would the new π -maximizing output level be? Why?
14. Differentiate between the factors that give the short-run average cost curve and the long-run average cost curves their shapes.

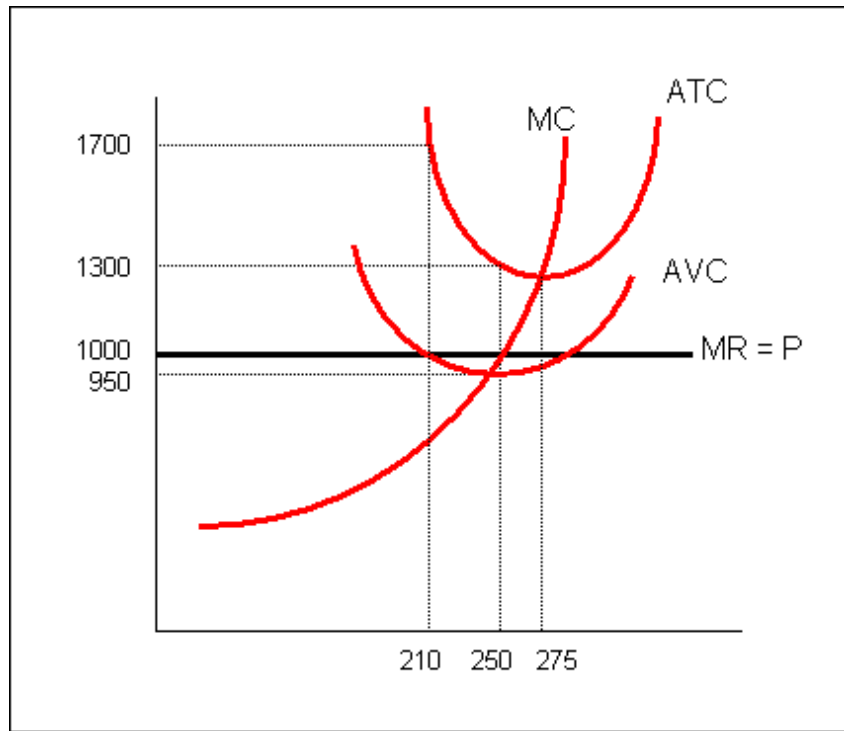
15. What three conditions must be satisfied for a competitive industry to be in long-run equilibrium? Why is each condition necessary?
16. In the 1960s, hula-hoops were a popular toy, but in a short while, their novelty wore off and prices fell. However, after a few months, they were higher than ever. Given this description, trace out on a graph the fluctuations in supply and demand. What kind of long-run cost industry is this?
17. "Economists are silly to say that profits are competed away in the long run. No firm would operate unless it made profits." Explain.
18. 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.)
19. 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.

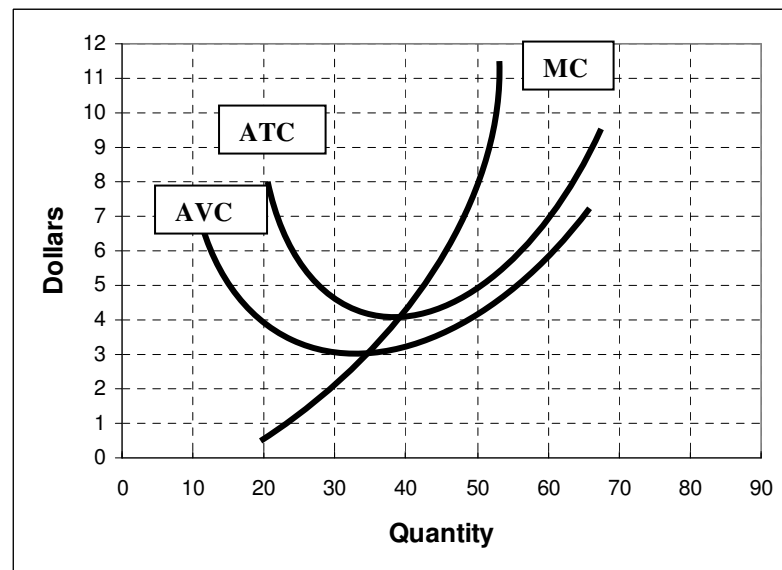
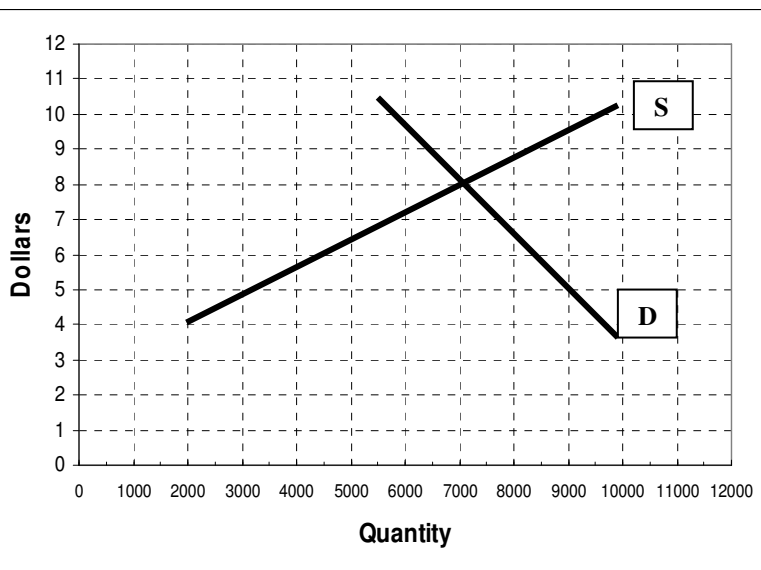
- a) What is the market price?
 - b) What is the industry output?
 - c) What is the output produced by each firm?
 - d) What is the economic profit made by each firm?
 - e) Do firms enter or exit the industry?
 - f) What is the number of firms in the long run?
20. The same demand conditions as those 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?

21. 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?

22. The graph on the left shows the firm's costs and the graph on the right shows the market supply and demand for an industry that is characterized by perfect competition. Answer the questions below by showing all calculations or providing a brief explanation.



- What price will the firm charge in the short run?
- What quantity will the firm choose to sell to maximize profit?
- How much profit will the firm earn?
- What are the firm's fixed costs?
- What price will the firm charge in a long-run equilibrium? [2 pts]

23. "Monopoly is good for producers but bad for consumers. The gains of the former offset the losses of the latter. On balance, there is no reason to think that monopoly is bad for the economy." Evaluate.
24. It has been argued that the development of the railroad in the middle of the nineteenth century substantially reduced the market power of many American manufacturing firms. Explain.
25. How are some firms able to earn economic profits year after year after year? Why doesn't the competitive process force economic profits to zero?
26. A monopolist produces 100 units of output where $MR = MC$ and charges a price of \$20. The average cost of 100 units is \$12. Draw this situation on a graph.
 a) What is total revenue, total cost, and economic profit at this output level?
 b) Suppose the government imposes a lump-sum tax of \$300 on the monopolist. How does the monopolist respond to this in terms of price and output? Illustrate graphically. What are its profits now?
27. A monopolist is producing at a point where its marginal cost exceeds its marginal revenue. How should it adjust its output level to increase its profit?
28. Do monopolies choose to produce on the elastic, inelastic, or unit elastic range of their demand curves? Why?
29. Monopolistic Firm:

Q	P	TR	MR	TC	MC	FC	VC	ATC	AVC	AFC	π
0	80	0	80	150	--			--	--	--	
10	75			350							
20	70			500							
30	65			700							
40	60			950							
50	55			1300							
60	50			1700							
70	45			2150							
80	40			2650							
90	35			3200							
100	30			3800							

- a) Complete the table.
- b) What is the π -maximizing output and price?
- c) Using your favorite spreadsheet, plot the following graphs (Q is on the horizontal axis):
 Graph 1: TR, TC, VC, FC versus Q
 Graph 2: P, MR, MC, AC, AVC versus Q
 Graph 3: π versus Q
- d) What is the lowest price at which the monopolist would be willing to operate at in the short run?
30. Is price discrimination harmful to the US economy? Explain why or why not. What three conditions are necessary for successful price discrimination?
31. Assume that a software company has a monopoly on the type of software they produce. People can download the software from the internet. Given this, the marginal cost to the company of one more person downloading

the software is zero. Since marginal cost is zero, should the monopoly provide the software free (a price of zero)? Explain using the concepts for profit maximization.

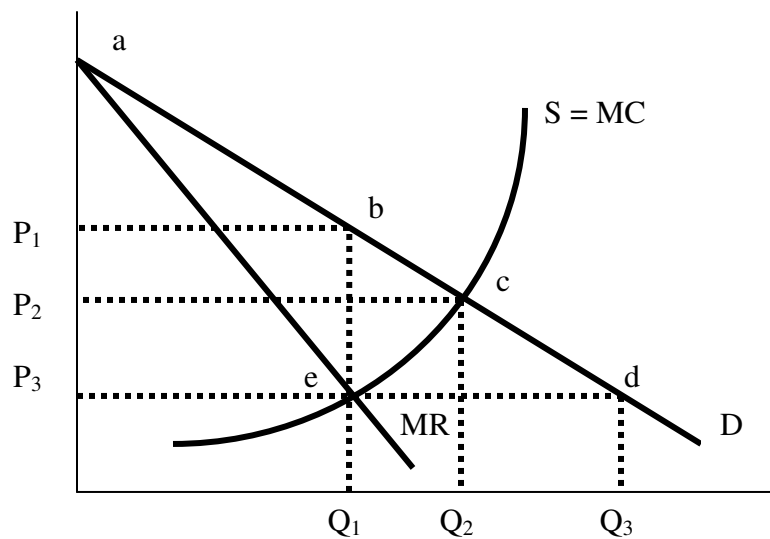
32. A price discriminating seller will charge a higher price to those market segments which have the relatively more inelastic demand. For each of the markets below, indicate which segment you think will be charged the higher price. Explain why you think that segment has a lower elasticity of demand.
- sales of new boats to those who presently own a boat, or those who do not own a boat.
 - sales of movie tickets to children or adults.
 - sales of airline tickets to business travelers or a couple on vacation.
 - sales of cosmetic surgery to the poor or the rich.

33. The following table indicates the prices various buyers are willing to pay for a Miata sports car:

Buyer	Maximum Price
Jessica	\$50,000
Connor	\$40,000
Steve	\$30,000
Nick	\$20,000
Nikki	\$10,000

The cost of producing the cars includes \$50,000 of fixed costs and a constant marginal cost of \$10,000.

- Graph the demand, marginal revenue, and marginal cost curves.
 - What is the profit-maximizing output and price for a monopolist? How much profit does the monopolist make?
 - If the monopolist can practice first-degree price discrimination, how many cars will she sell? How much profit will she make?
 - What techniques could the monopolist use to employ price discrimination?
34. The figure below represents a perfectly competitive industry that is taken over by a single firm and operated as a single-priced monopoly.



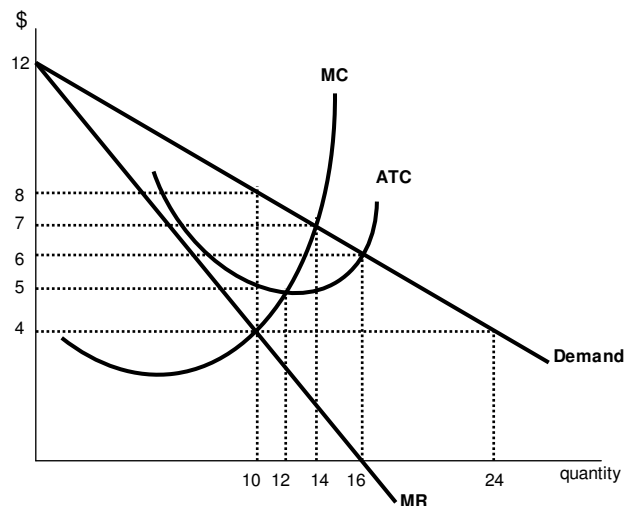
- What was the competitive price and quantity?
- What is the monopoly price and quantity?
- What area represents consumer surplus under perfect competition? (Identify the relevant geometrical areas)

by their endpoints.)

d) What area represents consumer surplus under monopoly?

e) What area represents the deadweight loss of monopoly?

35. Black Box Cable TV is able to purchase an exclusive right to sell a premium movie channel (PMC) in its market area. Let's assume that Black Box Cable pays \$150,000 a year for the exclusive marketing rights to PMC. Since Black Box has already installed cable to all of the homes in its market area, the marginal cost of delivering PMC to subscribers is zero. The manager of Black Box needs to know what price to charge for the PMC service to maximize her profit. Before setting price, she hires an economist to estimate demand for the PMC service. The economist discovers that there are two types of subscribers who value premium movie channels. First are the 4,000 die-hard TV viewers who will pay as much as \$150 a year for the new PMC premium channel. Second, the PMC channel will appeal to about 20,000 occasional TV viewers who will pay as much as \$20 a year for a subscription to PMC.
- a) If Black Box Cable TV is unable to price discriminate, what price will it choose to maximize its profit, and what is the amount of the profit?
- b) If Black Box Cable TV is able to price discriminate, what would be the maximum amount of profit it could generate?
- c) What is the deadweight loss associated with the nondiscriminating pricing policy compared to the price discriminating policy?
36. Policymakers are discussing various proposals regarding how to deal with natural monopolies. Senator Huff wants to regulate natural monopolies by equating price with average total cost. Huff contends that such a policy will ensure that monopolies make every effort to reduce costs. Senator Puff wants the government to own natural monopolies. Puff argues that government-owned monopolies usually do a better job of holding down costs than privately owned monopolies. Which senator's argument is correct?
37. The graph below depicts a monopolist.



- a) How much profit will the monopolist earn (assuming that it does not price discriminate)? Show all calculations.
- b) Suppose that the Average Cost curve shifts up by \$2 due to a rise in insurance premiums. What output and price should the monopolist now set?
- c) What is the dollar amount of consumer surplus under monopoly? Show all calculations.