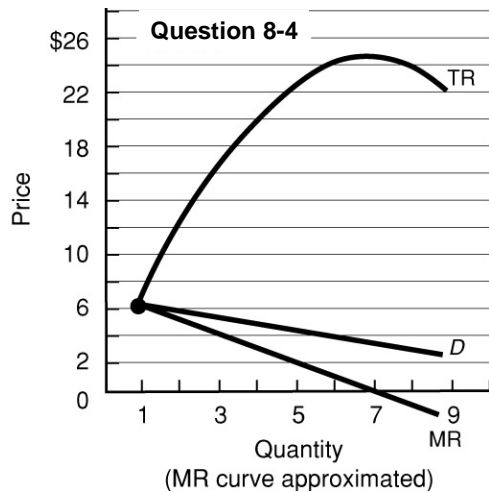ECON 103, 2008-2
ANSWERS TO HOME WORK ASSIGNMENTS

Due the Week of June 23

Chapter 8

WRITE [4]   Use the demand schedule that follows to calculate total revenue and marginal revenue at each quantity. Plot the demand, total-revenue, and marginal-revenue curves and explain the relationships between them. Explain why the marginal revenue of the fourth unit of output is $3.50, even though its price is $5.00. Use Chapter 4's total-revenue test for price elasticity to designate the elastic and inelastic segments of your graphed demand curve. What generalization can you make regarding the relationship between marginal revenue and elasticity of demand? Suppose the marginal cost of successive units of output were zero. What output would the profit-seeking firm produce? Finally, use your analysis to explain why a monopolist would never produce in the inelastic region of demand.

ANS:

Price	Q demanded	TR	MR
$7.00	0	$0.00	
$6.50	1	$6.50	$6.50
$6.00	2	$12.00	$5.50
$5.50	3	$16.50	$4.50
$5.00	4	$20.00	$3.50
$4.50	5	$22.50	$2.50
$4.00	6	$24.00	$1.50
$3.50	7	$24.50	$0.50
$3.00	8	$24.00	($0.50)
$2.50	9	$22.50	($1.50)

Because TR is increasing at a diminishing rate, MR is declining. When TR turns downward, MR becomes negative. Marginal revenue is below D because to sell an extra unit, the monopolist must lower the price on the marginal unit as well as on each of the preceding units sold. Four units sell for $5.00 each, but three of these four could have been sold for $5.50 had the monopolist been satisfied to sell only three. Having decided to sell four, the monopolist had to lower the price of the first three from $5.50 to $5.00, sacrificing $.50 on each for a total of $1.50. This "loss" of $1.50 explains the difference between the $5.00 price obtained on the fourth unit of output and its marginal revenue of $3.50.

Demand is elastic from P = $6.50 to P = $3.50, a range where TR is rising. The curve is of unitary elasticity at P = $3.50, where TR is at its maximum. The curve is inelastic from then on as the price continues to decrease and TR is falling. When MR is positive, demand is elastic. When MR is zero, demand is of unitary elasticity. When MR is negative, demand is inelastic.

If MC is zero, the monopolist should produce 7 units where MR is also zero.

It would never produce where demand is inelastic because MR is negative there while MC is positive. Specifically, if the firm were producing in the inelastic zone it could reduce output which, ceteris paribus, would reduce costs. But by reducing output, revenues go up. If TR increases and TC decreases, profit increases. The firm would certainly continue to cut output until it was out of the inelastic range of demand.

WRITE [5] Suppose a monopolist is faced with the demand schedule shown below and the same cost data as the competitive producer discussed in question 4 at the end of Chapter 7. Calculate the missing total- and marginal-revenue amounts, and determine the profit-maximizing price and profit-earning output for this monopolist. What is the monopolist's profit? Verify your answer graphically and by comparing total revenue and total cost.

ANS:

Price	Qd	TR	MR	AFC	AVC	ATC	TC	MC	Profit
$115	0	$0					$60.00		-$60.00
$100	1	$100	$100	$60.00	$45.00	$105.00	$105.00	$45.00	-$5.00
$83	2	$166	$66	$30.00	$42.50	$72.50	$145.00	$40.00	$21.00
$71	3	$213	$47	$20.00	$40.00	$60.00	$180.00	$35.00	$33.00
$63	4	$252	$39	$15.00	$37.50	$52.50	$210.00	$30.00	$42.00
$55	5	$275	$23	$12.00	$37.00	$49.00	$245.00	$35.00	$30.00
$48	6	$288	$13	$10.00	$37.50	$47.50	$285.00	$40.00	$3.00
$42	7	$294	$6	$8.57	$38.57	$47.14	$329.98	$44.98	-$35.98
$37	8	$296	$2	$7.50	$40.63	$48.13	$385.04	$55.06	-$89.04
$33	9	$297	$1	$6.67	$43.33	$50.00	$450.00	$64.96	-$153.00
$29	10	$290	-$7	$6.00	$46.50	$52.50	$525.00	$75.00	-$235.00

Profit maximizing price = $63;   Profit maximizing quantity = 4 units.
Your graph should have the same general appearance as Figure 9-4. At Q =4, TR = $252 and TC = $210 [= 4($52.50)].

WRITE [6] Suppose that a price discriminating monopolist has segregated its market into two groups of buyers, the first group described by the demand and revenue data that you developed for question 5.   The demand and revenue data for the second group of buyers is shown in the accompanying table. Assume that MC is $13 in both markets and MC = ATC at all output levels. What price will the firm charge in each market? Based solely on these two prices, what can you conclude about the relative elasticities of demand in the two markets? What will be this monopolist's total economic profit?

Price	Quantity demanded	Total revenue	Marginal Reveue
$71	0	$0	
63	1	$63	$63
55	2	$110	$47
48	3	$144	$34
42	4	$168	$24
37	5	$185	$17
33	6	$198	$13
29	7	$203	$5

ANS: Group 1 (from Question 5) will be sold 6 units at a price of $48; group 2 will buy 6 units at a price of $33. Based solely on the prices, it would appear that group 1's demand is more inelastic than group 2's demand. The monopolist's total profit will be $330 ($210 from group 1 and $120 from group 2).

WRITE [13] Use Figure 8-10 to explain why monopoly generates deadweight loss.

ANS: In monopoly, represented in Figure 8-10b, the output is lower than in perfectly competitive   market structure, represented in Figure 8-10a. Consumers pay a price above the firm's (and industry's) MC, reducing consumer surplus by the amount represented by triangles B in Figure 8-10b. Producers surplus is also lower than in a perfectly competitive market structure, the reduction represented by triangle C in Figure 8-10b. The net loss of consumer surplus and producer surplus, represented by triangles B and C in Figure 8-10b, is referred to as deadweight loss.

CONSIDER [1] "No firm is completely sheltered from rivals; all firms compete for the consumer dollars. monopoly, therefore, does not exist." Do you agree? Explain. How might you use Chapter 4's concept of cross elasticity of demand to judge whether monopoly exists?

ANS: Though it is true that "all firms compete for the dollars of consumers," it is playing on words to hold that monopoly does not exist. If you wish to send a first-class letter, it is the postal service or nothing. Of course, if the postal service raises its rate to $10 to get a letter across town in two days, you will use a courier, or the phone, or you will fax it. But within sensible limits, say a doubling of the postal rate, there is no alternative to the postal service at anything like a comparable price.
The same case can be made concerning the monopoly enjoyed by the local electricity company in any town. If you wish electric lights, you have to deal with the single company. It is a monopoly in that regard, even though you can switch to oil or natural gas for heating. Of course, you can use oil, natural gas, or kerosene for lighting too—but these are hardly convenient options.

The concept of cross elasticity of demand can be used to measure the presence of close substitutes for the product of a monopoly firm. If the cross elasticity of demand is greater than one, then the demand that the monopoly faces is elastic with respect to substitute products, and the firm has less control over its product price than if the cross elasticity of demand were inelastic. In other words, the monopoly faces competition from producers of substitute products.

CONSIDER: [3] How does the demand curve faced by a purely monopolistic seller differ from that confronting a purely competitive firm? Why does it differ? Of what significance is the difference? Why is the pure monopolist's demand curve not perfectly inelastic?

ANS: The demand curve facing a pure monopolist is downward sloping; that facing the purely competitive firm is horizontal, perfectly elastic. This is so for the pure competitor because the firm faces a multitude of competitors, all producing perfect substitutes. In these circumstances, the purely competitive firm may sell all that it wishes at the equilibrium price, but it can sell nothing for even so little as one cent higher. The individual firm's supply is so small a part of the total industry supply that it cannot affect the price.
The monopolist, on the other hand, is the industry and therefore is faced by a normal downward- sloping industry demand curve. Being the entire industry, the monopolist's supply is big enough to affect prices. By decreasing output, the monopolist can force the price up. Increasing output will drive it down.
Part of the demand curve facing a pure monopolist could be perfectly inelastic; if the monopolist put only a very few items on the market, it is possible the firm could sell them all at, say, $1, or $2, or $3. But it is the very fact that the monopolist could sell the same amount at higher and higher prices that would ensure that the profit-maximizing monopolist would not, in fact, sell in this perfectly inelastic range of the demand curve. Indeed, the monopolist would not sell in even the still slightly inelastic range of the demand curve. The reason is that so long as the demand curve is inelastic, MR must be negative, but since the MC of any item can hardly be negative also, the monopolist's profit must decrease if it produces here. To equate a positive MR with MC, the monopolist must produce in the elastic range of its demand curve.

CONSIDER: [8] Critically evaluate and explain:

    a.   "Because they can control product price, monopolists are always assured of profitable production by simply charging the highest price consumers will pay."

    b.   "The pure monopolist seeks that output which will yield the greatest per unit profit."

    c.   "An excess of price over marginal cost is the market's way of signaling the need for more production of a good."

    d.   "The more profitable a firm, the greater its monopoly power."

    e.   "The monopolist has a pricing policy; the competitive producer does not."

    f.   "With respect to resource allocation, the interests of the seller and of society coincide in a purely competitive market but conflict in a monopolized market."

    g.   "In a sense the monopolist makes a profit for not producing; the monopolist produces profits more than it does goods."

ANS.
a. Not true. Profitability depends upon the placement of the monopolist's cost curves relative to its demand curve. See figure 11-5 in the textbook.
b. Not true. Highest per unit profits do not translate into profit maximization. The monopolist wants to produce every unit that contributes (even just a penny) to its economic profits.
c. This is true. If p>mc it means the value of the marginal unit is greater than its cost. This means, for allocative efficiency, more should be produced.
d. This is true. If we measure monopoly power as the extent to which the firm can raise price above its costs without attracting entry to the market, then economic profits are a reasonable measure of monopoly power in the long run.
e. This is true. The perfect competitor accepts the market price -- the monopolist sets the market price.
f. This is true in the sense that the perfect competitor is "driven" to price at p=mc. The monopolist is driven by profit maximization to price at a point where p>mc.
g. This is true in the sense that the monopolist obtains economic profit by restricting supply (below what it would be in a competitive market).

CONSIDER [10] U.S. pharmaceutical companies charge different prices for prescription drugs to buyers in different nations, including Canada, depending on elasticity of demand and government-imposed price ceilings. Explain why these companies oppose laws allowing re-importation of drugs to the United States.

ANS. U.S. pharmaceutical companies are price discriminating based in part on the different elasticities of demand in different nations. Re-importation allows reselling of the goods, making it more difficult to price discriminate. To the extent that they could still charge different prices, the difference in prices would have to be small enough so that re-importation was not profitable. Prohibition of re-importation would allow pharmaceutical companies to charge the profit-maximizing price in each nation, without fear of being undercut back in the U.S. by those in nations, such as Canada, where the drugs are cheaper.

WRITE: The table to the right refers to a monopolist. It shows demand (e.g., at p=$32, 1 unit is demanded) and costs (e.g., at q=1, TC=$36).

Units	Price	TR	MR	Total cost	MC	Single Price profit	Price discrim revenue	Price discrim profit
0	34	0		20				
1	32	32	32	36	16	-4	32	-4
2	30	60	28	46	10	14	62	16
3	28	84	24	50	4	34	90	40
4	26	104	20	54	4	50	116	62
5	24	120	16	56	2	64	140	84
6	22	132	12	67	11	65	162	95
7	20	140	8	80	13	60	182	102
8	18	144	4	97	17	47	200	103
9	16	144	0	128	31	16	216	88
10	14	140	-4	160	32	-20	230	70

a. What is the profit maximizing level of output for a single price monopolist, and what are its profits (or losses)?

ANS: 6 units, MC of $11 just about equals MR of $12.

b. Will the single price monopolist achieve allocative efficiency at the profit maximizing level of output? Explain.

ANS: No, because price ($22) > MC ($11). This implies that too little is being produced. Additional units would add more to benefits than to costs.

c. Is demand elastic or inelastic at this price? Show your calculations.

ANS: for a price cut from $22 to $20, elasticity equals 1.6. For a price increase from $22 to $24, elasticity equals 2.1. Elasticity is greater than one in both cases so demand is elastic.

d. If the firm could perfectly price discriminate, how much would it produce, what would be its profits? Would it achieve allocative efficiency? Explain.

ANS: Produce 8 units, profits = $103. Price = $18, mc=$17,so the monopolist nearly achieves allocative efficiency, but not quite. It should produce just a little bit more.

CONSIDER: Movie theatres price discriminate between children, adults and seniors when selling entry tickets. However, once inside the theatre everybody pays the same price for popcorn. Why?

ANS: There are three conditions that need to be met for price discrimination to work: (a) the business has the power to set prices; (b) it offers different prices to groups of consumers (adults or children) based on the price elasticity of demand for movies among children, adults and seniors; and (c) there is no resale or transfer of the product from children or seniors who buy it at the lower price to adults who must buy it at the higher price. In the case of theatre seats all three conditions hold. In the case of food concessions, the third condition does not hold. If a child bought popcorn at a lower price than an adult, he/she could just resell the food to adults. This transfer would undercut the price discrimination power.