

Lesson 9 - Monopolies, Antitrust, and Price Discrimination

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Section 1: Monopolies Demand and Pricing

Monopolies are on the other end of the continuum from pure competition. A **monopoly** consists of one firm that produces a unique product or service with no close substitutes. Entry into the market is blocked, which gives the firm **market power** (i.e., the power to raise price above marginal cost). Historically, pure monopolies are rare and often short lived because the reason for their existence (usually blocked entry) is somehow weakened. For example, patents expire, new resources are often discovered, and new technologies allow new competitors into the market. We will expand on these sources of monopoly power later. It will also become clear that firms have an incentive to try to gain a monopoly. Studying the attributes and behavior of a monopoly is a useful reference point particularly when looking at the other market structures.


As an interesting side note, when there is only one seller in a market, it is called a monopoly, but when there is only one buyer in the market, it is called a **monopsony**. We will save our discussion on monopsonies until near the end of the course.

Characteristics of a Monopoly

The graphic below shows the characteristics of a monopoly

Monopoly

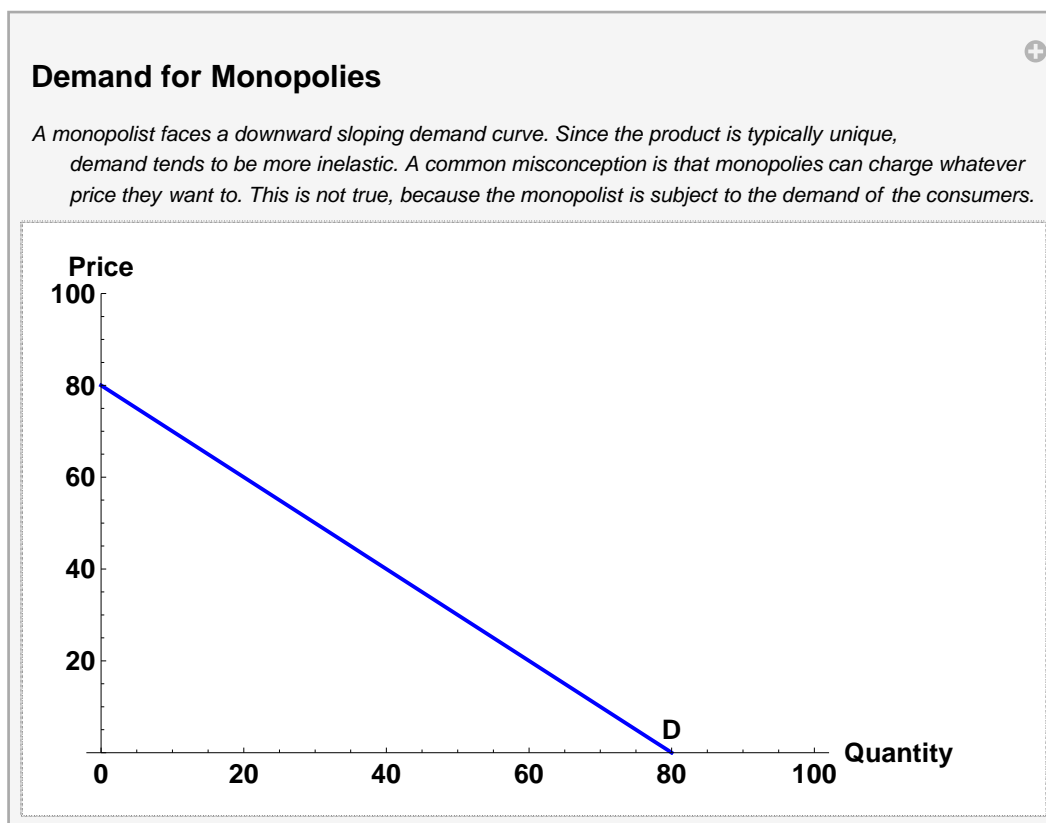
- Market Power - Price Maker
- One Firm
- High Barriers to Entry/
Blocked Entry
- Unique Product
- Examples: Local Utilities



Coded by David Barrus.

Demand

A monopoly determines not only the quantity to produce but also the price it will charge. The demand curve the firm faces is the market demand curve (see graph). Thus if it wants to sell more, it must lower the price. Does a monopoly have an incentive to advertise? Since the firm is also the market demand curve, it has one hundred percent of the market share; however, monopolies may **advertise** to increase overall market demand or to improve goodwill or public relations.



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A Single Price Monopolist

Unlike firms in pure competition that only decide the quantity to produce, monopolists must determine both the quantity and price. But these are not independent choices. Because a monopolist faces a downward sloping demand curve, she must lower the price if she wants to sell more goods (recall that the law of demand states that this inverse relationship exists between price and quantity demanded). Given that the monopolist must charge the same price to all consumers (i.e. she cannot price discriminate), then to sell more, she must charge a lower price, not only on the last good she wants to sell, but on all of the product that she could have sold at the higher price. This has important implications for **marginal revenue**. It means that marginal revenue falls at twice the rate of the demand curve (i.e. the slope is twice as steep; see graphic below). This might best be seen with an example. Let's assume that a monopolist can sell 1 barrel of oil for \$80 or 2 barrels for \$79 each. To sell two barrels, price must drop by \$1. But MR for the second one is change in TR divided by change in quantity or $(158 - 80) / (2-1) = \$78$. So MR fell by \$2 (\$80-78) – twice the rate as price.

A Single Price Monopolist

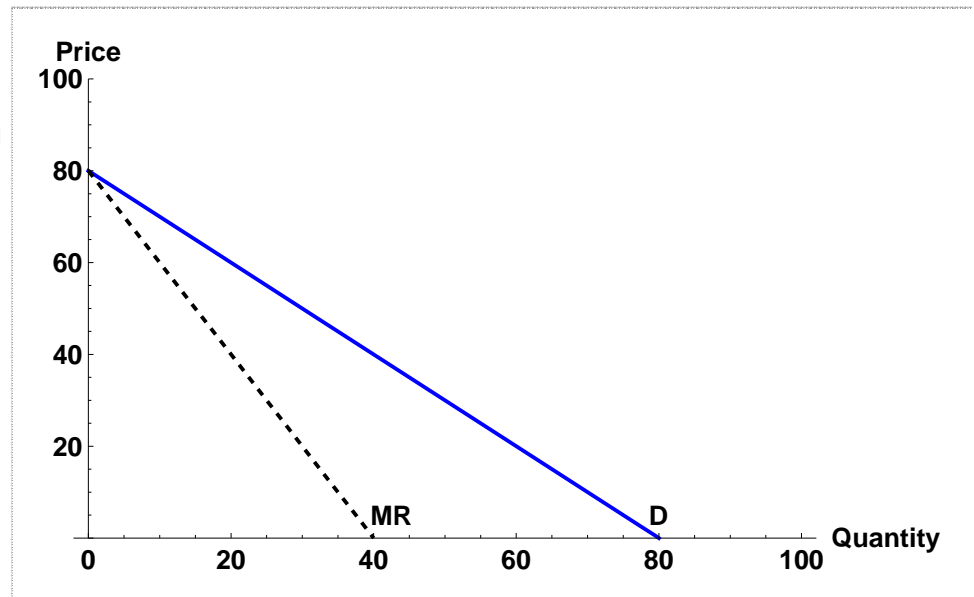
Unlike pure competition, a monopolist must determine what price to set. The monopolist must know the marginal revenue in order to set a price that

Factors to remember

$$MR = \Delta TR / \Delta Q$$

Slope of MR is twice as steep as Demand

Price > Marginal Revenue



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The **marginal revenue curve** for a single priced monopolist will always be twice as steep as the demand curve (see graphic above). Since the demand curve reflects the price and the marginal revenue curve is below the demand curve, the price is no longer equal to the marginal revenue as it was in pure competition.

Math Behind Marginal Revenue Curve

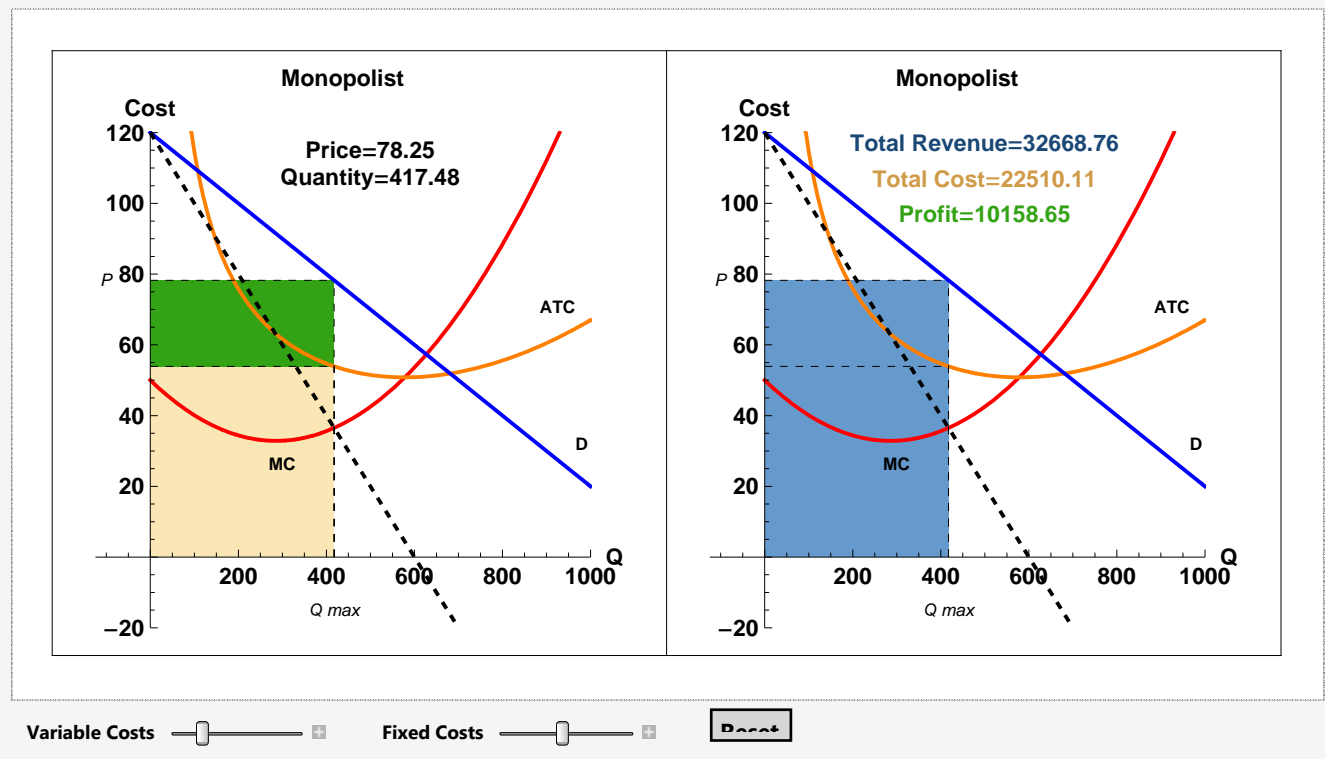
For those wanting to see mathematically why the marginal revenue curve is twice as steep as the demand curve, here is the math. Let's assume Demand is $P = 10 - 2Q$. In our example, the slope of the demand curve is -2. Total Revenue which is equal to price times quantity equals $(10 - 2Q)Q = 10Q - 2Q^2$. Using this equation we can evaluate the change in total revenue as Q changes. For example, let's look at the change in total revenue as quantity changes from 3 to 4. When Q equals 3, the total revenue is 12 and when Q equals 4, the total revenue is 8. A change in total revenue of 4 dollars as Q increases by one implies a slope of -4 which is twice the slope of demand. For those who have had calculus, take the first derivative of $10Q - 2Q^2$ to get the marginal revenue of $10 - 4Q$, which gives a slope of -4.

Determining Price and Quantity

Profit maximization for a monopoly, charging a single price, will occur where marginal revenue is equal to marginal cost. It is important to note that this gives the profit maximizing quantity but the price is determined by going up to the demand curve (see graphic below). That is, the price is obtained based upon what consumers are willing to pay for that quantity level which is determined by the demand curve.

Monopolist – Maximizing Profit

The profit maximizing quantity is determined where $MR=MC$. 'Q max' is the profit maximizing quantity. This profit maximizing quantity is then put into the demand curve to determine the profit maximizing price (P) the monopolist will charge. In this case, the demand curve is: $P=120-0.10Q$. Use the slider bar to shift the curves. The two graphs show a single-price monopolist. The graph on the right shows the total revenue (blue area) of the monopolist. If the firm is making an economic loss, the area indicating the amount of the loss appears (tan color). On the left, the total cost area (tan) is shown along with the economic profits (green) or economic loss (red). Move the sliders to see how profits as the firm's costs change (move the variable and/or fixed cost sliders.)



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Profits for the monopolist are obtained by calculating total revenue (TR) minus total cost (TC). ($TR = \text{Optimal price} \times \text{optimal quantity}$). In the graph on the right in the graphic above, the blue area is total revenue. Taking the average total cost times the profit maximizing quantity gives the total cost. In the graph on the left in the graphic above, the tan area is the total cost. If total cost is greater than total revenue the tan area will show up in the graph on the right. Move the variable and/or fixed costs to see how total revenue, total costs, and profits change.

In the short run, a monopoly may earn short run profits or losses, but unlike firms in pure competition that have zero economic profits in the long run, monopolies can maintain long run profits. If long run profits are negative, the firm would leave the industry and the good would no longer be produced, since the monopoly was the only firm in the industry.

Recall from our discussion on elasticities that along a linear demand curve, there is an elastic and inelastic portion. In the elastic portion, lower prices increases total revenue, and in the inelastic portion total revenue falls as price decreases. Total revenue is maximized at unit elasticity which occurs where marginal revenue is zero (see graphic below).

This provides for an important observation. Because we would expect marginal cost to be positive and a monopolist chooses to produce where $MR=MC$, we can conclude that a monopolist would only produce in the elastic region of the demand curve (see graphic below).

Elasticity and Total Revenue

The top graph shows the demand curve. Move the top slider to change the price. The bottom graph shows total revenue. As the price changes, total revenue changes. If the price is in the inelastic region, a price increase will increase total revenue. If the price is in the elastic region, then a price increase will decrease total revenue. Move the bottom slider to make the curve more elastic or inelastic.

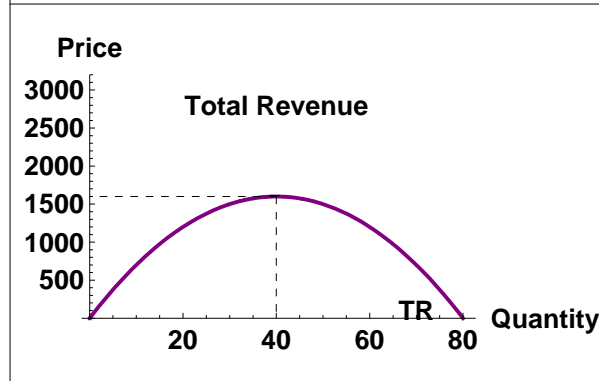
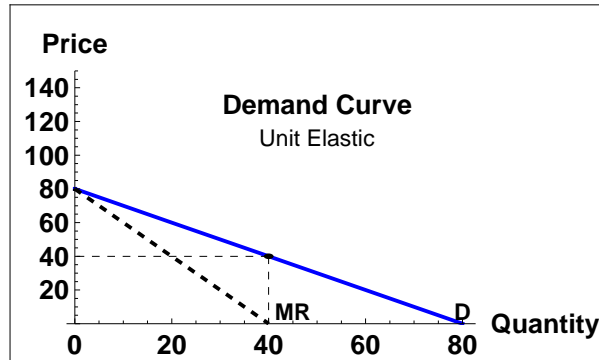
Price

More Inelastic.....More Elastic

Slope

Elasticity and Total Revenue

Price	40	
Total Revenue	1600	MAX
Elasticity	Unit Elastic	



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We can also use a table to determine the profit maximizing quantity and price for a single priced monopolist. Look at the table below. If the firm is following the decision rule of producing where the marginal revenue equals the marginal cost, we can determine that producing six units and charging a price of \$550 will maximize profits. At the sixth unit, our marginal revenue is 175 and the marginal cost is 140. At seven units the marginal cost would exceed the marginal revenue. In looking at the column on the far right, we verify that this is the quantity that maximizes profits. At six units of output, the mid-point elasticity between five and six units is 1.42, which is elastic. Notice that monopolist is producing in the elastic region of the demand curve. At six units the marginal revenue is still greater than the marginal cost, but since it is less at the seventh unit six units maximizes profits.

Determining Profit Maximizing Quantity for a Monopolist – Table

The table below illustrates where a monopolist maximizes profit. The monopolist has market power and can set the price above the competitive price. First, the monopolist determines the profit maximizing quantity by finding where $MR=MC$. Then the monopolist plugs that quantity into a demand curve to determine the profit maximizing price. In this example, the monopolist produces 6 units of the goods, which is in the elastic portion of the demand curve.

Profit Max.(Qmax)

$$MR = MC$$

Plug Qmax into Demand to get Price.

Quantity	Price	TC	TR	ATC	AVC	MC	MR	Profit	Elasticity
0	1000	500	–	–	–	–	–	–500	–
1	925	600	925	600.0	300.0	100	925	325	25.67
2	850	650	1700	325.0	175.0	50	775	1050	7.89
3	775	710	2325	236.7	136.7	60	625	1615	4.33
4	700	790	2800	197.5	122.5	80	475	2010	2.81
5	625	900	3125	180.0	120.0	110	325	2225	1.96
6	550	1040	3300	173.3	123.3	140	175	2260	1.42
7	475	1220	3325	174.3	131.4	180	25	2105	1.05
8	400	1450	3200	181.3	143.8	230	–125	1750	0.78
9	325	1740	2925	193.3	160.0	290	–275	1185	0.57
10	250	2100	2500	210.0	180.0	360	–425	400	0.40

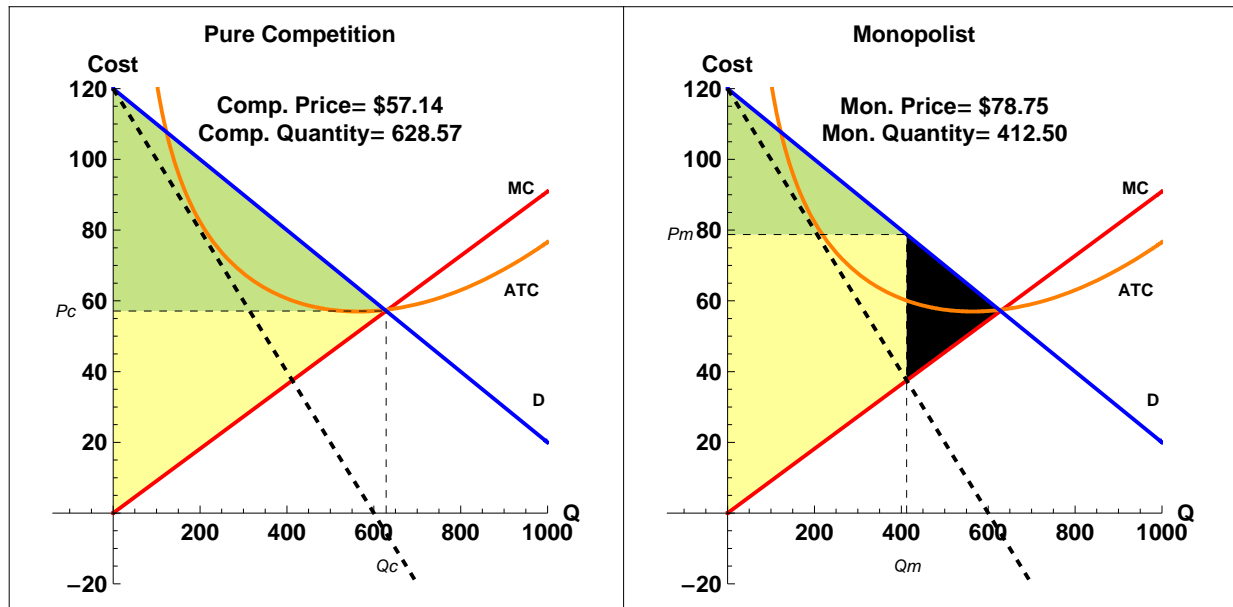
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Comparing to Pure (Perfect) Competition

Recall that purely competitive firms produce where MC is equal to price and that industry supply is obtained by horizontally adding the MC curves of the firms in an industry. In equilibrium, the industry supply curve (the sum of the MC curves) crosses the demand curve. If the monopoly was to act in the same fashion, it would produce where its MC curve crosses the demand curve (just like the sum of the MC curves cross the demand curve in pure competition – only it is the sum of one curve). So in comparing the outcome for pure competition to that of monopoly we see that a single price monopolist will produce less than the purely competitive market and charge a higher price (see graphic below).

Pure Competition vs. Monopoly

The two graphs compare a pure competition price (P_c) and quantity (Q_c), and a monopolist price (P_m) and quantity (Q_m). The upper green area in both graphs is the consumer surplus. The lower yellow area is producer surplus. In the monopolist graph, there is deadweight loss (black area). These graphs illustrate some key differences between monopolists and competitive markets. The monopolist price is higher than under competition. The quantity produced by a monopolist is less than if the market was competitive. Since the monopolist is above the competitive price, there is some inefficiency in the monopolist market. There are two types of efficiency: allocative ($\text{Price} = \text{Marginal Cost}$) and productive ($\text{Price} = \text{Minimum ATC}$). A monopolist is not allocatively efficient because $P > MC$. It is also not productively efficient because $P > \text{min. ATC}$. On the other hand, a purely competitive market is both allocatively and productively efficient.



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In pure competition, economic surplus which is consumer plus producer surplus, is maximized. The industry is **allocatively efficient** producing where the price is equal to the marginal cost. By restricting output and raising price, the single price monopolist captures a portion of the consumer surplus. Since output is restricted, a portion of both the consumer and producer surplus is lost. This loss of economic surplus is known as deadweight loss, that neither the consumer nor the producer enjoy.

A monopolist may or may not be productively efficient; it depends on whether it is producing at a point where ATC is at the minimum point. **Productive efficiency** means least-cost and this occurs where ATC is at its minimum point. In general, monopolies are not productively efficient. Monopolies may also suffer from what is called x-inefficiency. **X-inefficiency** arises when costs creep up due to lack of competition and/or actions pursued by the monopolist to protect its monopoly position. These monopoly protecting actions are also called rent-seeking activities.

Monopolies will often pursue **rent seeking** activities spending time or money on activities that are not related to the production of the good or service but intended to increase the market power and profitability of the firm. For example, major soft drink companies, such as Coke or Pepsi, will offer millions to a university or stadium if they are allowed to be the sole soft drink vendor. Likewise athletic wear firms may offer a university payments or discounts if they are allowed to be the sole vendor of apparel. These expenditures are not related to the production of the good or service but give them a monopoly in the respective markets.

Legal cartel theory suggests that some industries may seek to be regulated or desire that regulation continues, so that the number of firms is limited and the existing firms can act like a monopoly. **Regulation** such as limiting the number of firms or individuals in a market (e.g., medical school, state liquor licenses, or taxi cabs in New York City)

may be done with "good intentions," but they grant existing firms more market power which leads to higher prices and a lower quantity supplied.

Ponder and Prove - Section 1 - Monopolies Demand and Pricing

Section 1 Questions +

Instructions: Click on the button that represents the correct answer. After you select an answer, click on the 'Grade My Answer' button.

Question 1
Question 2
Question 3
Question 4

Which of the following is NOT a characteristic of a monopoly?

- One firm
- Barriers to entry
- Produces a unique product
- Price taker

Grade My Answer
Reset

"Results"

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Section 2: Barriers to Entry

Recall from our discussion of perfect competition that when firms are able to obtain economic profits, other firms/entrepreneurs are attracted to the industry and entry will occur until economic profits are reduced to zero. But if there is a **barrier to entry**, then profit-seeking firms do not enter to compete and economic profits can persist. There are a variety of different barriers that may allow a firm to exercise market power (which really just means that a firm can set price above marginal cost and extract positive profits). Barriers to entry include the following five barriers.

1. Legal Barriers

Some of the most obvious legal barriers are patents, copyrights, and licenses. Patents reward firms for investing millions of dollars in research and development of new products. They give a company the sole right to produce the product for a limited time period in order to help it recoup the research and development costs. Examples of patents include a pharmaceutical company's exclusive right to sell a medication or a chemical company having exclusive rights to sell a chemical it has developed. Firms will often use those profits to research and develop new products. Similar to patents, copyrights grant exclusive rights for products developed by firms such as films or books. Finally, licenses granted by the government restrict the number of firms in an industry. For example, some metropolitan areas, such as New York City, require taxi cabs to purchase a medallion, which are limited in number. In 2009, the price of these medallions exceeded \$750,000. Other examples of licenses include states that limit the number of liquor licenses or cities that limit the number of cable companies.

(Reference: http://www.usatoday.com/money/industries/travel/2009-08-05-taxi-cab-new-york-city-medallions_N.htm)

Governments often control essential services in a city such as water, sewer, and garbage. If all households are required to have garbage service and the government grants the contract to one firm, that firm would have a monopoly.

2. Control of Necessary Inputs

Another barrier to entry can occur when firms are able to own or control the necessary inputs or resources, and as a result, they may be able to control the market. In the early 1900's, Standard Oil's control of the oil refining and transportation was partly responsible for the passage of antitrust legislation which specifies regulations regarding monopolies and monopolizing practices. In the 1940s the government accused Aluminum Co. of America of being a monopoly by controlling the mineral bauxite, an essential input for making aluminum. De Beers' control of rough diamonds allowed it to control and set diamond prices.

(References: <http://www.time.com/time/magazine/article/0,9171,764369,00.html>,
http://www.forbes.com/2000/08/31/shilling_index.html)

3. Network Externalities

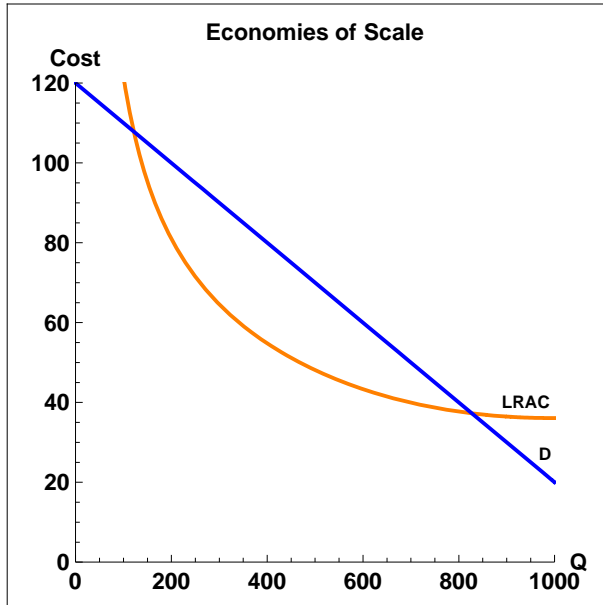
Network externalities may also create barriers to entry. A positive network externality occurs when the value of having or using an item increases as others use the item. A phone or fax machine, for example, becomes more useful when others have phones or fax machines. If the market is dominated by a particular product or brand, e.g., a computer operating system or certain software, a network externality exists so users don't want to change products or brands. So the externality creates a barrier for other firms to enter with a competing product.

4. Economies of Scale

In certain industries natural monopolies exist where the long run average cost curve continues to decline in the relative region of demand. Consequently, one firm is able to produce enough for the market at a lower per unit cost than would be the case if two firms shared the market. In this case, positive profits can exist, but entrants cannot enter to capture some of these profits because sharing the market means they have to enter at a smaller scale of operation and thus face higher average costs. The transmission of electricity is an example of a natural monopoly.

Economies of Scale – A Natural Monopoly

A natural monopoly has decreasing long-run average costs. This is typically due to the high start-up fixed costs that occur. As more output is produced, those fixed costs are spread out over all of the output. This prevents other firms from entering the market, and allows the one firm to maintain the monopoly. Example: Local electric company



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5. Strategic Behavior

Firms may undertake other strategic actions to discourage potential competitors from entering the market through pricing or production decisions. For example, a small town may have only one gas station that sets prices a little lower than the monopoly price (i.e., it does not act as a pure monopolist) in order to keep profits low enough to deter others from entering the market. Alternatively, a firm may build a facility larger than needed as a threat that it will increase production if other firms attempt to enter the market. These strategic actions create a barrier to entry.

While not a true monopoly, Toy's 'R' Us faced antitrust concerns for allegedly threatening that it would not sell manufacturers' goods unless they fixed the price of those goods when sold to competing discount stores.

(Reference: <http://online.wsj.com/article/SB125573656435491057.html>)

Ponder and Prove - Section 2 - Barriers to Entry

Section 2 Questions +

Instructions: Click on the button that represents the correct answer. After you select an answer, click on the 'Grade My Answer' button.

Question 1
Question 2
Question 3
Question 4

Which of the following is NOT considered a barrier to entry in a monopoly?

- Economies of scale
- Control of necessary inputs
- An economic profit other than zero in the long run
- Patents

Grade My Answer
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"Results"

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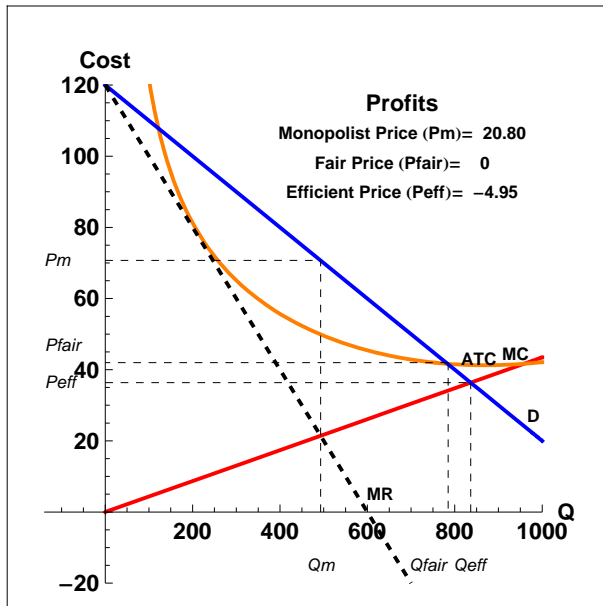
Section 3: Natural Monopolies

If an industry has a **natural monopoly**, a single firm is able to produce at a lower per unit cost compared to having multiple firms in the industry. Thus, governments typically opt to regulate instead of breaking up natural monopolies. An electrical generating company, for example has high fixed costs and the marginal cost of running power to one more house is very low.

An unregulated single-priced monopoly would maximize profits where marginal revenue equals marginal cost, producing Q_m and charging price, P_m (see graphic below). As the government steps in to regulate a market, what price should they allow a monopolist to charge?

Regulating a Natural Monopolist

If the monopolist is left to charge the monopolist price (P_m) then they will earn a profit of 20.80. The price is higher than the efficient (competitive) price, and there is deadweight loss. If the monopolist is regulated at the efficient or competitive price, they would have a loss of 4.95. The firm would be losing money. It is then best to regulate the monopolist at the fair price or at the firm's average total cost. In this case, economic profits are zero.



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Economically Efficient or Social Optimum Price

The **economically efficient** or **social optimum price** would occur where price equals marginal cost, making the industry allocatively efficient (see graphic above). However, since the average total cost is declining in the region of demand, and marginal cost intersects average cost at the minimum, marginal cost will be below the average cost in the relevant range of demand. If regulators force a monopoly to price at this point, where price equals marginal cost, they would force the monopoly to incur a loss or negative economic profits, which would eventually force the monopoly out of business. Since the monopoly is the only producer, government could subsidize the monopoly for these losses such that they earn a normal return, but this is often politically difficult.

Fair Return or Average Cost Pricing

Alternatively the government could force the monopoly to produce where price equals average total cost, leaving the firm a zero economic profit. This is **fair return** or **average cost pricing** (see graphic above). Thus the firm will remain in the industry since it is covering all opportunity costs. As demonstrated in the graph above, the price is less than that of the unregulated monopoly but higher than the economically efficient price. The drawback of this policy is that firms have no incentive to control costs. If costs rise, they can simply petition the government for price increases. But if the firm improves productivity and pursues cost cutting measures, the government would force them to lower prices. Thus local utility companies may have newer equipment and vehicles simply due to this perverse incentive.

Ponder and Prove - Section 3 - Natural Monopolies

Section 3 Questions +

Instructions: Click on the button that represents the correct answer. After you select an answer, click on the 'Grade My Answer' button.

Question 1
Question 2
Question 3
Question 4

What is a natural monopoly?

- Monopolies that organically evolve from natural market forces.
- Monopolies that deal with nature such as mining, forestry, salt, etc.
- A single firm is able to produce at a lower per unit cost than having multiple firms in the market.
- Firms that are able to be monopolies because of the 'natural' talent of the owners and operators.

Grade My Answer
Reset

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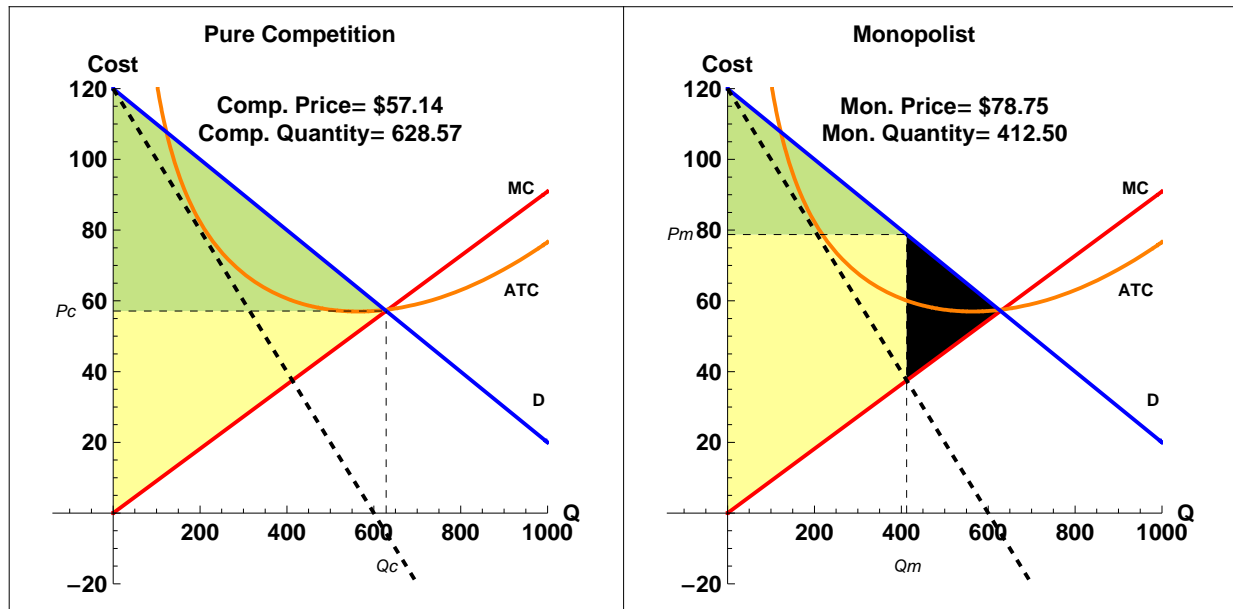
Section 4: Performance, Structure, and Market Concentration

Performance and Structure

Monopolies and firms that collude to act like monopolies, reduce competition and create inefficiencies in the market. We have seen that single priced monopolists are neither **allocatively efficient** (price equals marginal cost at the last unit produced) nor **productively efficient** (producing at the lowest average cost). Consequently, the United States government has passed certain laws that restrict monopolies.

Pure Competition vs. Monopoly

The two graphs compare a pure competition price (P_c) and quantity (Q_c), and a monopolist price (P_m) and quantity (Q_m). The upper green area in both graphs is the consumer surplus. The lower yellow area is producer surplus. In the monopolist graph, there is deadweight loss (black area). These graphs illustrate some key differences between monopolists and competitive markets. The monopolist price is higher than under competition. The quantity produced by a monopolist is less than if the market was competitive. Since the monopolist is above the competitive price, there is some inefficiency in the monopolist market. There are two types of efficiency: allocative ($\text{Price} = \text{Marginal Cost}$) and productive ($\text{Price} = \text{Minimum ATC}$). A monopolist is not allocatively efficient because $P > MC$. It is also not productively efficient because $P > \text{min. ATC}$. On the other hand, a purely competitive market is both allocatively and productively efficient.



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Government can evaluate a market based on the **structure of the market**, i.e., the number of firms in the industry and the barriers to entry, or by the market's **performance** or **conduct**, i.e., the behavior of the firms and the resulting prices and efficiencies. Should a monopoly exist, the government can pursue a variety of options:

- (1) break up the monopoly under antitrust laws;
- (2) regulate the monopoly; or
- (3) ignore the monopoly, if they anticipate that the monopoly will be short lived or have negligible impact.

Measuring Market Concentration

With a relatively few number of firms in the industry, firms often have an incentive to collude and act like a monopoly. Consequently, the government measures the amount of concentration that exist in a market or that would exist if a merger were to take place. This is referred to as **market concentration**. Market concentration is typically higher with fewer firms and lower with many firms. The two common measures are the four-firm concentration ratio and the Hefindahl-Hirschman Index (HHI). See: <http://www.census.gov/econ/concentration.html>

Market Concentration

The graphic below shows how to calculate the four-firm concentration ratio and the Herfindahl-Hirschman Index (HHI)

1. **Four-firm concentration ratio**
 - a. Percentage of sales of largest four firms
 - b. Sales of four largest firms / Total industry sales

2. **Herfindahl-Hirschman Index (HHI)**
 - a. Sum of squared market shares of all firms
 - b. Higher number = more concentration
 - c. Example: 5 firms each with 20%

$$20^2 + 20^2 + 20^2 + 20^2 + 20^2 = 2000$$

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The **four-firm concentration ratio** sums the market share of the four largest firms in the industry based on output. An industry in pure competition would have a very low concentration ratio. Industries in monopolistic competition typically have a concentration ratio less than 40, while oligopolies have a ratio greater than 40, such as the airline manufacturing industry.

The **Herfindahl-Hirschman Index**, often shortened to the Herfindahl Index or HHI, takes the percent of the market share of each firm, squares their values and sums them. The graphic below shows the U.S. Department of Justice definition of unconcentrated, moderately concentrated, and highly concentrated markets based on the HHI.

Market Concentration Definitions

This graphic shows the United States Department of Justice definition of unconcentrated, moderately concentrated, and highly concentrated markets. Source: <http://www.justice.gov/atr/public/guidelines/hmg-2010.html>

- Unconcentrated Markets: HHI below 1500**
- Moderately Concentrated Markets: HHI between 1500 and 2500**
- Highly Concentrated Markets: HHI above 2500**

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The more specific the industry definition, the greater the market concentration. For example, the food manufacturing industry as a whole has a low level of market concentration, however, there is significant market concentration in certain subsectors such as malt manufacturing and breakfast cereal manufacturing.

In the breweries industry (31212) which consists of establishments primarily engaged in brewing beer, ale, malt liquors, and nonalcoholic beer, the four-firm concentration ratio is 90.8. “From 1947 to 1995, the number of American brewers fell by more than 90 percent. Though a surge in craft producers followed, few compete directly with mass-market suds like Budweiser or Miller.” Source: <http://dealbook.blogs.nytimes.com/2009/08/27/rising-beer-prices-could-hint-at-oligopoly/>

Examples of Four-firm Concentration Ratios and HHI

This graphic shows four firm concentration ratios and HHI for different manufacturing sectors. This data is from the 2002 Economic Census that was released in 2006. Source: <http://www.census.gov/prod/ec02/ec0231sr1.pdf>

Sector	4-Firm	HHI (top 50)
Food Manufacturing (311)	16.8	118.7
Malt Manufacturing (311213)	91.4	2,192.4
Breakfast Cereal Manufacturing (31123)	82.1	2,999.6
Motor Vehicle Manufacturing (3361)	81.2	2,323.5
Metal Household Furniture Manufacturing (337124)	27.6	308.2
Guided Missile and Space Vehicle Manufacturing (336414)	95.3	Not Disclosed
Breweries (31212)	90.8	Not Disclosed

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Ponder and Prove - Section 4 - Performance, Structure, and Market Concentration

Section 4 Questions

Instructions: Click on the button that represents the correct answer. After you select an answer, click on the 'Grade My Answer' button.

Question 1 Question 2 Question 3 Question 4

Which of the following is NOT an option that the government has with the existence of a monopoly?

- Switch the monopoly to another industry
- Regulate the monopoly
- Break up the monopoly
- Ignore the monopoly

Grade My Answer

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Section 5: Antitrust Policy and Mergers

Antitrust Legislation

In 1890, the **Sherman Antitrust Act** was passed to reduce the power of firms that controlled a large percentage of a market. It made it illegal to participate in activities that result in the "restraint [of] trade or commerce", such as price

fixing, and activities which monopolize or attempt to create monopolies. This legislation targeted firms such as the Standard Oil Company which was monopolizing the refining and distribution of the petroleum. However, this powerful law was vague in many respects and subsequent laws were passed to more explicitly outline activities that were illegal.

The **Federal Trade Commission Act of 1914**, empowered the Federal Trade Commission (FTC) to prevent or stop unfair methods of competition and unfair or deceptive acts in or affecting commerce. Today the FTC and the Department of Justice's antitrust division have the responsibility to investigate firms for antitrust behavior.

The **Clayton Act of 1914**, strengthened the Sherman Antitrust Act, making illegal price discrimination of "commodities of like grade and quality" when it reduces competition and is not justified by cost differences. The purchase of a competitor's stock and having interlocking directorates, where the individuals are serving on both board of directors, are also illegal if they reduce competition. The Clayton Act also prohibits tie-in sales, where the purchase of one product is a condition of sale for another product. Later, the **Celler-Kefauver Act of 1950** closed loopholes in the Clayton Act by restricting companies from the purchase of the physical assets of competitors. While horizontal mergers were scrutinized under the Sherman Antitrust Act, vertical and conglomerate mergers could be blocked under the Celler-Kefauver Act if they could reduced competition.

(References:<http://www.stolaf.edu/people/becker/antitrust/statutes/clayton.html>; <http://www.stolaf.edu/people/becker/antitrust/statutes/ftc.html>)

Mergers

Whenever firms become large in size or large relative to their industry, policy-makers recognize that these firms are more able to pursue monopoly-type conduct and obtain inefficient market outcomes. At the same time, growth of a firm, as we have seen, allows it to capture economies of scale and scope. So when large firms merge, the benefits have to be measured against the potential for efficiency losses. There are three basic types of mergers. A **horizontal merger** is the merger or consolidation of two or more producers of the same product or service. For example, if a flour mill buys another flour mill. **Vertical mergers** occur when firms at different stages of production of a product merge. For example, a flour mill that buys a wheat farm would be an example of an upstream vertical merger (upstream means input-supplying), while the flour mill buying a bakery would be an example of a downstream vertical merger (downstream means output-using). **Conglomerate mergers** occur when the merging firms produce unrelated products, such as a flour mill purchasing a computer company. Conglomerate mergers may allow a firm economies of scope or to diversify. Historically, several tobacco companies have purchased food companies, such as Kraft, to help them diversify and improve their public image. The graphic below summarizes this information.

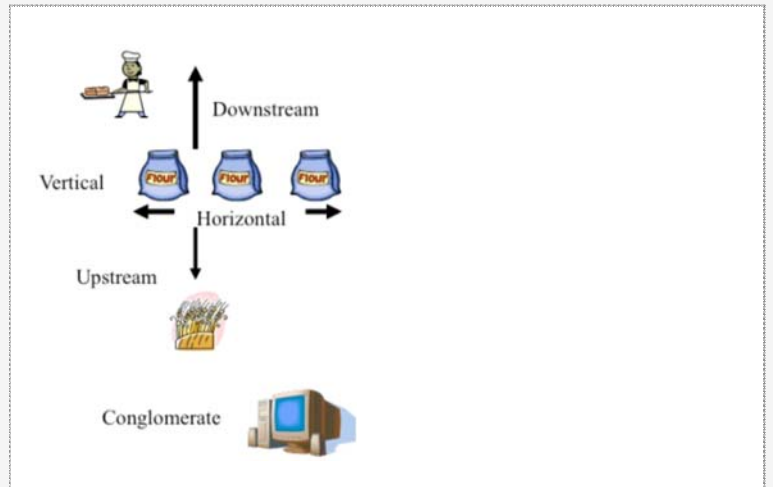
Types of Mergers

The figure on the right illustrates the different type of mergers for a flour mill. If a flour mill merges with a bakery (downstream) that buys their flour, and/or if they purchase a farm that supplies them wheat to grind (upstream), this is a vertical merger. If the flour mill purchases other flour mills, this is a horizontal merger. If the flour mill purchases a computer company, is a conglomerate merger.

Vertical: Firms merge with other firms in the supply chain

Horizontal: Firms merge with competitors

Conglomerate: Firms merge with firms that produce unrelated goods



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As government seeks to enforce antitrust laws, it often faces the challenge in defining the relevant market. The broader the market is defined, the lower the level of market concentration. “When Coca-Cola Co. sought to buy Dr Pepper in the mid-1980s, its experts argued in court that their market should include not just soft drinks but all potable liquids sold in North America, including water. The approach was dubbed the ‘Lake Erie defense.’” (Sirius-XM’s Fate Hinges on Definitions; If Satellite Radio Is Part Of a Broader Market, Deal May Pass Muster, Amy Schatz and John R. Wilke. Wall Street Journal. (Eastern edition). New York, N.Y.: Feb 21, 2007. pg. B.4).

Although the concentration ratio and HHI are useful measures, they fail to account for market concentration in local markets and foreign competition. Nationally, the HHI for readymix concrete manufacturing is 63.1; however, locally the market is often characterized as a monopoly or oligopoly with only few firms.

When the Antitrust Division of the Department of Justice analyzes a horizontal merger, they analyze all of the local markets that would be impacted by the merger. They calculate the HHI for the markets, and see in each market if there are competitive concerns. They have issued guidelines in helping them understand the impact of horizontal mergers on competition. The graphic below shows the 2010 merger guidelines using HHI. The guidelines from the Department of Justice focuses on horizontal mergers. Vertical mergers can also increase the market power of a firm, but are not as closely scrutinized as horizontal mergers.

Department of Justice (DOJ) Horizontal Merger HHI Guidelines

The graphic below shows the United States Department of Justice how changes of HHI should be handled in a horizontal merger in unconcentrated, moderately concentrated, and highly concentrated markets. Source: <http://www.justice.gov/atr/public/guidelines/hmg-2010.html>

Horizontal Mergers and Changes in the HHI

Small Change in Concentration: Mergers involving an increase in the HHI of less than 100 points are unlikely to have adverse competitive effects and ordinarily require no further analysis.

Unconcentrated Markets (HHI below 1500): Mergers resulting in unconcentrated markets are unlikely to have adverse competitive effects and ordinarily require no further analysis.

Moderately Concentrated Markets (HHI between 1500 and 2500): Mergers resulting in moderately concentrated markets that involve an increase in the HHI of more than 100 points potentially raise significant competitive concerns and often warrant scrutiny.

Highly Concentrated Markets (HHI above 2500): Mergers resulting in highly concentrated markets that involve an increase in the HHI of between 100 points and 200 points potentially raise significant competitive concerns and often warrant scrutiny. Mergers resulting in highly concentrated markets that involve an increase in the HHI of more than 200 points will be presumed to be likely to enhance market power. The presumption may be rebutted by persuasive evidence showing that the merger is unlikely to enhance market power.

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Ponder and Prove - Section 5 - Antitrust Policy and Mergers

Section 5 Questions

Instructions: Click on the button that represents the correct answer. After you select an answer, click on the 'Grade My Answer' button.

Question 1 Question 2 Question 3 Question 4

If there are 5 firms in a market, and the second and third firms want to merge and the HHI only increases by 50, what will the Department of Justice do?

- Deny the merger after review
- Allow the merger without further review
- Allow the merger with review
- Deny the merger with no review

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Section 6: Pricing Strategies

Law of One Price

As discussed before, in an efficient market where all goods are identical, the **law of one price** would indicate there should be one price for the commodity if transaction costs were zero. In other words, if a commodity such as wheat could be moved for no cost from one place to another, we would expect there to be one overall price emerge. Since transactions costs are positive, the difference that we would expect to see in the price of commodity would be based on the supply and demand of the commodity in each area and the cost of shipping the commodity. In perfect competition, we assume there is **perfect information**, in other words, we know exactly what price wheat is being sold for everywhere. If wheat is selling for a higher price in a neighboring town such that a farmer could increase his profits by taking his wheat there, the supply of wheat in that town would increase lowering the price and the price of wheat in the farmer's town would decrease driving the price to be same in the two towns except for the transaction costs.

Reasons Why Prices Vary

Most goods are not sold in perfectly competitive markets. As discussed in previous sections of this lesson, prices for goods such as hotel rooms and beef may vary due to actual or perceived differences. Monopolistically competitive firms seek to differentiate their products enough from their competition to charge a different price. Differentiation can lead to different prices for similar goods. Also lack of information can lead to different prices. The type of consumers can influence how firms price their goods. This will be discussed later in this section and in Section 4.

"High-Lo" Pricing and "Every-day Low Prices"

Two different stores sell identical products, but charge different prices for the same good. This could be an attempt by the different firms to attract different consumers. In **"High-Lo" pricing** a firm lowers the prices of certain goods for a period of time. The firm typically lowers the price on goods that will attract consumers into the store. At times these goods are loss leaders or the goods are priced below cost. Firms will lose money on a small group of goods to try and attract consumers to the store. When the consumer shops in the store, the firm is counting on the consumer buying some other goods that are not on sale. These "high" priced goods are usually marked up above the wholesale price. In this way, the firm will lose some money on some items, but they will make it back up on the higher priced items. Example firms that pursue this strategy are Broliums, Albertsons, and Macy's.

When firms charge **"Every-day Low Prices"**, a firm's goods will be kept at a price slightly above the wholesale cost, and they will seldom have sales. Therefore, the prices seldom change, and the firm usually says their goods are always on "sale." This allows consumers to know a good estimate of where the price will be from week to week. Examples of these firms are Walmart, Lowes, and J.C. Penny.

The reasons why firms engage in different types of pricing is because they believe their consumers have different preferences and costs. For example, a consumer lives close to a store that engages in "high-lo" pricing, and the store that engages in "every-day low prices" is further away. This particular consumer values her time. Therefore, she will just shop at the closest store. Her time is so valuable that she would rather pay a higher average price for groceries than go searching for the lowest price goods. On the other hand, her next door neighbor values finding the lowest price. The neighbor will shop at every store to look for the best deals. This type of consumer is a "cherry picker." The neighbor will end up paying a lower average price, but has spent more time and money in finding the best deal. This helps us understand why firms engage in different pricing strategies. They are usually trying to target a specific type of consumer.

Ponder and Prove - Section 6 - Pricing Strategies

Section 6 Questions +

Instructions: Click on the button that represents the correct answer. After you select an answer, click on the 'Grade My Answer' button.

Question 1
Question 2
Question 3
Question 4

What is the law of one price?

- There are be multiple prices for a good, but there is only one true market price
- There should only be one price for ALL goods sold in an economy
- There is one price for a good, and transaction costs do not have to be zero
- There is one price for a good if transaction costs are zero

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Section 7: Price Discrimination

Price Discrimination

If instead of charging each consumer the same price, a firm could **price discriminate**, which means charging different prices to different consumers based upon their willingness to pay, how would they behave? What would be required for a firm to be able to price discriminate?

Certain conditions must hold in order for a firm to charge different prices for the same product. First, a firm must be able to set the price (i.e. it must have some market power). Second, the firm must be able to segment the market into groups based upon either their willingness to pay or their different elasticities of demand. Third, the firm must be able to prevent resale of the item from one market segment to another.

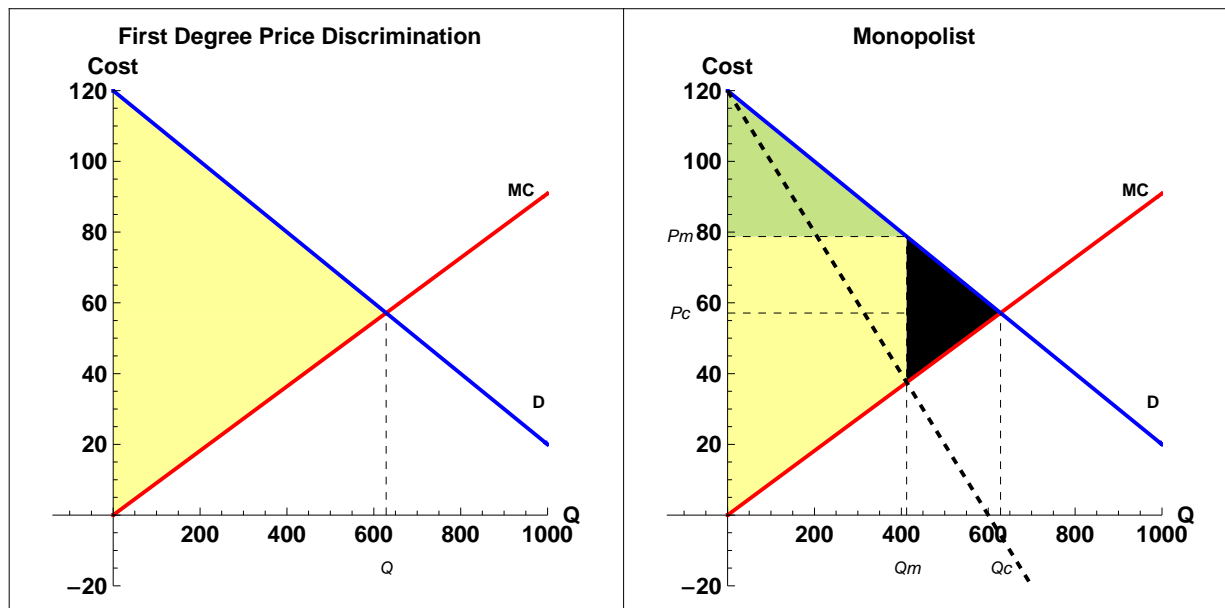
These may seem like difficult or unlikely conditions. But in fact, price discrimination can be found in a variety of sectors including automobile sales, movie and airline tickets, utilities and phone rates. Even student discounts are a form of price discrimination.

First Degree or Perfect Price Discrimination

There are three different degrees or levels of price discrimination. These levels are related to how well the monopolist can identify individual willingness to pay and segment the market accordingly. First, we will discuss first degree or perfect price discrimination.

First Degree Price Discrimination

The two graphs compare situations where a monopolist is able to undertake first degree price discrimination (graph on the left), and where a monopolist behaves like a monopolist. The upper green area in both graphs is the consumer surplus. The yellow area is producer surplus. In the monopolist graph, there is deadweight loss (black area). A firm that perfectly executes first degree price discrimination is able to charge each consumer their max willingness to pay or every price that makes up the demand curve. This is why all of the shaded area is yellow. The firm extracts all of the consumer surplus and converts it to consumer surplus. Notice that there is no deadweight loss in first degree price discrimination.



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First degree or perfect price discrimination is when a firm charges each consumer their maximum willingness to pay, which is reflected by the demand curve (see graphic above). As in other cases, it is optimal for the firm to choose its output at the point where $MR=MC$. But if a firm can charge each person his/her maximum willingness to pay, then $MR = \text{price}$ as found on the demand curve. So it would be willing to sell its products up to the point where the MC curve crosses the demand curve, i.e. where $MC = \text{price} = MR$. This means that not only will the firm be willing to sell more units than it did as a single priced monopolist, but it will also be allocatively efficient because price equals marginal cost at the last unit. However, each consumer is now paying her maximum willingness to pay, and therefore receives no consumer surplus. So although the output level is allocatively efficient and the same as perfect competition would obtain, the distribution of economic surplus is quite different – the firm extracts all of the surplus!

Since a firm may be unable to assess each consumers maximum willingness-to-pay and the cost of gathering that information may be prohibitive, first degree price discrimination is often difficult /impossible to implement. The law profession is perhaps the best example of perfect price discrimination – their offer for a “free consultation” is designed to obtain information on willingness and ability to pay. Some other examples of attempts at perfect price discrimination would be a car salesman who tries to assess each consumer’s maximum willingness-to-pay and charges accordingly. Auctions also try to reach each consumer’s maximum price.

Second Degree Price Discrimination

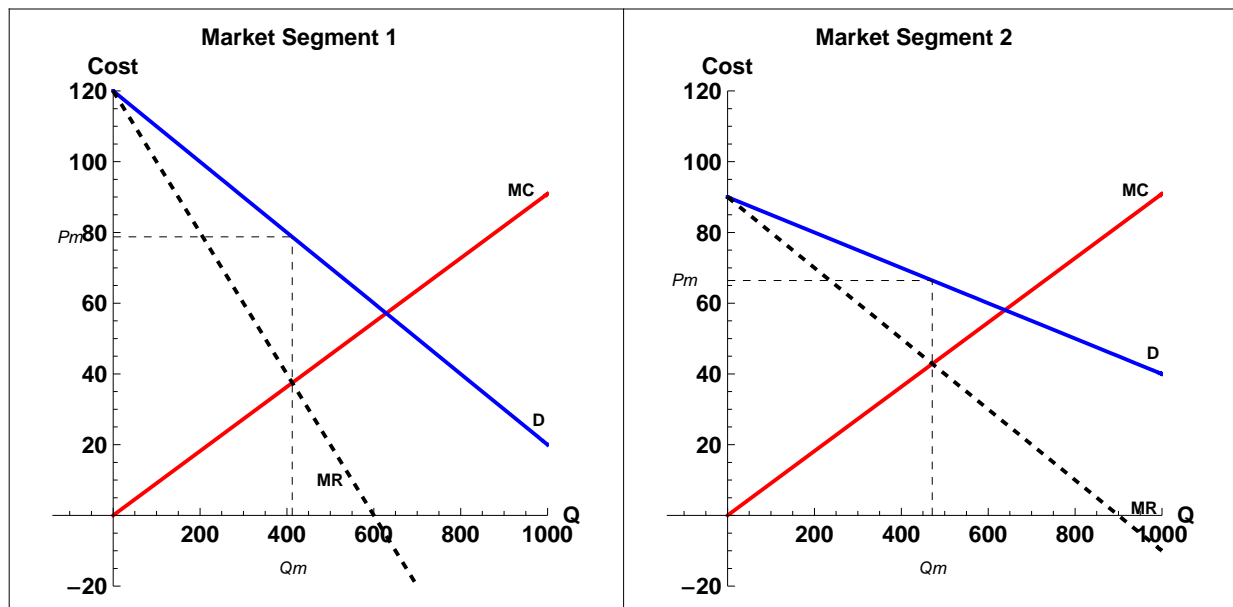
When a monopolist cannot perfectly identify and segment consumers based upon individual willingness to pay, there still may be a way to extract some (but less) consumer surplus to increase profits. Second degree price discrimination and third degree price discrimination (discussed later) might be employed under the right conditions. **Second**

degree price discrimination is implemented when the monopolist knows that there are two or more groups of consumers with different willingness to pay, but she cannot identify which consumers belong to each group. If we make things simple and assume that there are two groups, a high demand group (H) and a low demand group (L), then ideally, she'd like to charge a high price to the H group and a low price to the L group. But if she does this, consumers in the H group will claim to be from the L group and everyone will get the low price. Second degree price discrimination or block pricing charges different prices to different consumer groups based on the quantity consumed. That is, the firm knows that the H consumers are willing to purchase a higher quantity than the L consumers at the same price. Therefore, it will set a price for the L group that extracts all of their consumer surplus for a small quantity level (say \$2 for a package of 4 rolls of toilet paper), but this would leave H consumers with some consumer surplus because they have a higher demand. To get at least some of that consumer surplus from them, the monopolist sets a higher price for a larger package that targets H consumers (say \$3.50 for a package of 8 rolls of toilet paper). The volume discount encourages the H consumers to buy the larger package and also allows the firm to extract more of their consumer surplus, because they get them to buy a larger quantity (otherwise they would only buy the 4 roll package). Unlike perfect price discrimination that extracts all of the consumer surplus, in second degree price discrimination, the high demand group still keeps some.

Third Degree Price Discrimination

Third Degree Price Discrimination

The graph shows third-degree price discrimination. In this example, a firm faces two types of consumers. In the graph on the left (Market Segment 1), the consumers have more inelastic demand than the consumers in Market Segment 2. This allows the firm to charge a higher price to the consumers with the more inelastic demand. The other set of consumers with the more elastic demand are charged a lower price than the consumers in Market Segment 1. The firm has to be able to identify different consumer groups with different demand. If the firm is able to do this, then they can charge different prices to both groups.



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Third degree price discrimination may be employed when the firm cannot identify individual demands, but can identify groups of consumers that have similar demands and can segment them based upon some easily identifiable characteristic such as age, time of purchase, residency, or location. Then the monopolist charges different prices to the different groups based on their relative elasticities of demand. The more inelastic the demand, the higher the price. This type of price discrimination is most common. Being able to segment the market, into groups that have

different elasticities, allows the firm to charge different prices and increase overall profitability. Recall that the firm must be able to prevent the resale of the good for price discrimination to work. This is why we often see third degree price discrimination in the service sector, where the nature of the product or service makes the resale of the good to another segment of the market difficult or impossible. Here are a few examples of third degree price discrimination.

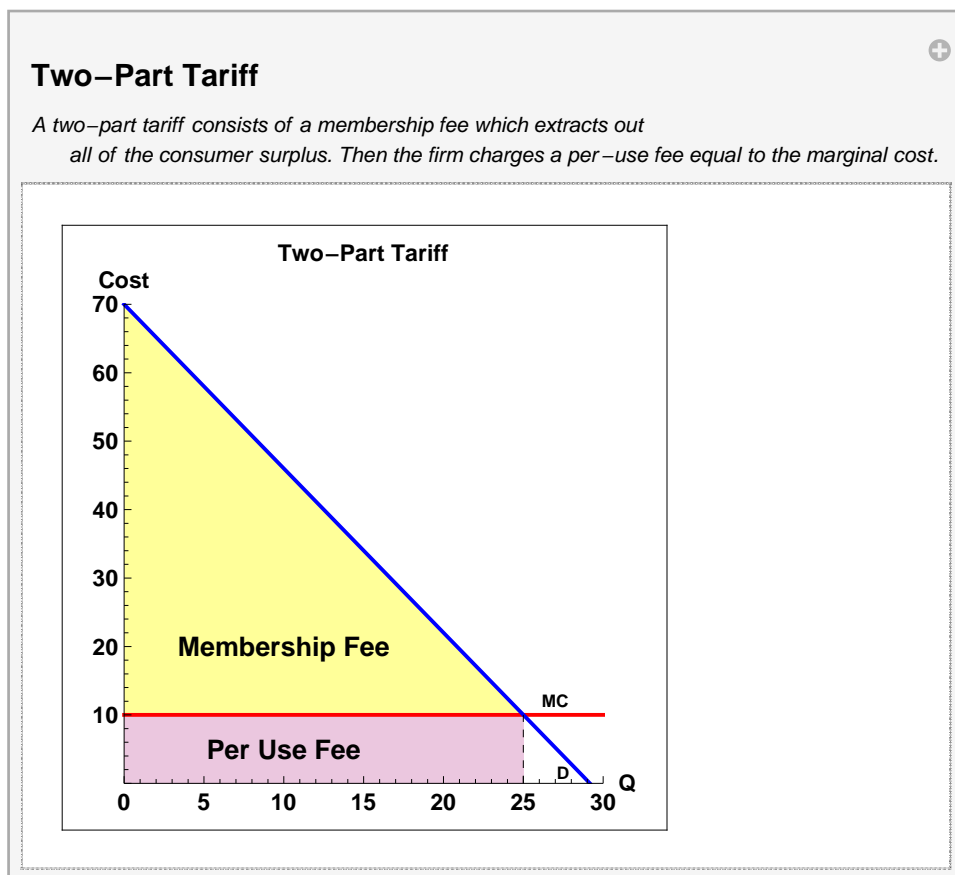
Movie theaters often charge different prices based on the time of consumption and age. The elasticity of demand for those attending a matinee is more elastic than those during primetime, so a lower price is charged for the matinee. Young children and senior citizens have different elasticities of demand than young adults, which allow the theaters to price accordingly.

Airlines also price discriminate. Those purchasing tickets at least two weeks in advance typically get a lower price than individuals purchasing tickets only a day or two before the flight. The distance and destination of the flight also make a difference since there are fewer substitutes if one is flying to say Hawaii verses another city within the state.

Gas stations within the same city often price discriminate charging a higher price at stations located close to the interstate or on the main roads.

Some theme parks, such as Disneyland and Disney World, offer residents of California and Florida different prices than non-state residents.

Two-Part Tariff



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There are a number of pricing strategies that do not seem like price discrimination, but in fact are! One is worthy of note: the two-part tariff. The **two-part tariff** charges individuals an upfront membership fee then also charges them a per use fee. Under the right conditions, the two-part tariff makes perfect price discrimination possible. For example, some golf courses and health clubs charge an annual membership fee in addition to the per use fee for each round

of golf or workout. If the marginal cost of providing a round of golf is ten dollars, then the golf club charges a ten dollar per use fee and the golfer decides to play 25 rounds of golf per year. If there was no membership fee the area below the demand curve and above the price would be consumer surplus, however, by charging a membership fee equal to the area of consumer surplus (recall the area of a triangle is $.5 * \text{base} * \text{height}$ or $.5 * 25 * 60 = \$750$), the golf club is able to convert the consumer surplus into additional revenue for the firm (see graphic above). This is of course, first degree or perfect price discrimination if the membership fee differs by consumer based upon willingness to pay. Alternatively, if the firm can't identify individual demands, but knows the demands for different groups, it could still use two-part tariffs to obtain the second degree price discrimination outcome. Either way, the firm extracts some of the consumer surplus as additional profits.

Another example of a two-part tariff would be a cell phone company that charges a monthly fee in addition to a per minute charge. Although other pricing strategies exist, you should be able to understand the incentive for why firms would want to price discriminate.

Ponder and Prove - Section 7 - Price Discrimination

Section 7 Questions +

Instructions: Click on the button that represents the correct answer. After you select an answer, click on the 'Grade My Answer' button.

Question 1
Question 2
Question 3
Question 4

What is price discrimination?

- Charging a constant price to everyone
- Charging a different price to different customers based on their willingness to pay
- Charging a different price every day to everyone
- Charging a different price to the same customers

Grade My Answer
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Summary

Key Terms

Advertise: monopolies typically advertise to increase their market share or to improve their public relations

Allocatively Efficient: producing where price equals the marginal cost

Average Cost Pricing: producing where the price equals the average total cost

Barriers to Entry: limitations that discourage/disable new firms from entering a market, such as: legal barriers, control of necessary inputs, network externalities, economies of scale, and strategic behavior

Celler-Kefauver Act of 1950: This act closed loopholes in the Clayton Act by restricting companies from the purchase of the physical assets of competitors. Vertical and conglomerate mergers could be blocked under this act if

they could reduced competition.

Clayton Act of 1914: It strengthened the Sherman Antitrust Act, making illegal price discrimination of “commodities of like grade and quality” when it is reduces competition and is not justified by cost differences.

Conglomerate Mergers: This type of merger occurs when the merging firms produce unrelated products, such as a flour mill purchasing a computer company.

Control of Necessary Inputs: a barrier to entry where firms are able to control the market by controlling the essential inputs or resources

Economically Efficient Price: the point where the price equals the marginal cost, this makes the industry allocatively efficient

Economies of Scale: the condition where firms experience decreasing average total costs as they increase output

Every-day Low Prices: A pricing strategy where a firm’s goods will be kept at a price slightly above the wholesale cost, and they will seldom have sales.

Fair Return Pricing: (See Average Cost Pricing)

Federal Trade Commission Act of 1914: This act empowered the Federal Trade Commission (FTC) to prevent or stop unfair methods of competition and unfair or deceptive acts in or affecting commerce.

First Degree Price Discrimination: This type of price discrimination is when a firm charges each consumer their maximum willingness to pay, which is reflected by the demand curve.

Four-firm Concentration Ratios: The sum of the market share of the four largest firms. Calculated by taking total sales in the four largest firms in an industry and dividing by total industry sales.

Herfindahl – Hirschman Index (HHI): Gives a number that indicates the concentration of an industry. Found by taking the percent of the market share of each firm and squaring each market share for each firm and them together.

High-Lo Pricing: A pricing strategy where a firm lowers the prices of certain goods for a period of time. The firm typically lowers the price on goods that will attract consumers into the store. The other goods are marked above the wholesale price.

Horizontal Mergers: A merger or consolidation of two or more producers of the same product or service.

Law of One Price: In an efficient market where all goods are identical, the law of one price would indicate there should be one price for the commodity if transaction costs were zero

Legal Barriers: barriers such patents, copy writes, and licenses that discourage new entrants in a market by giving exclusive rights to certain existing firms

Marginal Revenue: the additional revenue created by selling an additional unit of output

Marginal Revenue Curve: represents the marginal revenue for a particular firm at different levels of price and quantity

Market Concentration: The amount of market power that firms have in a market. Market concentration is typically higher with fewer firms and lower with many firms

Market Power: the power to raise the price above the marginal cost

Monopoly: one firm that produces a unique product with no close substitutes

Monopsony: one firm who is the only buyer in the market

Natural Monopoly: a single firm that is able to meet the industry demand at a lower per unit cost than two or more firms would be able to

Network Externalities: when the value of having or using an item increases as others use the item

Perfect Information: In perfect competition, we assume there is perfect information, in other words, we know exactly what price wheat is being sold for everywhere.

Perfect Price Discrimination: See “First Degree Price Discrimination”

Performance: How a market or firm performs

Price Discrimination: Charging different prices to different consumers based upon their willingness to pay for the same good.

Productive Efficiency: when a firm is producing at the lowest point of the average total cost curve

Profit Maximization: a firm maximizes its profits by produces at the point where marginal cost equals marginal revenue

Profits: total economic costs minus total revenue

Regulation: government legislation that can limit a firm’s abilities in order to solve a problem

Rent Seeking: when a monopoly spends time and/or money on activities that increase its market power rather than

the production of goods and services

Second Degree Price Discrimination: Price discrimination where the monopolist knows that there are two or more groups of consumers with different willingness to pay, but she cannot identify which consumers belong to each group. So she sets up different “buckets” or product bundles that consumer select.

Sherman Antitrust Act (1890): This act was passed to reduce the power of firms that controlled a large percentage of a market. It made it illegal to participate in activities that result in the “restraint [of] trade or commerce”, such as price fixing, and activities which monopolize or attempt to create monopolies.

Single Price Monopolist: when a monopolist must sell their goods at one price; it cannot charge different prices to different customers

Socially Optimum Price: when the industry is producing where the price equals marginal cost

Strategic Behavior: when a firm makes particular price and production decisions in order to discourage potential competitors from entering the market

Structure: The number of firms in the industry and the barriers to entry

Third Degree Price Discrimination: Price discrimination where a firm cannot identify individual demands, but can identify groups of consumers that have similar demands and can segment them based upon some easily identifiable characteristic such as age, time of purchase, residency, or location.

Two-part Tariff: A situation where a firm charges individuals an upfront membership fee then also charges them a per use fee.

Vertical Mergers: These mergers occur when firms at different stages of production of a product merge.

X – inefficiency: when costs rise due to the lack of competition and/or the actions taken to keep potential competitors from entering the market

Objectives

Section 1

1. Describe the behavior of monopolists in pricing and output decision.
2. Describe the characteristics of monopolists.
3. Explain the relationship between the demand curve for the monopolist's product and its marginal revenue curve.
4. Explain the relationship between price and marginal revenue for a single price monopolist.
5. Explain the optimal pricing and production decisions of a single price monopolist and identify the resulting profits.
6. Compare the efficiency of monopolists to pure competition.
7. Identify the consumer and producer surplus under a monopolist.
8. Identify the dead-weight loss of a single price monopolist.
9. Explain rent seeking behavior.
10. Explain why x-inefficiencies exist under a monopolist.

Section 2

1. Explain the conditions leading to a monopolists including: entry blocked by government action (patent or copyright, public franchise, licensing), control of a key resource, network externalities, natural monopoly (economies of scale).

Section 3

1. Explain government regulation of monopolies.
2. Explain the implications of a regulator following the marginal cost pricing rule for efficiency and the impact on monopolist's profit.
3. Explain the implications of a regulator following the average cost pricing rule for efficiency and the impact on monopolist's profit.
4. If an industry has a natural monopoly, explain how a government regulator could respond and the resulting impact on the market.

Section 4

1. Explain how market concentration is measured and impacts firm behavior.
2. Compute the Four Firm Concentration Ratio of an industry
3. Compute the Herfindahl Index of an industry.

4. Discuss how the type of product and the market definition influence these measures.

Section 5

1. Discuss how the government uses the above measures to determine if firms should be allowed to merge.
2. Explain the difference between horizontal, vertical, and conglomerate mergers.
3. Explain the legal cartel theory and why firms would want to be regulated.
4. Explain the potential shortcomings of government intervention and regulation.
5. Identify and discuss the major antitrust legislation in the United States.

Section 6:

1. Explain the Law of One Price
2. Explain different pricing strategies such as frequent sales vs. "always low prices"

Section 7:

1. Explain the behavior of price discriminating monopolists.
2. Explain why perfect price discrimination yields the same output as in pure competition, but with different amounts of consumer and producer surplus.
3. Explain the behavior of monopolists using second degree price discrimination.
4. Explain the behavior of monopolists using third degree price discrimination.
5. Explain the purpose of a two part tariff.

