

1. What are the major characteristics of monopoly?

Ans: A monopolist is the only seller of a product for which there are no close substitutes. To maintain this position as the sole seller of a unique product, there must be barriers to entry. Also, the monopolist has “price making” power because the monopolist *is* the industry and supplies the entire market for the product. Given a down-sloping demand for the product, the monopolist must decrease price to increase quantity sold. Finally, advertising under monopoly often depends on the nature of the product and whether the monopolist feels there is a need to increase demand for the product.

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Learning Objectives: 8.1

2. What are the major barriers to entry that explain the existence of monopoly?

Ans: There are at least four types of entry barriers that create the conditions for monopoly. First, economies of scale means that in some industries large-scale production is necessary to achieve the most efficient level of production. In this case, the long-run average cost curve will tend to decline over a wide range of output for a product. Either a few firms, or in the extreme, one firm, will be necessary to provide market demand in the most efficient way. In the extreme, there are natural monopolies that arise when competition between firms is simply inefficient or impractical. The best examples of natural monopolies are public utilities, which are given the exclusive right by government to provide the utility services. Second, the government can restrict entry into a market by granting patents and licenses. A patent gives exclusive production rights to a firm for twenty years. Licenses limit entry into a business or an occupation. Third, pure monopoly arises when a firm has complete ownership of an essential resource, such as aluminum or copper. Fourth, there are pricing or strategic barriers to entry.

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3. What is the relationship between economies of scale and a natural monopoly?

Ans: In those extreme cases where there are extensive economies of scale across the full range of potential output for market demand, it may be most economical for only one firm to supply the entire market. In this case one firm, rather than two or more firms, would have declining average costs across the entire range of market demand and be the lowest cost producer. The single firm would be characterized as a natural monopoly.

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4. In what ways, if any, do the demand schedules for a purely competitive firm and a monopolist differ? What significance does this have for the price-output behaviour of each?

Ans: The perfectly competitive firm faces a horizontal demand schedule (perfectly elastic demand) that means it has no control over the price of its product, but must accept the market price and make its output decisions accordingly.

The monopolist faces the downward-sloping market demand curve since it dominates the market. Therefore, the monopoly firm must make simultaneous decisions about both the price and output levels in determining the profit-maximizing level of output. Unless it is able to be perfectly discriminating, the monopolist must realize that the marginal revenue is different from the price at each output level. Because the profit-maximizing monopolist is trying to equate marginal revenue (rather than price) with marginal cost, the firm has to estimate the impact that any change in output will have on its existing price and therefore, on marginal revenue. Once marginal revenue has been equated with marginal cost, the monopolist will produce that level of output, and charge the price (above marginal revenue) associated with that output.

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Learning Objectives: 8.1

5. Why is marginal revenue less than price for every level of output except the first?

Ans: The monopolist is the industry, so its demand curve slopes downward. To increase sales, the monopolist must lower price. The price decreases apply not to the additional quantity sold, but also to all other units of output which otherwise would have been sold at a higher price. As each extra unit of output is sold, it will contribute to total revenue its price less the sum of the price decreases that apply to all prior units of output sold.

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6. The demand for a monopoly is $P = 80 - 0.2Q_D$. At what output level would the monopoly maximize total revenues? What is the firm's marginal revenue?

Ans: A monopoly maximizes total revenues where demand is unit elastic. For a straight-line demand curve, this occurs at its middle. When demand is $P = 80 - 0.2Q_D$, total revenues are maximized at an output of 200 units. When total revenues are maximized, marginal revenue is zero. Therefore, the monopolist's marginal revenue curve, which begins at the same vertical intercept as its demand curve, must pass through the point \$0 and 200 units. $MR = 80 - 0.4Q_D$.

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Learning Objectives: 8.1

7. How does price elasticity affect the price-quantity combination and segment of the demand curve that the monopolist would prefer for price and output?

Ans: The profit-maximizing monopolist will avoid price-quantity combinations in the inelastic portion of the demand curve and prefer some price-quantity combination in the elastic portion. In the inelastic range of the demand curve, marginal revenue is negative. In this range, a drop in price will result in a drop in total revenue. It will also increase total costs, and thus decrease profits. The opposite results in the case of the elastic portion of the demand curve.

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Learning Objectives: 8.1

8. Can a monopoly that is producing in the inelastic range of demand be maximizing profit?

Ans: If a monopoly is producing in the inelastic range of demand, it can increase its total revenues by reducing output and charging a higher price. At the same time, as it is reducing output, it is also reducing its total costs. Therefore, the firm can make a larger profit by producing a different level of output.

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9. Evaluate. If a monopoly is maximizing profit, it must also be maximizing total revenues.

Ans: Profit maximization occurs when $MR = MC$. Total revenues are maximized when $MR = 0$ or at the level of output where demand is unit elastic. Therefore, generally, when a firm is maximizing profit, it is not maximizing total revenue. The only exception to this is when $MC = 0$.

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Learning Objectives: 8.1-8.2

10. A monopolist determines that at the current level of output the marginal cost of production is \$2.00, average variable costs are \$2.75, and average total costs are \$2.95. The marginal revenue is \$2.75. What would you recommend that the monopolist do to maximize profits?

Ans: Marginal revenue is greater than marginal cost at the current level of output. The monopolist should increase output to where marginal costs equal marginal revenue.

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Learning Objectives: 8.2

11. A monopolist sells output for \$4.00 per unit at the current level of production. At this level of output, the marginal cost is \$3.00, average variable costs are \$3.75, and average total costs are \$4.25. The marginal revenue is \$3.00. What is the short-run condition for the monopolist and what output changes would you recommend?

Ans: The monopolist should make no change in the level of output because the marginal costs equal the marginal revenue at the current level of output. However, the monopolist is experiencing short-run losses because average total cost is greater than the price (average revenue). In the long run, the monopolist may want to try to shift the demand curve so that price is greater than average total cost at the current level of production. The monopolist may also want to find ways to reduce average costs.

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Learning Objectives: 8.2

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12. The demand schedule for the product produced by a monopolist is given in the table below. Complete the table by computing total revenue and marginal revenue.

<u>Quantity demanded</u>	<u>Price</u>	<u>Total revenue</u>	<u>Marginal Revenue</u>
1	\$325	\$_____	\$_____
2	300	_____	_____
3	275	_____	_____
4	250	_____	_____
5	225	_____	_____
6	200	_____	_____
7	175	_____	_____
8	150	_____	_____
9	125	_____	_____
10	100	_____	_____
11	75	_____	_____
12	50	_____	_____
13	25	_____	_____
14	0	_____	_____

(a) What do the data in the table indicate about the relationship between total revenue and marginal revenue? Explain.

(b) What do the data in the table indicate about the elasticity of demand?

Ans:

<u>Quantity Demanded</u>	<u>Price</u>	<u>Total revenue</u>	<u>Marginal revenue</u>
1	\$325	\$325	\$325
2	300	600	275
3	275	825	225
4	250	1,000	175
5	225	1,125	125
6	200	1,200	75
7	175	1,225	25
8	150	1,200	-25
9	125	1,125	-75
10	100	1,000	-125
11	75	825	-175
12	50	600	-225
13	25	325	-275
14	0	0	-325

(a) As total revenue rises to a maximum, marginal revenue falls toward zero. As total revenue falls from its maximum, marginal revenue becomes negative.

(b) Demand is elastic as price falls from \$325 to \$175 because total revenue rises.
Demand is inelastic as price falls from \$175 to \$0 because total revenue also falls.

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13. The following table contains demand and cost data for a monopolist. Complete the table by filling in the columns for total revenue, marginal revenue, and marginal cost. Answer these three questions: (a) What output will the monopolist produce? (b) What price will the monopolist charge? (c) What total profit will the monopolist receive at the profit-maximizing level of output?

<u>Quantity</u>	<u>Price</u>	<u>Total revenue</u>	<u>Marginal revenue</u>	<u>Total cost</u>	<u>Marginal cost</u>
0	\$34	\$_____		\$20	
1	32	_____	\$_____	36	\$_____
2	30	_____	_____	46	_____
3	28	_____	_____	50	_____
4	26	_____	_____	54	_____
5	24	_____	_____	56	_____
6	22	_____	_____	64	_____
7	20	_____	_____	80	_____
8	18	_____	_____	100	_____
9	16	_____	_____	128	_____
10	14	_____	_____	160	_____

Ans:

<u>Quantity</u>	<u>Price</u>	<u>Total revenue</u>	<u>Marginal revenue</u>	<u>Total cost</u>	<u>Marginal cost</u>
0	\$34	\$0		\$20	
1	32	32	\$32	36	\$16
2	30	60	28	46	10
3	28	84	24	50	4
4	26	104	20	54	4
5	24	120	16	56	2
6	22	132	12	64	8
7	20	140	8	80	16
8	18	144	4	100	20
9	16	144	0	128	28
10	14	140	-4	160	32

- (a) The monopolist will produce 6 units of output because MR is closest to equality with MC without exceeding MC.
 (b) The monopolist will charge a price of \$22.
 (c) The monopolist will make a profit of \$68 (\$132 – 64).

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Learning Objectives: 8.2

14. Why is there a supply curve in perfect competition but no supply curve in monopoly?

Ans: A purely competitive firm has a supply curve that is the portion of the marginal cost curve above average variable cost. Under perfect competition, price equals marginal revenue. Output is determined where price (marginal revenue) equals marginal cost. As the price rises above minimum average variable cost, output will increase. In this case, there is a unique relationship between price and quantity supplied.

The monopolist has no supply curve because there is no unique relationship between price and output (quantity supplied). Price and output will change when demand and marginal revenue change. Under monopoly, price does not equal marginal revenue as is the case in pure competition. The monopolist sets output where marginal revenue equals marginal cost, but there can be different prices associated with this level of output because of changes in demand and marginal revenue.

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Learning Objectives: 8.2

15. Why would a monopoly that can lower its average total cost by producing more output choose not to do so?

Ans: Although the monopolist can lower its average total cost by producing more output, to sell that output, it would have to lower the price on all units. The sale of additional units will lead to such small increases in total revenues or perhaps decreases in total revenues that economic profits will fall.

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Learning Objectives: 8.2

16. What conditions must exist in order for a monopolist to achieve economic profits? Is the profitability of a firm's operation a good index of the degree of monopoly power it possesses?

Ans: To be profitable the monopolist must produce a price-quantity combination in the elastic segment of its demand curve, and this must also be a position where the total cost does not exceed the total revenue. Monopolists that face high costs and weak demand may experience losses in the short-run.

Profitability is a good index of the degree of monopoly power, but monopoly power may exist without profitability in the short-run. However, monopolies exhibiting a high economic profit probably do have a high degree of monopoly power. They are not subject to the threat of competition from new entrants nor from substitute products. High profits would likely not exist if the firm feared competition. It would either keep its profits down so the industry would not be as attractive to potential competitors, or it would incur additional costs in trying to retain the barriers that gave it the monopoly power.

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Learning Objectives: 8.2

17. Do you agree or disagree with the statement that: "A monopolist always charges the highest possible price." Explain.

Ans: Disagree. The pure monopolist has a down-sloping demand curve for the product. If the monopolist charged the highest price, the monopolist would only sell one unit or no units of the product. The monopolist, however, is concerned with maximizing profits, not with charging the highest price. A lower price would produce more revenue relative to cost. The monopolist will charge the price where the additional revenue from the sale of another unit just equals the additional cost of the additional units, or where $MR = MC$. The monopolist will set price somewhere in the elastic portion of the demand curve where marginal revenue is positive but less than price.

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Learning Objectives: 8.2

18. "Monopoly guarantees economic profits." Discuss whether this is a valid statement.

Ans: The statement is not valid. A monopolist has a greater likelihood of earning economic profits, but the monopoly position does not guarantee profits. There can be weak demand for a monopoly product that results in the monopolist price being less than average total costs at the profit-maximizing level of output. This situation results in economic losses for the monopolist.

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Learning Objectives: 8.2

19. How does monopoly compare with perfect competition in terms of price, output, and efficiency?

Ans: Given the same costs of production, a monopolist will charge a higher price and produce less output than a perfectly competitive firm or industry. The result in monopoly is an under-allocation of resources to the production of the product. Society would prefer more output.

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Learning Objectives: 8.3

20. Explain how monopoly causes an inefficient allocation of resources when the competitive firm does not, even when both seek to maximize profits.

Ans: Both monopolies and competitive firms will maximize profits where marginal revenue equals marginal cost. The difference is that in a competitive environment, marginal revenue is the same as the price. Therefore, price is equal to marginal cost and in the long run this will be at the minimum average cost level. This means that there are no economic profits, and there is allocative efficiency because consumers are paying a price equal to the marginal cost of the last product produced. Also, productive efficiency exists because $P = \text{minimum ATC}$.

However, the monopoly finds its marginal revenue is below the price it can obtain at each output level. This occurs because the monopolist faces a downsloping market demand curve, and to sell larger output, it must lower the price. Since the price is lowered on all units of output, the gain in total revenue is less than the price for each additional unit produced. That is, the marginal revenue is below the price. When a monopoly finds the output level where marginal revenue equals marginal cost, it then finds that it can sell that level of output at a price that exceeds the marginal revenue. Therefore, the consumer is paying a price that exceeds the marginal cost of production. This means allocative efficiency is not achieved. If the price were allowed to fall to the marginal cost, the consumer would purchase a greater quantity at a lower price. Therefore, the monopoly situation is not efficient from the economic point of view. Specifically, there is an underallocation of resources ($P > MC$). Also, production does not occur at minimum average total cost so productive efficiency is not realized. There is also the possibility that a lack of competitive pressure will cause the monopolist to be less efficient in its production methods (x-inefficiency), so monopoly may not be as efficient in the production sense as is the competitive firm.

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Learning Objectives: 8.3

21. How does monopoly result in income transfers?

Ans: Monopoly generally contributes to income inequality. The reason is that monopolists charge a higher price and produce less output than a purely competitive firm with the same costs. A monopolist can obtain economic profits over time. These profits come at the expense of consumers and become income for stockholders of the monopolistic firm. These stockholders are most likely from upper-income groups. Thus, income is transferred from a group with generally average income (consumers) to a high-income group (monopoly stockholders).

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Learning Objectives: 8.3

22. How does simultaneous consumption affect economies of scale?

Ans: Simultaneous (or non-rivalrous) consumption is a situation where a product can satisfy a large number of consumers at the same time. For example, once software is created for one customer the producer can provide it to another customer or to a million customers at essentially the same marginal cost. As the number of users increases, however, average total cost falls and the firm achieves greater economies of scale.

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Learning Objectives: 8.3

23. What are network effects? How do they contribute to economies of scale?

Ans: As the total number of users increases on a network such as the Internet there are increases in the value of Internet-related products for each user on the network. The benefits from products also push users to select standardized products so they can communicate more easily or complete business faster. The standardization can create economies of scale so that products can be produced at a lower average cost. These economies of scale can also create monopolies if one firm's product is a basic standard for the network. These firms, however, may not be natural monopolies because they achieve minimum efficient scale at less than the full size of the market.

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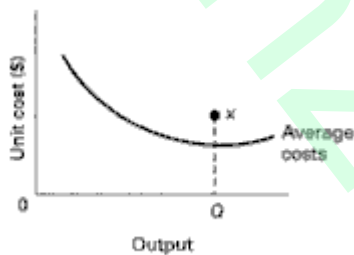
24. What is X-inefficiency? Why is it likely to occur in monopoly?

Ans: X-inefficiency is a situation where a firm's production costs are greater than the minimum possible costs. If a firm chooses the most efficient technology from existing technologies, then the firm should be able to achieve the minimum average total cost for each level of output. When the firm does not achieve this minimum there is X-inefficiency. X-inefficiency occurs because there are internal problems such as bad management by the firm. If the managers have other goals than cost minimization for the firm, then this divergence of goals can lead to X-inefficiency. Monopoly firms are more prone to X-inefficiency than purely competitive firms because they face no effective price or market pressure to reduce costs at each given level of output.

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Learning Objectives: 8.3

25. Draw a graph that illustrates X-inefficiency. Explain the concept of X-inefficiency using the graph.



Ans: The graph shows the unit costs of production as output increases. There are economies of scale that occur with large-scale production. With X-inefficiency, the monopolist produces a given level of output for a cost that is above the average or unit cost that is possible at that level of output (see point x on graph). The attainable average cost is reflected by the average cost curve, but bad management and “internal” problems for the firm cause costs to be higher than what is technologically attainable.

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Learning Objectives: 8.3

26. What is the relationship between rent-seeking expenditures and monopoly?

Ans: Monopolies have the potential to earn economic profits in the long run. Given this potential, firms with monopoly aspirations will go to great lengths to obtain or to protect a monopoly position. This effort may involve lobbying government officials, incurring substantial court costs in legal disputes, or public advertising to enhance the image of the firm. Thus monopolies engage in “rent-seeking” behaviour in an effort to transfer income or wealth (economic profits) to the firm at the expense of society or other parties (other firms and consumers). These rent-seeking expenditures only add to the cost of production for the monopolist and do not increase output.

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Learning Objectives: 8.3

27. What are three policy options for dealing with monopolies that are entrenched and inefficient?

Ans: First, government can file charges against the monopoly for engaging in anticompetitive behaviour under Canada's anti-combines laws. Second, government can regulate the monopoly. In this latter case, the monopoly firm is permitted to exist, but its price and output decisions are subject to public scrutiny through regulation. Third, the government may do nothing if the monopoly is short-lived.

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Learning Objectives: 8.3

28. Price discrimination is often used by businesses. Explain the conditions under which price discrimination is practiced and the economic consequences of price discrimination.

Ans: Three conditions make price discrimination possible. First, the seller must be a monopolist, or possess some degree of power to control the price of the product. Second, the seller must be able to segment the buyers of the product into different groups that reflect differing willingness to pay for the product. Third, the buyers who have the opportunity to purchase at a lower price cannot resell the product to the buyers who must purchase the product at a higher price.

The consequences of price discrimination are twofold. The seller practicing price discrimination will be able to increase profits because she will be able to extract more revenue from buyers, and given the same cost structure, will be able to make more profit. Also, the price discriminating seller will tend to produce more output than the non-price discriminating seller.

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Learning Objectives: 8.4

29. Explain the relationship between the price elasticity of demand and price discrimination. Give two examples.

Ans: Price discrimination is often used when there are different elasticities of demand among buyers of a product. For example, phone rates during a business day are higher than phone rates at night and on weekends because demand is relatively more inelastic during the day and relatively more elastic during the evenings and on weekends. As another example, movie theatres charge higher prices during the evening when the demand is relatively inelastic and charge lower prices during the day when demand is relatively more elastic.

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Learning Objectives: 8.4

30. What does a monopoly's marginal revenue curve look like if it practices perfect price discrimination?

Ans: When a monopoly uses perfect price discrimination, it charges each consumer the maximum price that the consumer is willing to pay. To sell additional units, it does not need to lower its price on all units sold but only on the additional units. Therefore, marginal revenue is equal to price and the monopoly's marginal revenue curve corresponds to the demand curve.

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Learning Objectives: 8.4

31. Assume that a monopolist is able to engage in perfect price discrimination and sell each unit of the product at a price equal to the maximum price the buyer of that unit of the product would be willing to pay. Complete the table below by computing total revenue and marginal revenue for the price discriminating monopolist.

<u>Quantity</u>	<u>Price</u>	<u>Total revenue</u>	<u>Marginal revenue</u>	<u>Total Cost</u>	<u>Marginal cost</u>
0	\$34	\$ _____		\$20	
1	32	_____	\$ _____	36	\$ _____
2	30	_____	_____	46	_____
3	28	_____	_____	50	_____
4	26	_____	_____	54	_____
5	24	_____	_____	56	_____
6	22	_____	_____	64	_____
7	20	_____	_____	80	_____
8	18	_____	_____	100	_____
9	16	_____	_____	128	_____
10	14	_____	_____	160	_____

- (a) What is the marginal revenue that the discriminating monopolist obtains from the sale of each additional unit?
- (b) How many units would be produced and what would be the total revenue for the perfectly discriminating monopolist? What would economic profits be?
- (c) Compare the economic effects of price discrimination to no price discrimination for the pure monopolist in terms of profits and the level of output.

Ans:

<u>Quantity</u>	<u>Price</u>	<u>Total revenue</u>	<u>Marginal revenue</u>	<u>Total cost</u>	<u>Marginal cost</u>
0	\$34	\$ 0		\$20	
1	32	32	\$32	36	\$16
2	30	62	30	46	10
3	28	90	28	50	4
4	26	116	26	54	4
5	24	140	24	56	2
6	22	162	22	64	8
7	20	182	20	80	16
8	18	200	18	100	20
9	16	216	16	128	28
10	14	230	14	160	32

- (a) The marginal revenue is equal to price.

(b) The discriminating monopolist would produce 7 units of output because MR is closest to equality with MC at that output level without exceeding MC. The price would be \$20 and the economic profit would be \$102 (\$182 – 80).

(c) The price discriminating monopolist will produce more output and obtain more profits than a monopolist that does not practice price discrimination.

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Learning Objectives: 8.4

32. What are the consequences of price discrimination for the producer, the consumer, and for society?

Ans: Price discrimination can yield additional profit for the pure monopolists. By segmenting the market, the monopolist can charge a higher price to those who are willing to pay more for a product. Total revenue and profits are increased as a consequence. A discriminating monopolist will also produce more output than a non-discriminating monopolist. When a discriminating monopolist lowers the price, the reduced price is only for the additional units sold and not for prior units sold. Total revenue can increase as output increases beyond what would be the case if there were no price discrimination and thus the firm will find it more profitable to increase output. For some consumers, the use of price discrimination makes available units that would otherwise not be available for purchase. From society's perspective, this increased output makes the pure monopolist less allocatively inefficient than would be the case if there were no price discrimination.

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Learning Objectives: 8.4

33. What regulation options does a government have to limit monopoly power in the case of a natural monopoly?

Ans: A natural monopoly is characterised by downward-sloping average total cost over the relevant market demand curve. Economies of scale clearly indicate that it is cheaper for one firm to operate in the industry rather than multiple firms, but an unregulated firm would earn monopoly profits. A government might choose to regulate the monopoly either by setting a maximum price such that $P=MC$ where the market demand curve intersects the firm's marginal cost curve. At this point, $P < ATC$ so the firm loses profits, suggesting that the firm will need some form of subsidy. Alternatively, the government could use fair-return pricing such that price is set where ATC intersects with market demand. At this point the firm earns zero profit. Either pricing regulation is difficult to implement.

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Learning Objectives: 8.5

34. What is the dilemma of regulation in the case of a regulated monopoly?

Ans: When price is set equal to marginal cost to achieve the most efficient allocation of resources there will be a lower price and greater level of output. The regulated monopoly, however, is likely to realize an economic loss with this socially optimal price and require a subsidy from government. In contrast, a “fair-return” price where price equals average cost produces no profits or losses for the regulated monopolist, but results in less output and a higher price than under the socially optimal price. The regulatory body must make a decision about whether to subsidize a monopolist charging the socially optimal price, or accept less output or under-allocation of resources and a higher price that results from the fair-return pricing policy.

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Learning Objectives: 8.5

35. In the table below are cost and demand data for a monopolist.

<u>Quantity demanded</u>	<u>Price</u>	<u>Marginal revenue</u>	<u>Average cost</u>	<u>Marginal cost</u>
0	\$35.00			
1	32.00	\$ 32.00	\$48.00	\$48.00
2	29.00	26.00	30.00	12.00
3	26.00	20.00	23.34	10.00
4	23.00	14.00	21.00	14.00
5	20.00	8.00	20.00	16.00
6	17.00	2.00	19.50	17.00
7	14.00	-4.00	19.28	18.00
8	11.00	-10.00	18.68	18.50
9	8.00	-16.00	18.72	19.00

- (a) What is the level of price, output, and amount of profit for an unregulated monopolist?
- (b) Using the data in the table, what is the price, output, and profit for a regulated monopolist that sets price equal to marginal cost compared with an unregulated monopolist?
- (c) Using the data in the table, what is the price, output, and profit for a regulated monopolist that charges a “fair-return” price compared with an unregulated monopolist?

(d) Analyze the effect of regulation on the allocation of resources. Which situation is most efficient? Which situation is most likely to be chosen by government? Why?

Ans: (a) The unregulated monopolist will charge a price of \$23.00, produce 4 units, and make a profit of \$8.

(b) The regulated monopolist in this case would set price equal to \$17, produce 6 units of output, but would have economic losses of \$15.

(c) The regulated monopolist in this case would charge a price of \$20 (equal to average cost), produce 5 units of output, and make no economic profits.

(d) The most efficient situation would be where the price was set equal to marginal cost. The price reflects what society is willing to pay and the marginal cost for producing another unit. That situation, however, produces a loss for the firm of \$15, which the government would have to subsidize, which would be an unpopular policy. Therefore, the government is most likely to select “fair-return” pricing where AC is equal to MC. The firm neither makes an economic profit nor incurs a loss. The output level is greater than a situation where the firm is unregulated but still entails an under-allocation of resources.

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Learning Objectives: 8.2, 8.5

36. In the table below are cost and demand data for a monopolist.

<u>Quantity demanded</u>	<u>Price</u>	<u>Marginal revenue</u>	<u>Average cost</u>	<u>Marginal cost</u>
0	\$105.00			
1	96.00	\$ 96.00	\$144.00	\$144.00
2	87.00	78.00	90.00	36.00
3	78.00	60.00	70.34	30.00
4	69.00	42.00	63.00	42.00
5	60.00	24.00	60.00	48.00
6	51.00	6.00	58.50	51.00
7	42.00	-12.00	57.86	54.00
8	33.00	-30.00	57.50	55.50
9	24.00	-48.00	57.33	56.00

- (a) What is the level of price, output, and amount of profit for an unregulated monopolist?
- (b) Using the data in the table, what is the price, output, and profit for a regulated monopolist that sets price equal to marginal cost compared with an unregulated monopolist?
- (c) Using the data in the table, what is the price, output, and profit for a regulated monopolist that charges a “fair-return” price compared with an unregulated monopolist?
- (d) Analyze the effect of regulation on the allocation of resources. Which situation is most efficient? Which situation is most likely to be chosen by government? Why?

Ans: (a) The unregulated monopolist will charge a price of \$69, produce 4 units, and make a profit of \$24.

(b) The regulated monopolist in this case would set price equal to \$51, produce 6 units of output, but would have economic losses of \$45.

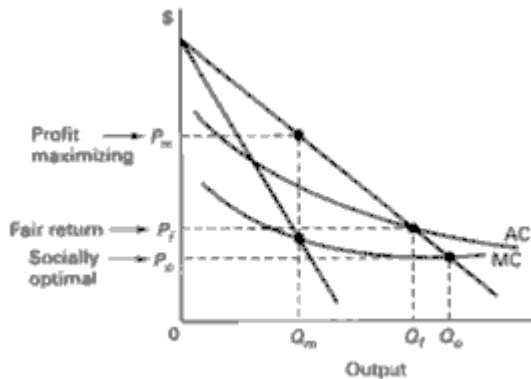
(c) The regulated monopolist in this case would charge a price of \$60, produce 5 units of output, and make no economic profits.

(d) The most efficient situation would be where the price was set equal to marginal cost. The price reflects what society is willing to pay and the marginal cost for producing another unit. That situation, however, produces a loss for the firm of \$45, which the government would have to subsidize an unpopular policy. Therefore, the government is most likely to select “fair-return” pricing where AC is equal to MC. The firm neither makes an economic profit nor incurs a loss. The output level is greater than a situation where the firm is unregulated.

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Learning Objectives: 8.2, 8.5

37. Draw a graph that illustrates the dilemma of regulation for a natural monopoly. On the graph, show the: (a) “socially optimal” price; (b) “fair-return” price; and (c) profit-maximizing price for the unregulated monopolist.



Ans: The socially optimal price is shown where price is determined by the intersection of the demand curve and MC. This low price will produce the most output but results in economic loss. The unregulated monopolist will produce at the level of output determined by the intersection of MR and MC. The price will be higher in this case and output will be less. The “fair-return” price is set at the output level where ATC intersects the demand curve. This output level is less than the one for the socially optimal price, and the price is higher, but the output level is greater and price is lower than in the unregulated case. Also, the firm makes no economic profit (just a normal profit) but also incurs no economic losses that would require a government subsidy. The “fair-return” price is a compromise between two difficult choices, and it improves the allocation of resources over the unregulated case.

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Learning Objectives: 8.5

38. What is the deadweight loss associated with a monopoly?

Ans: A monopoly maximizes profit by producing the output where $P > MC$. As a result, allocative efficiency is not achieved. Resources are under-allocated to this industry. This inefficiency can also be viewed in relation to consumer and producer surplus. The sum of consumer and producer surplus is not maximized when the monopoly produces the profit maximizing output level. The net loss of consumer and producer surplus is equal to the deadweight loss.

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Learning Objectives: 8.6

39. How would consumer and producer surplus change if a monopolist was required to produce the level of output that achieves allocative efficiency?

Ans: Under this requirement, the monopolist must increase its output and reduce the price that it charges. As a result, consumer surplus increases. On the other hand, this output-price level does not maximize profit. Therefore, producer surplus decreases. However, the increase in consumer surplus exceeds the decrease in producer surplus and society overall enjoys a gain in net surplus. As a result, the deadweight loss associated with the monopoly is eliminated.

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Learning Objectives: 8.6

40. The following table contains demand and cost data for a monopolist. Answer the following questions: (a) What output will the monopolist produce? (b) What price will the monopolist charge to sell this output? (c) What is consumer surplus at this output level? (d) What is producer surplus at this output level? (e) What is the allocatively efficient output level? (f) What market price will be charged to sell this output level? (g) What is consumer surplus at this output level? (h) What is producer surplus at this output level? (i) What is the size of the deadweight loss associated with the monopoly?

<u>Quantity</u>	<u>Price</u>	<u>Total revenue</u>	<u>Marginal revenue</u>	<u>Total cost</u>	<u>Marginal cost</u>
0	\$34	\$0		\$84	
1	32	32	\$32	96	\$12
2	30	60	28	106	10
3	28	84	24	114	8
4	26	104	20	118	4
5	24	120	16	122	4
6	22	132	12	128	6
7	20	140	8	140	12
8	18	144	4	160	20
9	16	144	0	190	30
10	14	140	-4	240	50

- Ans: (a) The monopolist will produce 6 units of output because MR is closest to equality with MC.
- (b) The monopolist will charge a price of \$22.
- (c) Consumer surplus is equal to \$30 (\$10 + \$8 + \$6 + \$4 + \$2 + \$0).
- (d) Producer surplus is equal to \$88 (\$10 + \$12 + \$14 + \$18 + \$18 + \$16).
- (e) The allocatively efficient output is 7 units where P is closest to equality with MC.
- (f) The price is \$20.
- (g) Consumer surplus is equal to \$42 (\$12 + \$10 + \$8 + \$6 + \$4 + \$2 + \$0).
- (h) Producer surplus is equal to \$84 (\$8 + \$10 + \$12 + \$16 + \$16 + \$14 + \$8).
- (i) The deadweight loss is \$8 42 + \$84 - (\$30 + \$88).

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Learning Objective: 8.2, 8.6

41. The following table contains demand and cost data for a monopolist. Answer the following questions: (a) What output will the monopolist produce? (b) What price will the monopolist charge to sell this output? (c) What is consumer surplus at this output level? (d) What is producer surplus at this output level? (e) What is the allocatively efficient output level? (f) What market price will be charged to sell this output level? (g) What is consumer surplus at this output level? (h) What is producer surplus at this output level? (i) What is the size of the deadweight loss associated with the monopoly?

<u>Quantity</u>	<u>Price</u>	<u>Total revenue</u>	<u>Marginal revenue</u>	<u>Total cost</u>	<u>Marginal cost</u>
0	\$34	\$0		\$74	
1	32	32	\$32	92	\$18
2	30	60	28	104	12
3	28	84	24	110	6
4	26	104	20	114	4
5	24	120	16	116	2
6	22	132	12	124	8
7	20	140	8	140	16
8	18	144	4	160	20
9	16	144	0	188	28
10	14	140	-4	220	32

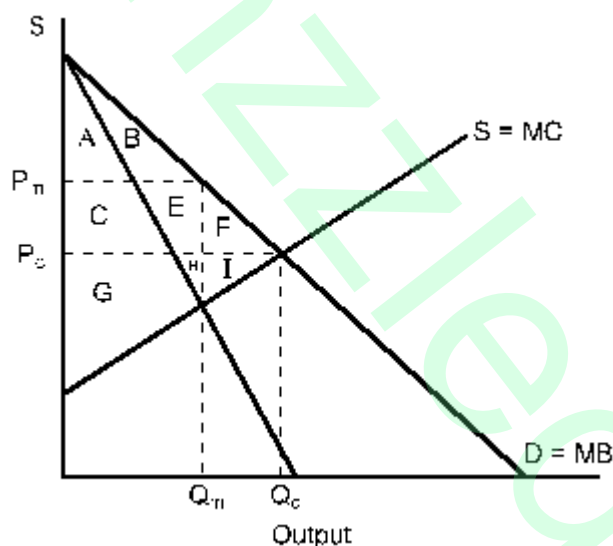
- Ans: (a) The monopolist will produce 6 units of output because MR is closest to equality with MC.
- (b) The monopolist will charge a price of \$22.
- (c) Consumer surplus is equal to \$30 (\$10 + \$8 + \$6 + \$4 + \$2 + \$0).
- (d) Producer surplus is equal to \$82 (\$4 + \$10 + \$16 + \$18 + \$20 + \$14).
- (e) The allocatively efficient output is 7 units where P is closest to equality with MC.
- (f) The price is \$20.
- (g) Consumer surplus is equal to \$42 (\$12 + \$10 + \$8 + \$6 + \$4 + \$2 + \$0).
- (h) Producer surplus is equal to \$74 (\$2 + \$8 + \$14 + \$16 + \$18 + \$12 + \$4).
- (i) The deadweight loss is \$4 $42 + 74 - (\$30 + \$82)$.

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Learning Objective: 8.2, 8.6

Indicate the following in your graph:

- Ans:



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- (h) Producer surplus is $C+E+G+H$.
- (i) The deadweight loss is $F+I$.
- (j) A monopoly that engages in perfect price discrimination produces the same output as a purely competitive industry. Producer surplus is $A+B+C+E+F+G+H+I$.
- (k) Since a pure monopoly that engages in perfect price discrimination produces the same output as a perfectly competitive industry, there is no deadweight loss.
- (l) When a monopoly takes over a perfectly competitive industry, output is reduced and price is increased. As a result, the consumer is adversely affected as evidenced by the reduction in consumer surplus. On the other hand, the producer benefits through increased profit and producer surplus. The reduction in output results in an under-allocation of resources to the industry. The existence of a deadweight loss shows that allocative efficiency is not achieved and that society is worse off under the monopoly.

If the monopoly engages in perfect price discrimination, under-allocation of resources does not occur and society is not burdened by a deadweight loss. Allocative efficiency is achieved. However, all consumer surplus is transferred to the producer.

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Learning Objective: 8.4, 8.6

43. What was the power of the De Beers diamond monopoly? What supply and demand factors have affected it in recent years?

Ans: De Beers produces about 50 percent of all rough-cut diamonds in the world and buys for resale many of the diamonds produced elsewhere. It markets about 63 percent of the world's diamonds. Its past price and output behaviour fit the monopoly model. It sells a limited quantity of diamonds, which will yield an "appropriate" monopoly price that is well over production costs. The firm earned monopoly profit.

Several supply factors have undercut the monopoly power of De Beers. New diamond discoveries increased the supply of diamonds on the market that were not under the firm's control. Other firms have withdrawn from an arrangement in which they sold their diamonds to De Beers and these firms now market their diamonds on their own. De Beers was also concerned about possible boycotts from their buying diamonds in war-torn regions of Africa, and thus they would be accused of indirectly financing the conflicts. These diamond-producing areas were no longer under De Beers's control. The company has responded to the problem of no longer being able to control diamond supply as a monopolist by putting more emphasis on the demand for its diamonds through advertising, which in effect creates an increased demand for De Beers's diamonds over other diamonds. De Beers can also still manipulate supply to a certain extent because it still has control over a large share of diamonds produced and marketed.

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Learning Objective: Last Word