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1. (a) Assume that a profit-maximizing firm in a perfectly competitive industry is earning economic profits. For a given market price, draw a correctly labeled graph and show each of the following for a typical firm in this perfectly competitive industry.

   (i) Marginal revenue

   (ii) Output

   (iii) Economic profits

   (b) Using the information in (a), draw correctly labeled side-by-side graphs for the industry and a typical firm.

   (i) Given the existence of economic profits of the typical firm, show on the graphs how the industry adjusts in the long run and explain the process that leads to the long-run equilibrium.

   (ii) Show on the graphs each of the following for the industry and for the typical firm in long-run equilibrium.

   - Price
   - Output

   (c) Now assume that the government sets a price that is less than the equilibrium price but greater than average variable cost. Indicate how each of the following will change for the typical firm and explain why the change occurs.

   (i) Marginal revenue

   (ii) Level of output

   (iii) Short-run total cost

   (iv) Short-run total revenue

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2. Assume that product X is produced in a perfectly competitive industry and that product X yields costs to individuals who are neither consumers nor producers of product X.

   (a) Using one correctly labeled graph, show the industry output and price under each of the following conditions.

      (i) The industry ignores the externality.

      (ii) The industry produces the socially optimum level of output.

   Assume that the market is producing the level of output you identified in (i).

   (b) Identify one policy the government might use to achieve the level of output you identified in (ii). 2

3. Sparkle Car Wash is a profit-maximizing firm with the following production information.

Number of Workers	Number of Cars Washed per Day
0	0
1	15
2	35
3	60
4	75
5	85
6	80

(a) With which worker is marginal product maximized?

(b) Identify and define the economic principle that explains why marginal product eventually decreases.

(c) Explain why Sparkle would never hire the sixth worker.

(d) If Sparkle charges $6 for washing a car, what is the maximum daily wage that Sparkle would be willing to pay the fourth worker?

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1. Claire invented product X and obtained a patent to prevent other firms from producing X. She is currently producing product X and earning positive economic profits.

   (a) Using a correctly labeled graph, show each of the following for Claire if she maximizes profits.

   (i) Output

   (ii) Price

   (iii) Economic profits

   (b) Assume that Claire hires labor in a perfectly competitive labor market. Using correctly labeled side-by-side graphs for the labor market and for Claire, show each of the following.

   (i) The wage rate of the workers

   (ii) The number of workers Claire will hire

   (c) Assume now the patent expires and many firms produce the identical product that Claire produces. Using correctly labeled side-by-side graphs for the industry and the firm, show each of the following in long-run equilibrium.

   (i) Industry price and output

   (ii) The typical firm's price and output

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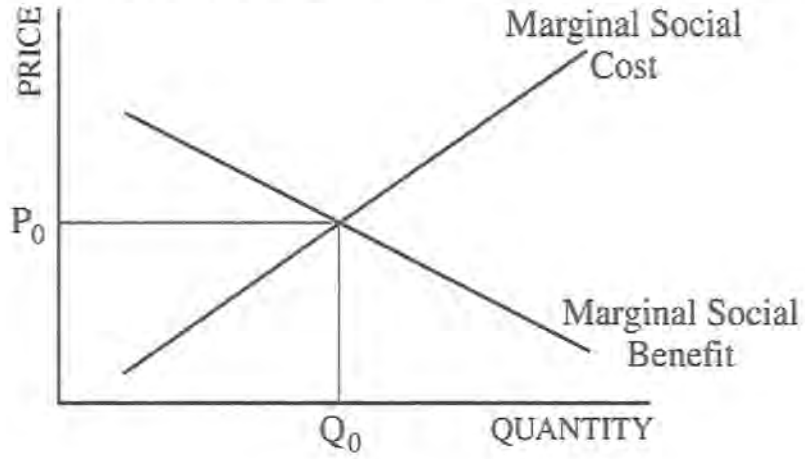
2. The graph below shows the price (P_0) and quantity (Q_0) at which there is an efficient allocation of resources.



However, in some cases the market fails to allocate resources efficiently.

(a) Assume the chemical industry is polluting the air.

(i) Using marginal benefit and marginal cost analysis, explain how the chemical industry is misallocating resources.

(ii) Identify one policy or action the government could take to correct this market failure.

(b) Assume it is difficult to exclude nonpayers from enjoying the benefits of national defense.

(i) Using marginal benefit and marginal cost analysis, explain how the private market will fail to produce the efficient level of national defense.

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(ii) Identify one policy or action the government could take to correct this market failure.

3. The table below shows total utility in utils that a utility-maximizing consumer receives from consuming two goods: apples and oranges.

Apples		Oranges	
Quantity	Total utility	Quantity	Total utility
0	0	0	0
1	20	1	30
2	35	2	50
3	45	3	65
4	50	4	75
5	52	5	80

Assume that apples cost \$1 each, oranges cost \$2 each, and the consumer spends the entire income of \$7 on apples and oranges.

(a) Using the concept of marginal utility per dollar spent, identify the combination of apples and oranges the consumer will purchase. Explain your reasoning.

(b) With the prices of apples and oranges remaining constant, assume that the consumer's income increases to \$12. Identify each of the following.

(i) The combination of apples and oranges the consumer will now purchase

(ii) The total utility the consumer will receive from consuming the combination in (i)

(c) With income remaining at \$12, assume the price of oranges increases to \$4 each. Identify each of the following.

(i) The combination of apples and oranges the consumer will now purchase

(ii) The total utility the consumer will receive from consuming the combination in (i)

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1. Assume that two firms are operating with identical cost schedules, but one firm is in a perfectly competitive industry, and the other is in a monopolistically competitive industry.
   (a) Using two correctly labeled graphs, show the long-run equilibrium price and output levels for each of these two firms.
   (b) Compare the long-run equilibrium price and output levels for these two firms.
   (c) What level of economic profit will each firm earn in the long run? Why do these results occur?
   (d) For each of the two firms at the equilibrium quantity, indicate whether the firm's demand curve is perfectly elastic, elastic, unit elastic, inelastic or perfectly inelastic. How can you tell? **7**

2. The government has decided to take action to reduce the pollution caused by the chemical industry. This industry is composed of profit-maximizing, perfectly competitive firms.

   (a) Identify one policy that the government could implement to reduce pollution.

   (b) Explain the effect the policy you identified in part (a) would have on each of the following for the firms in the chemical industry.

      (i) Marginal cost

      (ii) Output

      (iii) Price

   (c) Explain the effect of the policy you identified in part (a) on the efficiency of the allocation of society's resources. 8

3. The labor market in the town of Bazra is perfectly competitive, and 10 percent of the labor force is employed in the clothing industry.

   (a) Assume that the clothing manufacturers close their plants in Bazra. Using a correctly labeled supply and demand graph, predict the impact that closing these plants will have on each of the following.

      (i) The wage rate and number of workers employed in Bazra

      (ii) The number of workers in Bazra looking for work who cannot find employment at the wage rate you identified in (i)

   (b) After the clothing manufacturers closed their plants in Bazra, the town passes a law that establishes an effective minimum wage. What impact will this minimum wage have on each of the following?

      (i) The wage rate and number of workers employed in Bazra

      (ii) The number of workers in Bazra looking for work who cannot find employment

   (c) Assume that the minimum wage remains in effect and there is an increase in the demand for goods produced in Bazra. What happens to employment in Bazra? Explain why.

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1. Market structures differ from one another in many respects. Consider two profit-maximizing firms that earn short-run economic profits. One is a perfectly competitive firm and the other is a monopoly.

   (a) For each firm, draw a correctly labeled graph showing the following.

      (i) Price

      (ii) Quantity of output

      (iii) Area of economic profits

   (b) For each firm, explain the relationship between price and marginal revenue.

   (c) For each firm, explain how the economic profits would most likely change in the long run.

   (d) Label the area that represents the deadweight loss on the graph for the monopoly firm drawn in (a). Explain what this deadweight loss represents.

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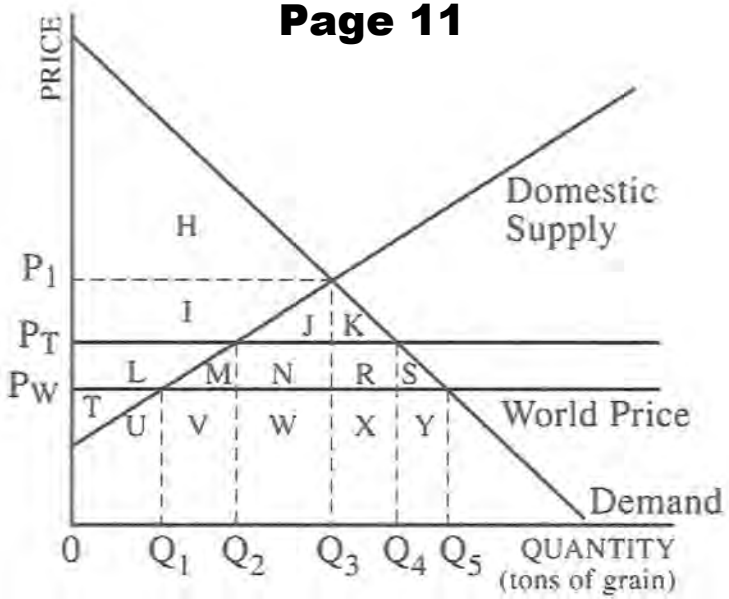

2. The diagram above illustrates the domestic market for grain in Country X before and after international trade. The letters inside the diagram represent areas, not points.

   (a) Using the labeling of the graph, identify each of the following before any trade occurs.

   (i) Equilibrium price and quantity

   (ii) Area of consumer surplus

   (iii) Area of producer surplus

   (b) Using the labeling of the graph, identify the amount of grain that Country X will import if it engages in trade and the world price of grain is at P_W.

   (c) Now assume that Country X imposes a tariff that raises the price of grain from the free-trade case to P_T. Using the labeling of the graph, identify the change in each of the following.

   (i) Domestic production

   (ii) Domestic consumption

   (iii) Consumer surplus

   (iv) Producer surplus

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3. Leadmill Company is a perfectly competitive pencil-manufacturing firm. Leadmill can sell all of the pencils it produces at a market price of $2 per dozen and can hire all the workers it needs at a wage rate of $8 per hour. The output of the workers at Leadmill is given in the table below.

Number of Workers	Output (dozens)
0	0
1	8
2	15
3	21
4	26
5	30
6	33
7	35
8	36

(a) Using marginal analysis, state the condition for employing the profit-maximizing number of workers.

(b) How many workers should Leadmill hire to maximize profit? Explain how you derived that number.

(c) If the wage rate decreased to $6 dollars per hour, how many workers would Leadmill employ?

(d) If the wage rate was $6 per hour and the price of pencils decreased to $1 per dozen, how many workers would Leadmill employ?

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1. J & P Company operates in a perfectly competitive market for smoke alarms. J & P is currently earning short-run positive economic profits.

   (a) Using correctly labeled side-by-side graphs for the smoke alarm market and J & P Company, indicate each of the following for both the market and the J & P Company.

      (i) Price

      (ii) Output

   (b) In the graph in part (a) for J & P, indicate the area of economic profits that J & P Company is earning in the short run.

   (c) Using a new set of correctly labeled side-by-side graphs for the smoke alarm market and J & P Company, show what will happen in the long run to each of the following.

      (i) Long-run equilibrium price and quantity in the market

      (ii) Long-run equilibrium price and quantity for J & P Company

   (d) Assume that purchases of smoke alarms create positive externalities. Draw a correctly labeled graph of the smoke alarm market.

      (i) Label the market equilibrium quantity as Q_m.

      (ii) Label the socially optimum equilibrium quantity as Q_s.

   (e) Identify one government policy that could be implemented to encourage the industry to produce the socially optimum level of smoke alarms.

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2. (a) Draw a correctly labeled graph showing a typical monopoly that is maximizing profit and indicate each of the following.

   (i) Price

   (ii) Quantity of output

   (iii) Profit

   (b) Describe and explain the relationship between the monopolist's demand curve and marginal revenue curve.

   (c) Label each of the following on your graph in part (a).

   (i) Consumer surplus

   (ii) Deadweight loss

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3. Assume that Company XYZ is a profit-maximizing firm that hires its labor in a perfectly competitive labor market and sells its product in a perfectly competitive output market.

   (a) Define the marginal revenue product of labor (MRP_L).

   (b) Using correctly labeled side-by-side graphs, show each of the following.

      (i) The equilibrium wage in the labor market

      (ii) The labor supply curve the firm faces

      (iii) The number of workers the firm will hire

   (c) Company XYZ develops a new technology that increases its labor productivity. Currently this technology is not available to any other firm. For Company XYZ, explain how the increased productivity will affect each of the following.

      (i) Wage rates

      (ii) Number of workers hired

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1. Due to a new technology, Brunelle Inc. enjoys monopoly power. Brunelle does not engage in price discrimination.
   (a) Explain why the demand curve lies above the marginal revenue curve for Brunelle.
   (b) Assume that Brunelle is earning short-run economic profits. Using a correctly labeled graph, show the following for Brunelle.
      (i) Profit-maximizing level of output, labeled as Q^*
      (ii) Profit-maximizing price, labeled as P^*
      (iii) Economic profits, as a shaded area
   (c) If Brunelle wants to maximize its total revenues instead of profits, using the graph from part (b) show the following.
      (i) Revenue-maximizing level of output, labeled as Q^r
      (ii) Revenue-maximizing price, labeled as P^r
   (d) Given your answer in part (b), indicate whether Brunelle is producing the allocatively efficient level of output. Explain.
   (e) Explain what will happen to Brunelle's demand curve as other firms adopt the same technology.

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2. In each part below, assume that the government imposes a per-unit sales tax and that the supply curve is upward-sloping.

   (a) In industry X, consumers buy the same quantity no matter what the price is.

      (i) Using a correctly labeled graph, show what happens to the quantity sold when the tax is imposed.

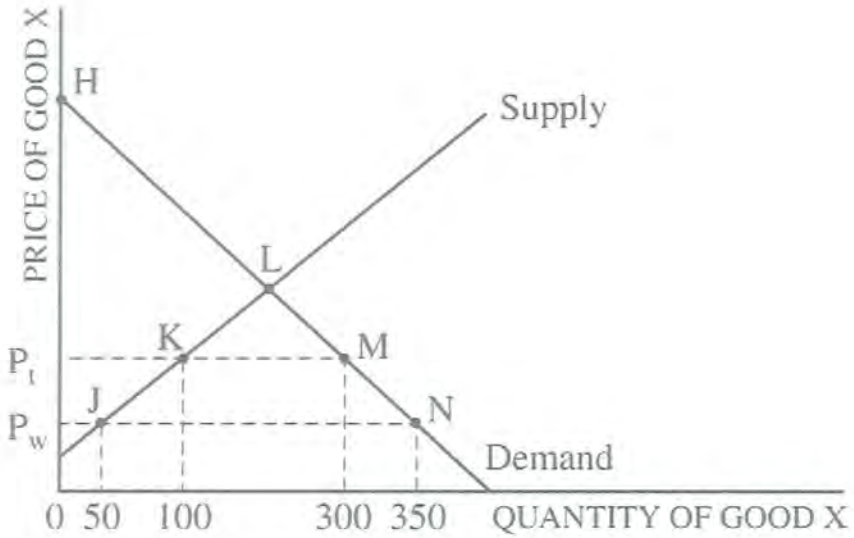
      (ii) How will the burden of the tax be distributed between buyers and sellers?

   (b) In industry Y, the market demand curve is perfectly elastic.

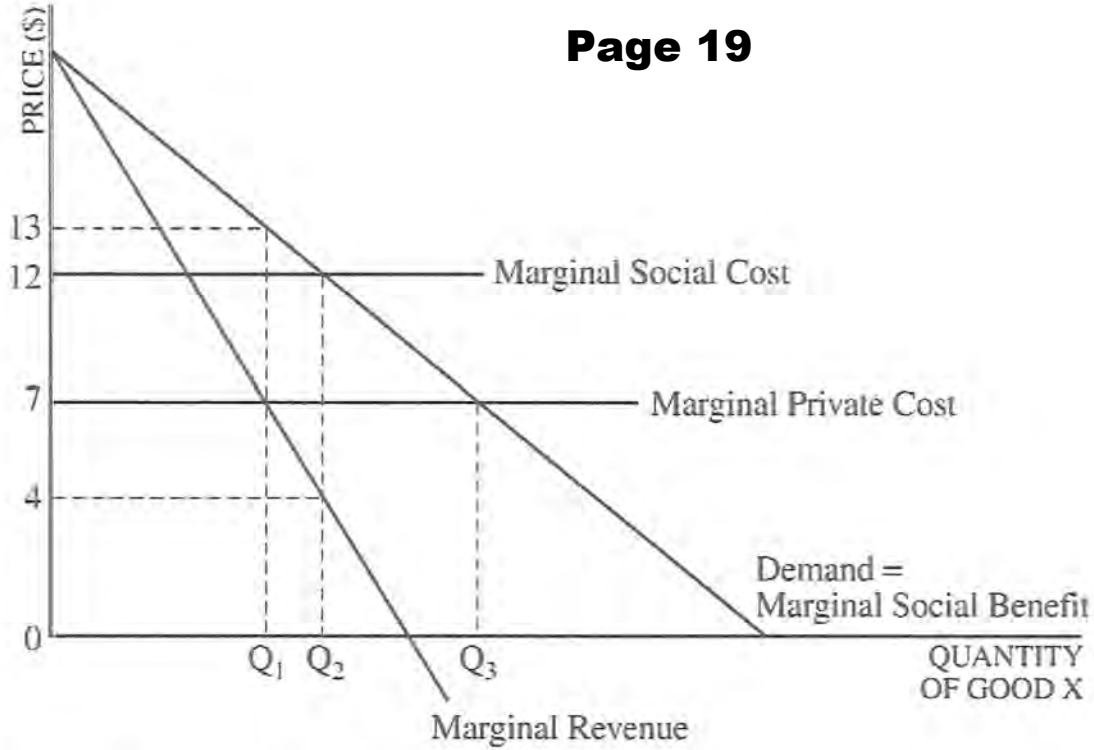
      (i) Using a correctly labeled graph, show what happens to the price of the good that the consumers pay when the tax is imposed.

      (ii) How will the burden of the tax be distributed between buyers and sellers?

   (c) In industry Z, the market demand curve is downward-sloping. Using a correctly labeled graph, shade the area that represents total tax revenues.



3. The diagram above shows the domestic supply and demand for good X in the country of Placonia.
   (a) If the current world price of good X is P_w, does Placonia export or import good X? Explain.
   (b) Given your answer in part (a), indicate the quantity of good X that Placonia exports or imports.
   (c) Assume that the government of Placonia imposes a tariff on good X, increasing the price from P_w to P_t. Using the labels in the graph, indicate the change in each of the following in Placonia.
      (i) Consumer surplus
      (ii) Producer surplus
   (d) Indicate how employment in the domestic industry that produces good X is affected by the tariff.



1. The production of good X creates an externality. The following questions are based on the graph above, which shows the marginal revenue, marginal social benefit, marginal private cost, and marginal social cost associated with the production of good X.

   (a) Is the externality positive or negative? Explain.

   (b) Using labeling from the graph above, identify the socially optimum output. Explain how you determined your answer.

   (c) Suppose that good X is produced by a profit-maximizing monopoly. Answer each of the following.

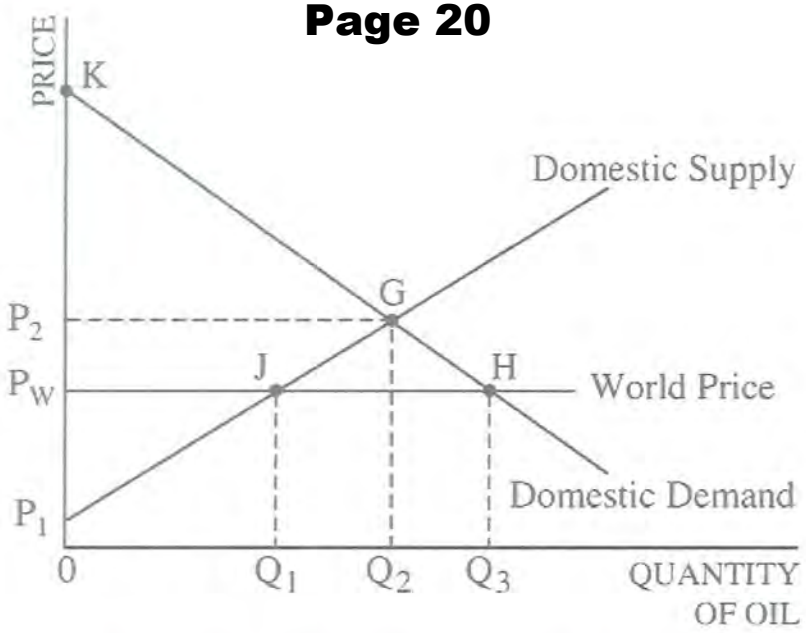
      (i) Using labeling from the graph above, identify the unregulated firm's output. Explain how you determined your answer.

   (d) Suppose that good X is produced in a perfectly competitive industry. Answer each of the following.

      (i) Using labeling from the graph on the previous page, identify equilibrium output in the absence of regulation. Explain how you determined your answer.

      (ii) To produce the socially optimum output, indicate whether the government should tax or subsidize the firms in the industry.

      (iii) Calculate the dollar value of the needed per-unit tax or subsidy.



2. The graph above shows the demand for oil by United States residents, the supply of oil by United States producers, and the world price of oil. Use the labeling of the graph to answer the following questions.

   (a) Identify the following before international trade occurs.

      (i) Price of oil in the United States market

      (ii) Quantity of oil produced in the United States

   (b) Now assume that the United States begins to import oil at the world market price of P_w. Identify the quantity imported by the United States.

   (c) Identify the consumer surplus in the United States market for each of the following cases.

      (i) Before international trade

      (ii) After international trade

   (d) Identify the producer surplus in the United States market for each of the following cases.

      (i) Before international trade

      (ii) After international trade

   (e) Identify the net gain in total surplus from trade.

3. Assume that a profit-maximizing firm in a monopolistically competitive industry is in long-run equilibrium.
   (a) Draw a correctly labeled graph that shows the profit-maximizing firm's price and output.
   (b) Assume that the city in which this industry operates eliminates the business license fee (a fixed cost) for all firms in this industry. How does the elimination of the license fee affect each of the following for the individual firm in the short run? Explain your answers.
      (i) Output
      (ii) Economic profits

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1. Bestmilk, a typical profit-maximizing dairy firm, is operating in a constant-cost, perfectly competitive industry that is in long-run equilibrium.

   (a) Draw correctly labeled side-by-side graphs for the dairy market and for Bestmilk and show each of the following.

      (i) Price and output for the industry

      (ii) Price and output for Bestmilk

   (b) Assume that milk is a normal good and that consumer income falls. Assume that Bestmilk continues to produce. On your graphs in part (a), show the effect of the decrease in income on each of the following in the short run.

      (i) Price and output for the industry

      (ii) Price and output for Bestmilk

      (iii) Area of loss or profit for Bestmilk

   (c) Following the decrease in consumer income, what must be true for Bestmilk to continue to produce in the short run?

   (d) Assume that the industry adjusts to a new long-run equilibrium. Compare the following between the initial and the new long-run equilibrium.

      (i) Price in the industry

      (ii) Output of a typical firm

      (iii) The number of firms in the dairy industry

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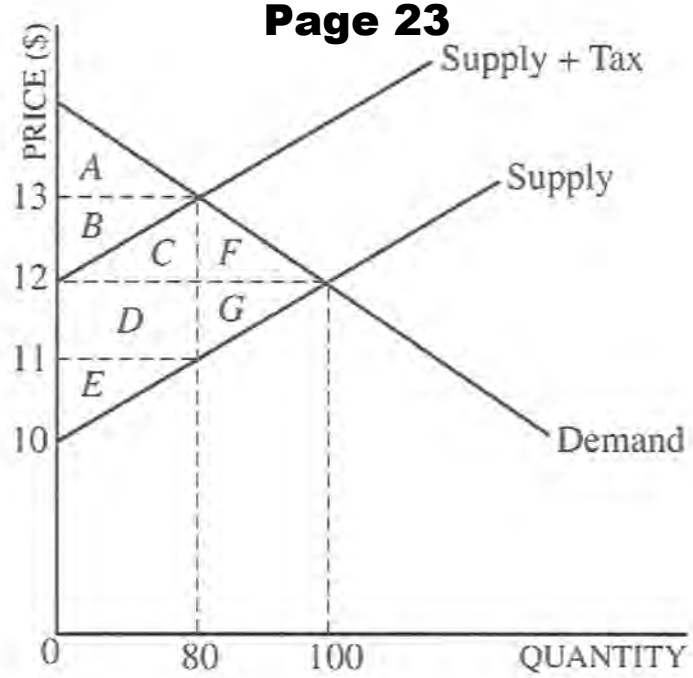

2. The graph above shows the market for a good that is subject to a per-unit tax. The letters in the graph represent the enclosed areas.

   (a) Using the labeling on the graph, identify each of the following.

      (i) The equilibrium price and quantity before the tax

      (ii) The area representing the consumer surplus before the tax

      (iii) The area representing the producer surplus before the tax

   (b) Assume that the tax is now imposed. Based on the graph, does the price paid by the buyers rise by the full amount of the tax? Explain.

   (c) Using the labeling on the graph, identify each of the following after the imposition of the tax.

      (i) The net price received by the sellers

      (ii) The amount of tax revenue

      (iii) The area representing the consumer surplus

      (iv) The area representing the deadweight loss

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3. P & L is a profit-maximizing shirt-manufacturing firm. The firm can sell all the shirts it can produce to retailers at a price of $20 each. P & L can hire all of the workers it wants at a market wage of $120 per day per worker. The table below shows the firm's short-run production function.

Number of Workers	Number of Shirts per Day
0	0
1	10
2	25
3	45
4	60
5	72
6	80
7	85
8	82

(a) In what kind of market structure does this firm sell its output? How can you tell?

(b) In what kind of market structure does this firm hire its workers? How can you tell?

(c) Calculate the marginal revenue product of the third worker. Show your work.

(d) How many workers should the firm hire to maximize profit? Explain.

1. Petsall Corporation is a profit-maximizing monopolist. It sells a patented rabies vaccine for pets and earns economic profits.

   (a) Draw a correctly labeled graph that shows each of the following for Petsall.

      (i) Output and price of the vaccine

      (ii) Area of economic profits

   (b) Assume that Petsall hires its production workers in a perfectly competitive labor market at the wage rate of $20 per hour.

      (i) State the marginal conditions for hiring the profit-maximizing amount of labor.

      (ii) Draw a correctly labeled graph that shows the labor supply and demand curves for Petsall and indicate the profit-maximizing quantity of labor.

   (c) Suppose that the market wage rate now falls to $15 per hour. Show on your diagram in (b) (ii) how each of the following would be affected.

      (i) The supply of labor to Petsall

      (ii) The amount of labor Petsall would hire

   (d) Given the lower wage rate in (c), indicate how each of the following would change.

      (i) Total fixed cost

      (ii) Marginal cost

      (iii) Price of the product

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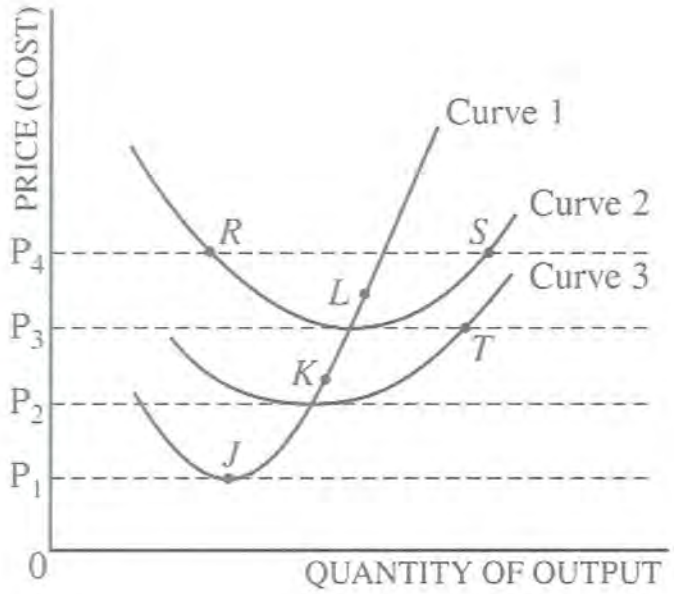

2. The graph above shows the short-run cost structure of a firm in a perfectly competitive industry.
   (a) Identify the cost curves that are denoted by each of the following labels.
      (i) Curve 1
      (ii) Curve 2
      (iii) Curve 3
   (b) Explain why curve 1 does each of the following as output increases.
      (i) Initially decreases
      (ii) Finally increases
   (c) What measure of cost is represented by the vertical distance between curve 2 and curve 3 ?
   (d) Explain why the vertical distance between curve 2 and curve 3 decreases as output increases.
   (e) Using the letters on the graph, identify two points on the firm's short-run supply curve.

3. Assume that bread and butter are complementary goods. The government begins to subsidize the production of wheat, which is an input in the production of bread.

   (a) For each of the following markets, draw correctly labeled supply and demand graphs and show the effect of the subsidy on the equilibrium price and quantity in the short run.

      (i) The wheat market

      (ii) The bread market

      (iii) The butter market

   (b) If the demand for bread is price elastic, how will total revenues for the bread producers change as a result of the government subsidy?

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1. Assume that Clark Electronics has a monopoly in the production and sale of a new device for detecting and destroying a computer virus. Clark Electronics currently incurs short-run losses, but it continues to operate.
   (a) What must be true for Clark to continue to operate in the short run?
   (b) Draw a correctly labeled graph, and show each of the following for Clark.
      (i) The profit-maximizing price and output
      (ii) Area of loss
   (c) Assume Clark is maximizing profit. What will happen to its total revenue if Clark raises its price? Explain.
   (d) If demand for the new device increases, explain what will happen to each of the following in the short run.
      (i) Profit-maximizing output
      (ii) Total cost

2. Assume that the market for home security systems is perfectly competitive and currently in equilibrium.
   (a) Using a correctly labeled graph of supply and demand, show each of the following.
      (i) The equilibrium price and quantity, labeled as P* and Q*, respectively
      (ii) The area representing consumer surplus, labeled as CS
      (iii) The area representing producer surplus, labeled as PS
   (b) Suppose that the government imposes an effective (binding) price ceiling. Redraw your graph in part (a), and label the ceiling price as P_2. Completely shade the area representing the sum of the consumer surplus and the producer surplus after the imposition of the price ceiling.
   (c) Suppose the demand for home security systems decreases and the price ceiling remains binding. Indicate what will happen to each of the following.
      (i) Consumer surplus
      (ii) Producer surplus

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3. Pride Textiles produces and sells towels in a perfectly competitive market. Pride Textiles hires its workers in a perfectly competitive labor market. Assume that the market wage rate for workers is $80 per day.

   (a) State the conditions necessary for hiring the profit-maximizing amount of labor.

   (b) At the profit-maximizing level of output, suppose that the marginal product of the last worker hired is 20 towels per day. Calculate the price of a towel.

   (c) Draw a correctly labeled graph of the labor supply and demand curves for Pride Textiles, and show the equilibrium amount of labor hired.

   (d) Given your answer to part (b), if the price of a towel increases, explain how Pride's profit-maximizing quantity of labor will be affected.

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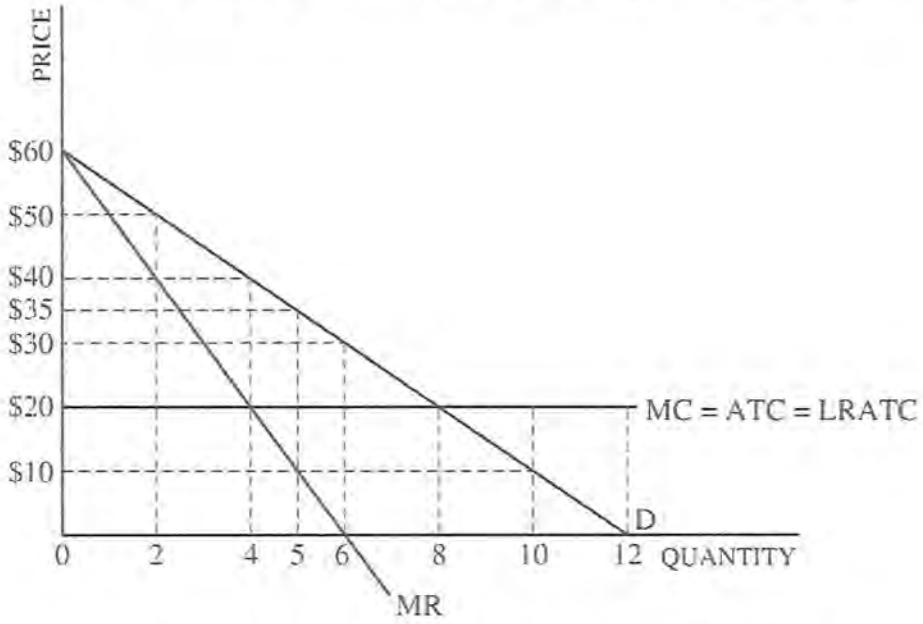
1. The graph below shows the demand curve (D), marginal revenue curve (MR), marginal cost curve (MC), average total cost curve (ATC), and long-run average total cost curve (LRATC) for a monopolist.



(a) Using the numbers given in the graph, identify each of the following for the profit-maximizing monopolist.

(i) The quantity produced

(ii) The price

(iii) The allocatively efficient quantity

(b) At the profit-maximizing quantity from part (a)(i), is the monopolist experiencing economies of scale? Explain.

(c) Now assume that the monopolist produces 10 units. Using the numbers given in the graph, calculate each of the following. Show your work.

(i) The monopolist's economic profit

(ii) The consumer surplus

(iii) The deadweight loss

(d) At what quantity is demand unit elastic?

(e) Suppose the monopolist perfectly price discriminates and chooses the quantity that maximizes profit. Determine the dollar value of each of the following.

(i) The monopolist's profit

(ii) The consumer surplus

2. Ray's Stable hires workers in a perfectly competitive factor market for unskilled labor.

   (a) Using correctly labeled side-by-side graphs for the labor market and Ray's Stable, show each of the following.

      (i) The equilibrium wage and quantity for unskilled labor, labeled W_E and Q_E, respectively

      (ii) The wage paid by Ray's Stable and the quantity of unskilled labor hired, labeled W_R and Q_R, respectively

   (b) Is the marginal factor cost of unskilled labor for Ray's Stable greater than, less than, or equal to W_E? Explain.

   (c) Now assume that the government imposes an effective minimum wage for unskilled labor.

      (i) Show the minimum wage on your graphs in part (a), labeled W_{MIN}.

      (ii) On the labor market graph in part (a), show the quantity of unskilled labor supplied in the labor market as a result of the minimum wage, labeled Q_S.

      (iii) As a result of the new minimum wage, will the marginal revenue product of the last worker hired by Ray's Stable increase, decrease, or stay the same?

3. Assume that gasoline is sold in a competitive market in which demand is relatively inelastic and supply is relatively elastic.

   (a) Draw a correctly labeled graph of the gasoline market. On your graph show the equilibrium price and quantity of gasoline, labeled P_E and Q_E.

   (b) Suppose the government imposes a $2 per unit tax on the producers of gasoline. On your graph from part (a), show each of the following after the tax is imposed.

      (i) The price paid by buyers, labeled P_B

      (ii) The after-tax price received by sellers, labeled P_S

      (iii) The quantity, labeled Q_T

   (c) Using the labeling on your graph, explain how to calculate the total tax revenue collected by the government.

   (d) Will the tax burden fall entirely on buyers, entirely on sellers, more on buyers and less on sellers, more on sellers and less on buyers, or equally on buyers and sellers? Explain.

1. A typical profit-maximizing firm in a perfectly competitive constant-cost industry is earning a positive economic profit.
   (a) Is the market price greater than, less than, or equal to the firm's price? Explain.
   (b) Draw correctly labeled side-by-side graphs for both the market and a typical firm and show each of the following.
      (i) Market price and quantity, labeled P_m and Q_m
      (ii) The firm's quantity, labeled Q_f
      (iii) The firm's average revenue curve, labeled AR
      (iv) The firm's average total cost curve, labeled ATC
      (v) The area representing total cost, shaded completely
   (c) If one firm in the market were to raise its price, what will happen to its total revenue? Explain.
   (d) Now suppose the market is in long-run equilibrium. The government gives a lump-sum subsidy to each firm producing in the industry. Indicate whether each of the following will increase, decrease, or remain the same.
      (i) The firm's quantity in the short run. Explain.
      (ii) The market price and quantity in the long run. Explain.

2. Breadbasket and Quicklunch are the only two sandwich shops serving a small town. Each shop can choose to set a high price or a low price for sandwiches. The payoff matrix below shows the daily profits for each combination of prices that the two shops could choose. The first entry shows Breadbasket's profits, and the second entry shows Quicklunch's profits. Assuming that both shops know the information shown in the matrix, answer the following.

		Quicklunch	
		High Price	Low Price
Breadbasket	High Price	\$105, \$110	\$40, \$130
	Low Price	\$120, \$80	\$75, \$70

(a) Does each shop have a dominant strategy to set a high price, a dominant strategy to set a low price, or does it have no dominant strategy?

(i) Breadbasket

(ii) Quicklunch

(b) If the two shops do not cooperate on setting prices, what will be the profit for each shop?

(i) Breadbasket

(ii) Quicklunch

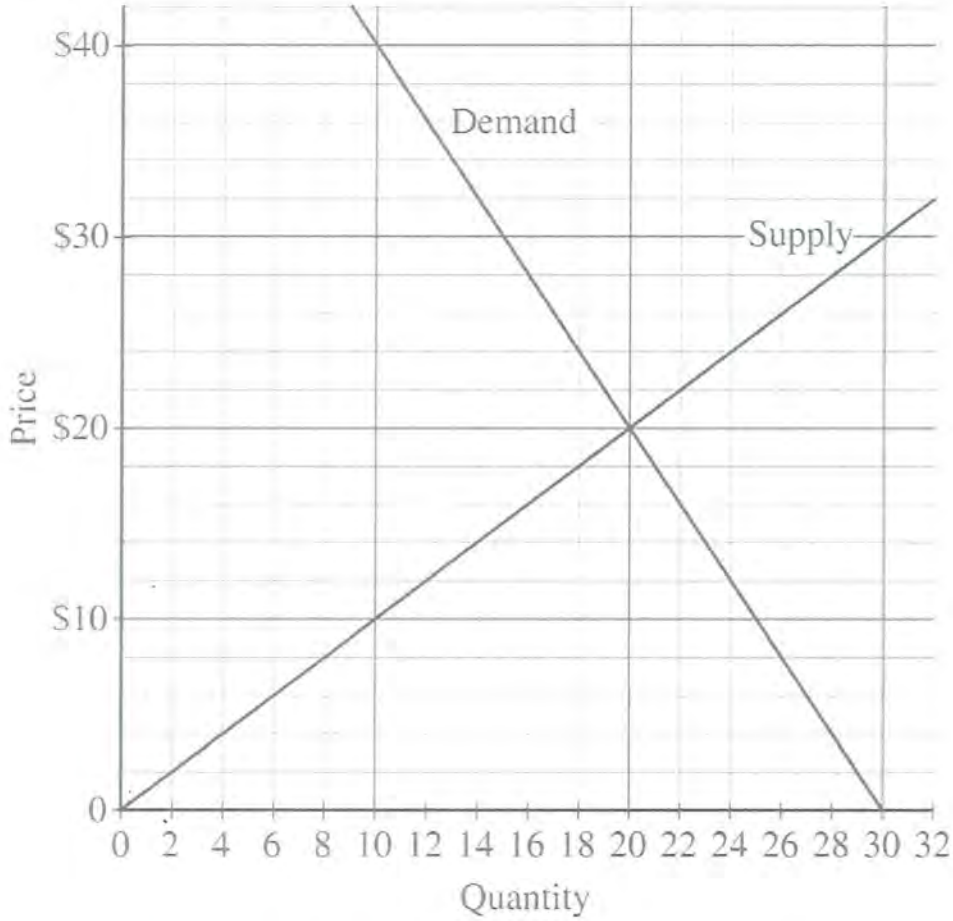
(c) The town government is concerned that food prices are too high. It decides to give a daily subsidy of \$20 to any shop that chooses to set a low price for its food items. Redraw the payoff matrix under the government subsidy system.

Using your redrawn payoff matrix, answer each of the following.

(i) Would Quicklunch choose to set a high price or a low price? Explain using specific values from your redrawn matrix.

(ii) Would the profits for Breadbasket increase, decrease, or stay the same? Explain with a comparison to your answer in part (b)(i). Use the specific values.

3. The graph below shows the market for widgets. The government is considering intervening in this market.



(a) Calculate the total producer surplus at the market equilibrium price and quantity. Show your work.

(b) If the government imposes a price floor at $16, is there a shortage, a surplus, or neither? Explain.

(c) If instead the government imposes a price ceiling at $12, is there a shortage, a surplus, or neither? Explain.

(d) If instead the government restricts the market output to 10 units, calculate the deadweight loss. Show your work.

(e) Assume the price decreases from $20 to $12.
(i) Calculate the price elasticity of demand. Show your work.
(ii) In this price range, is demand perfectly elastic, relatively elastic, unit elastic, relatively inelastic, or perfectly inelastic?

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1. The markets for bananas, muffins, and coffee are interrelated, and each market is perfectly competitive.

   (a) In the market for bananas, the equilibrium price is $1.00 per pound, and the equilibrium quantity is 1,000 pounds per week. Suppose the government imposes a price floor on bananas at $1.20 per pound, causing the quantity supplied to increase to 1,500 pounds per week.

   (i) Would the price floor result in a shortage, a surplus, or neither? Explain.

   (ii) Calculate the price elasticity of supply if the price increases from $1 to $1.20. Show your work.

   (iii) Between $1 and $1.20, is the supply elastic, unit elastic, or inelastic? Explain.

   q1 micro micro 2016

   (b) Bananas are an input for muffins.

   (i) Draw a correctly labeled graph of the market for muffins indicating the equilibrium price and quantity, labeled P_0 and Q_0, respectively.

   (ii) On the graph drawn in part (b)(i), show the impact of an increase in the price of bananas on the muffin market, labeling the new equilibrium price and quantity P_1 and Q_1, respectively.

   (iii) On the same graph, completely shade the area that represents the **change** in the consumer surplus caused by the increase in the price of bananas.

   (c) In the market for coffee, the equilibrium price is $3.00 per cup and the equilibrium quantity is 100 cups per week. The cross-price elasticity of coffee with respect to muffins is −2.

   (i) Are coffee and muffins normal goods, inferior goods, complementary goods, or substitute goods?

   (ii) Assume the supply of coffee is perfectly elastic. Using the equilibrium price and quantity given above, draw a correctly labeled graph for the coffee market, and show the impact of an increase in the price of muffins on the coffee market.

   (iii) Given the original quantity of 100 cups of coffee per week, if the increase in the price of muffins is 10%, calculate the new equilibrium quantity in the coffee market. Show your work.

2. Martha has a fixed budget of $20, and she spends it all on two goods, X and Y. The price of X is $4 per unit, and the price of Y is $2 per unit. The table below shows the total benefit, measured in dollars, Martha receives from the consumption of each good.

q2 micro micro 2016

Quantity of X	Total Benefit from X	Quantity of Y	Total Benefit from Y
0	$0	0	$0
1	$16	1	$10
2	$28	2	$18
3	$36	3	$24
4	$40	4	$28
5	$41	5	$30

(a) What is Martha's marginal benefit of the fifth unit of good X?

(b) Calculate the total consumer surplus if Martha consumes 5 units of X. Show your work.

(c) Martha is currently consuming 4 units of X and 2 units of Y. Use marginal analysis to explain why this combination is not optimal for Martha.

(d) What is Martha's optimal combination of goods X and Y?

(e) Indicate whether each of the following will cause the optimal quantity of good Y to increase, decrease, or stay the same.

(i) The price of good Y doubles.

(ii) Martha's income falls to $10 with no changes in prices.

(iii) Martha's income doubles, and the price of both goods double.

q3 micro micro 2016

3. Camden's Cakery is one of many dessert cafés serving a local community. Each café produces a slightly differentiated product, there are no barriers to entry or exit, and the firm is in long-run equilibrium.

   (a) Draw a correctly labeled graph showing Camden's demand curve, marginal revenue curve, marginal cost curve, and long-run average total cost curve. Label Camden's profit-maximizing output Q_m and its price P_m.

   (b) On your graph in part (a), label the output at which total revenue is maximized Q_R.

   (c) Do firms in this market experience economies of scale, diseconomies of scale, or neither in long-run equilibrium? Explain.

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1. Corn is used as food and as an input in the production of ethanol, an alternative fuel. Assume corn is produced in a perfectly competitive market.

   (a) Draw correctly labeled side-by-side graphs for the corn market and a representative corn farmer. On your graphs show each of the following.

      (i) The equilibrium price and quantity in the corn market, labeled P_M and Q_M, respectively

      (ii) The profit-maximizing quantity of corn produced by the representative farmer earning zero economic profit, labeled Q_F

   (b) Assume the demand for ethanol increases. On your graphs in part (a) show what will happen to each of the following in the short run.

      (i) The market price and quantity of corn, labeled P^* and Q^*

      (ii) The area of the profit or loss earned by the representative corn farmer, shaded completely

   (c) Relative to your answer in part (b), state what will happen to the market equilibrium price and quantity of corn in the long run. Explain.

   (d) Soybeans are produced in a perfectly competitive market. Assume farmers can grow either corn or soybeans on the same land. What happens to the price of soybeans in the next planting season if the price of corn increases? Explain.

   (e) Assume instead that the government sets a binding price ceiling in the corn market. Draw a new correctly labeled graph for the corn market and show each of the following.

      (i) The binding price ceiling, labeled P_c

      (ii) The quantity purchased by consumers in the corn market, labeled Q_p

2. The table below shows the output a firm produces using different amounts of capital (K) and labor (L). The markets for capital and labor are perfectly competitive. The rental rate of capital is $75 per unit, and the wage rate is $200 per unit. In the short run, capital is fixed and labor is variable.

Labor	Output with K=1	Output with K=2
0	0	0
1	10	20
2	25	50
3	38	75

(a) If the firm uses one unit of capital and one unit of labor, will it be operating with constant, increasing, or decreasing returns to scale? Explain using numbers from the table.

(b) Assume now that the firm currently has two units of capital and is using three units of labor.

(i) Calculate the marginal product for the third unit of labor. Show your work.

(ii) Did the firm experience diminishing marginal returns with the addition of the third unit of labor? Explain using numbers from the table.

(iii) Calculate the firm's average total cost for its current level of production. Show your work.

(iv) If the firm's output is sold in a competitive market, what is the lowest output price at which the third unit of labor would be hired?

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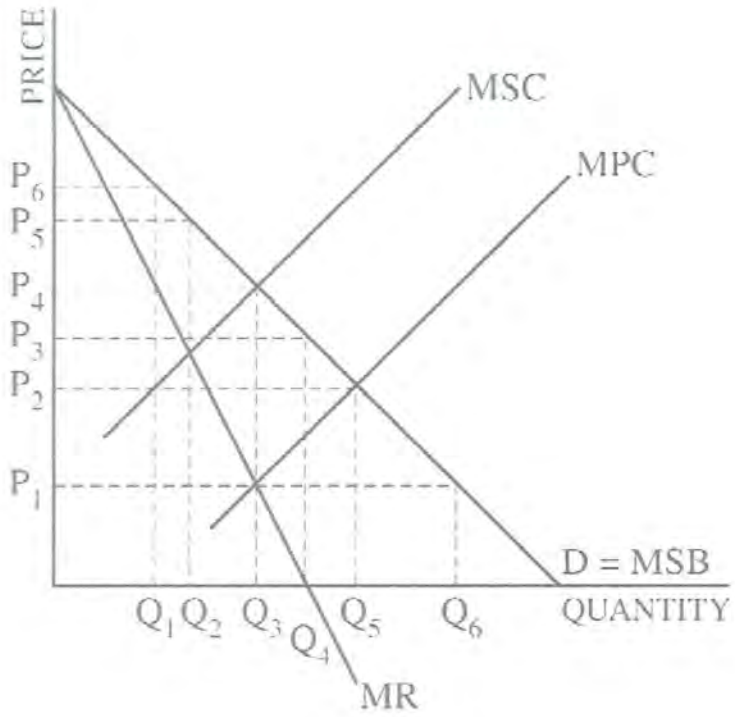
3. The graph below shows the marginal social cost (MSC), marginal private cost (MPC), marginal social benefit (MSB), demand (D), and marginal revenue (MR) curves for a monopoly.



(a) Identify the monopolist's

(i) profit-maximizing quantity

(ii) profit-maximizing price

(b) What information in the graph indicates that there is a negative externality?

(c) Identify the socially optimal quantity.

(d) In the case in which the government imposes a per-unit tax equal to the marginal external cost, identify each of the following.

(i) The dollar value of the tax, using the price labels from the graph

(ii) The profit-maximizing quantity associated with the tax

(e) Given the monopoly facing the negative externality, would the deadweight loss increase, decrease, or stay the same as a result of imposing the per-unit tax? Explain.

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1. In the early twentieth century, limited transportation options and the lack of effective substitutes gave Single Cinema monopoly power in a small town. Assume that Single Cinema is a profit-maximizing firm and currently operates at a negative economic profit in the short run.

   (a) Draw a correctly labeled graph for Single Cinema, and show each of the following.

      (i) The profit-maximizing price and quantity of tickets, labeled as P_m and Q_m, respectively

      (ii) The area representing the negative economic profit, shaded completely

   (b) Explain why Single Cinema continues to operate in the short run despite earning negative economic profit in the short run.

   (c) Would Single Cinema's total revenue increase, decrease, or stay the same if it decides to sell one fewer ticket than Q_m? Explain.

   (d) Single Cinema hires workers in a perfectly competitive labor market with a downward-sloping demand curve. Suppose the number of workers available in the market decreases.

      (i) What will happen to the wage rate? Explain.

      (ii) What will happen to the marginal revenue product of the last worker hired? Explain.

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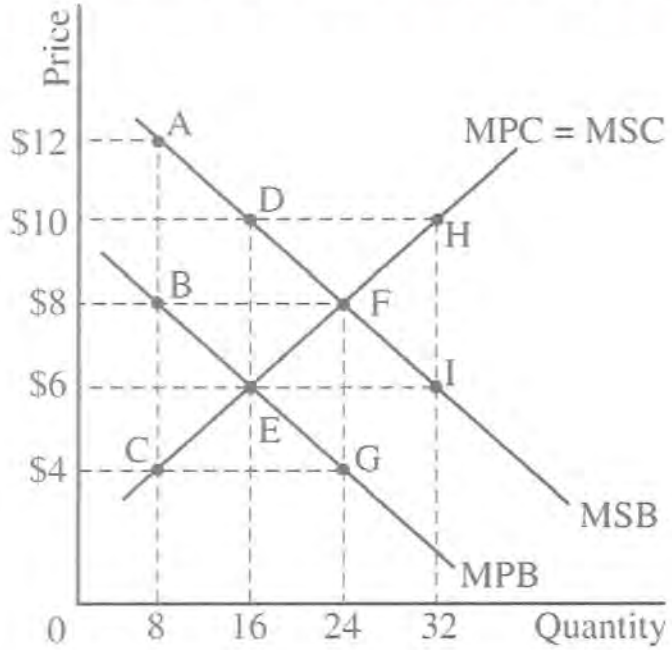
2. Modern-day word processing software gives consumers the ability to create and save documents in different file formats that can then be accessed by multiple computer operating systems. The graph below depicts a perfectly competitive market for word processing software. In the graph, MSB is the marginal social benefit, MPB is the marginal private benefit, MPC is the marginal private cost, and MSC is the marginal social cost.



(a) Identify the type of market failure illustrated by the graph. Explain.

(b) Using the numbers on the graph, identify the market equilibrium price and quantity.

(c) Using the labeling on the graph, identify the area representing the deadweight loss at the quantity identified in part (b).

(d) Suppose the government is considering granting a subsidy to correct the market failure. What is the dollar value of the per-unit subsidy that would achieve the socially optimal quantity?

(e) Suppose the government does not grant the subsidy and instead imposes a price floor at $8.

(i) How many units will consumers and producers exchange at the price floor?

(ii) Does the price floor correct the market failure? Explain.

3. Nirali is a student at the University of Ainsley. She has 5 hours to study for two exams today. The tables below show Nirali's expected scores given the amount of time she studies for each exam.

Number of Hours Spent Studying Microeconomics	Expected Score on Microeconomics Exam (100-point scale)
5	100
4	96
3	90
2	82
1	60
0	0

Number of Hours Spent Studying History	Expected Score on History Exam (100-point scale)
0	0
1	40
2	60
3	72
4	77
5	80

(a) Nirali spends 3 hours studying microeconomics and 2 hours studying history. Calculate her gain from the second hour spent studying history.

(b) Calculate Nirali's opportunity cost of the second hour spent studying history.

(c) Assume Nirali increases the time she allocates to studying history. What happens to the opportunity cost of studying history? Explain.

(d) Assume that Nirali has a goal of maximizing the sum of her test scores (the score on microeconomics plus the score on history). How many hours should she study for each exam?

(e) Nirali learns that her tennis practice has been canceled, freeing up an additional hour for studying. Given your answer to part (d), will Nirali allocate the additional hour to studying microeconomics or to studying history to maximize the sum of her test scores? Explain using marginal analysis.

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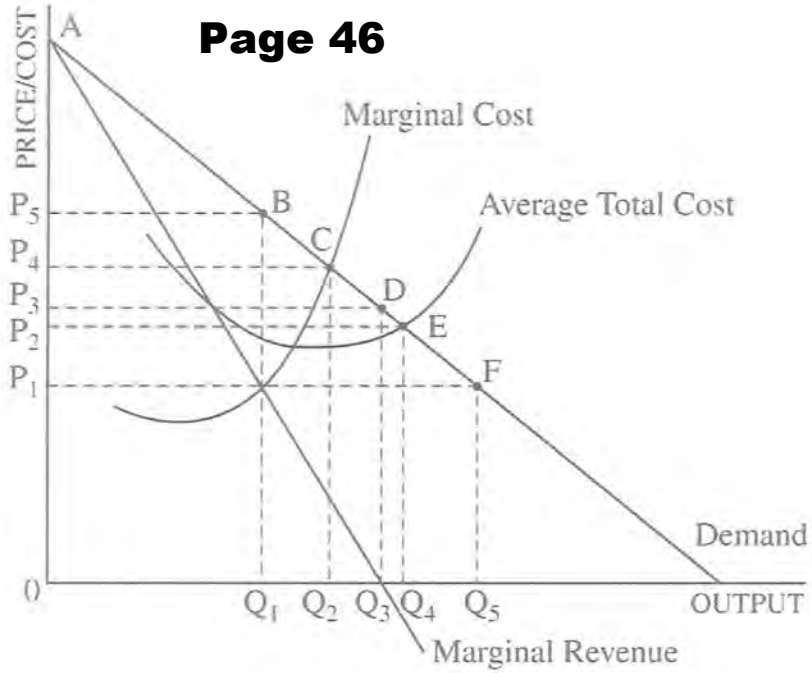

1. The diagram above shows the cost and revenue curves for a monopoly.

   (a) How does a monopolist determine its profit-maximizing level of output and price?

   (b) Using the information in the graph, identify each of the following for the monopolist.

   (i) The profit-maximizing level of output and price

   (ii) The line segment of the demand curve that is elastic

   (c) Suppose that the industry depicted in the graph became perfectly competitive without changing the demand or cost curves. Identify the equilibrium price and output that would prevail in the perfectly competitive market.

   (d) Using the information in the graph, identify the area of consumer surplus for each of the following.

   (i) The profit-maximizing monopoly

   (ii) The perfectly competitive industry

   (e) Define allocative efficiency.

   (f) To be allocatively efficient, what level of output should the monopolist produce?

   (g) Should the government use a per-unit tax or a per-unit subsidy to lead the monopolist to produce the allocatively efficient level of output? Explain how this tax or subsidy would achieve the allocatively efficient level of output.

2. Assume that a firm produces output using one fixed input, capital, and one variable input, labor. The firm can sell all of the output it produces at a market price of $3 each, can hire all of the workers it wants at a market wage rate of $11 each, and has fixed costs of $10. It faces the following production schedule.

Number of Employees	Total Output
0	0
1	14
2	26
3	35
4	42
5	46
6	48

(a) In what kind of market structure does this firm sell its output? How can you tell?

(b) In what kind of market structure does this firm hire its employees? How can you tell?

(c) Using marginal revenue product analysis, how many employees should this firm hire to maximize short-run profits? How can you determine that?

(d) Based on your answer in part (c), how many units of output will this firm produce?

(e) At the level of output you identified in part (d), is the firm earning an economic profit, a normal profit, or suffering a loss? How can you tell?

3. Assume all of the following about imported and domestically produced shoes.
   - They are sold in two separate and perfectly competitive markets.
   - They are close substitutes.
   - The demand for both is price elastic.

   Now assume that a tariff is imposed on imported shoes.

   (a) Using a correctly labeled graph, show the impact of the tariff on each of the following in the market for imported shoes.
      (i) Price
      (ii) Output

   (b) Using a new correctly labeled graph, show the impact of the tariff on each of the following in the market for domestically produced shoes.
      (i) Price
      (ii) Output

   (c) Given that the demand for imported shoes is price elastic, will expenditures on imported shoes by consumers increase, decrease, or remain the same? How do you know?

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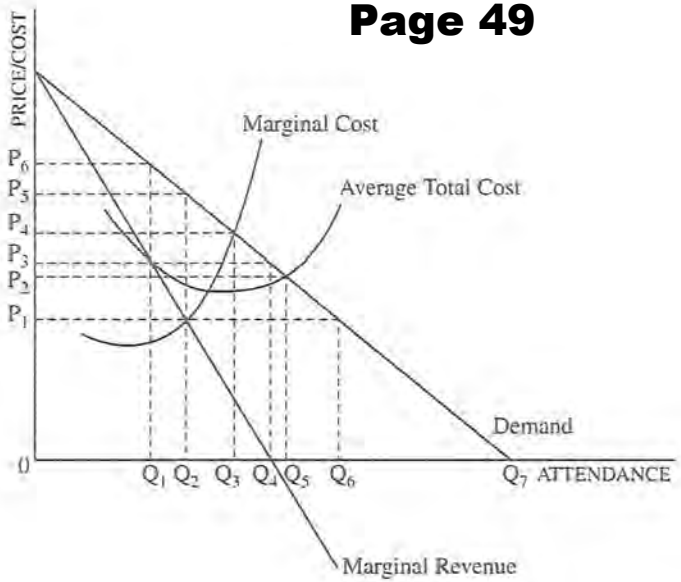

1. There is one art museum on the island of Watsonia. The museum's demand and cost curves are shown in the graph above. The museum currently relies on an admission charge for some of its funding. Its directors are debating about how to set the admission charge.
   (a) Using the labeling of the graph above, identify the price and quantity associated with the following objectives.
      (i) The museum maximizes its profit.
      (ii) The museum maximizes its total revenue.
      (iii) The museum maximizes the sum of consumer and producer surplus.
      (iv) The museum maximizes its attendance, as long as it breaks even.
   (b) When the attendance is Q_1, is the demand price elastic, inelastic, or unit elastic? Explain.

(c) Assume that the price is set at P_2. Assuming the existence of an opportunity cost, indicate whether the museum's accounting profits would be positive, negative, or zero. Explain why.

(d) Assume that the government decides the museum should charge no admission and agrees to subsidize the museum for any losses.
   (i) Using the labeling in the graph, identify the museum's attendance under that circumstance.
   (ii) Would the outcome be allocatively efficient? Explain.

Short-Run Total Cost Function

Quantity Produced	Total Cost (in dollars)
0	20
1	27
2	38
3	53
4	72
5	95
6	122

2. The table above gives the short-run total cost function for a typical firm in a perfectly competitive industry.
   (a) What is the dollar value of the firm's total fixed cost?
   (b) Calculate the marginal cost of producing the first unit of output.
   (c) If the price the firm receives for its product is $20, indicate the firm's profit-maximizing quantity of output and explain how you determined your answer.
   (d) Given your results in part (c), explain what will happen to the number of firms in the industry in the long run.
   (e) Assume that this firm operates in a constant-cost industry and has reached long-run equilibrium. If the government imposes a per-unit tax of $2, indicate what will happen to the firm's profit-maximizing output in the long run.

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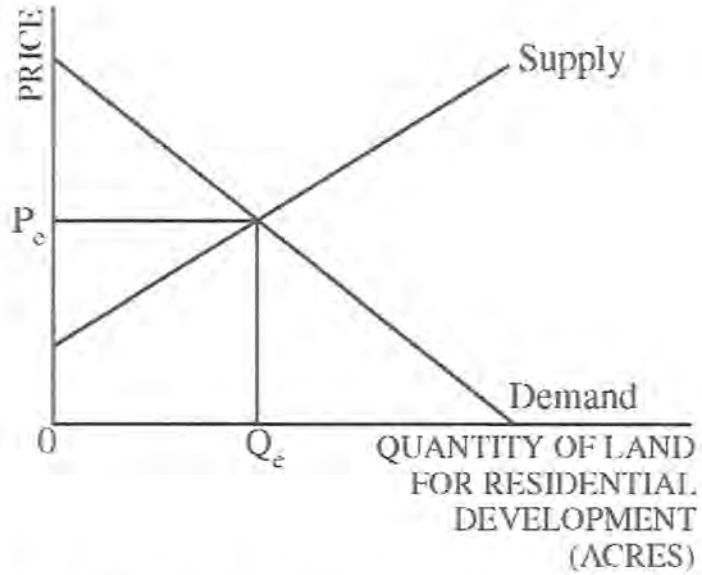

3. The supply and demand for land for residential development is shown in the diagram above. The land supplied for such development comes from privately held open-space land or privately held farmland.

   (a) Redraw the graph above and show how an increase in income will affect the equilibrium price and quantity of land converted into residential development, assuming that land for residential development is a normal good.

   (b) Redraw the graph above and show how a decrease in government per-unit subsidies to farmers will affect the equilibrium price and quantity of land converted into residential development.

   (c) Assume that the conversion of open-space land and farmland imposes costs on the general population, which can no longer enjoy the scenic vistas.

      (i) Indicate whether the marginal social cost of converting land is greater than, less than, or equal to the marginal private cost of converting land.

      (ii) Explain whether the private market quantity of land converted into residential development is socially optimal.

1. Assume that the cellular telephone industry is monopolistically competitive.
   (a) Assume that cellular telephone manufacturers are earning short-run economic profits. Draw a correctly labeled graph for a typical firm in the industry and show each of the following.
      (i) The profit-maximizing output and price
      (ii) The area representing economic profit
   (b) At the profit-maximizing price you identified in part (a), would the typical firm's demand curve be price inelastic? Explain.
   (c) Given the information in part (a), what happens to the demand curve for the typical firm in the long run? Explain.
   (d) Using a new correctly labeled graph, show the profit-maximizing output and price for the typical firm in the long run.
   (e) Does the typical firm produce an output level that minimizes its average total cost in the long run?
   (f) In long-run equilibrium, does the typical firm produce the allocatively efficient level of output? Explain.

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2. Two airline companies, Airtouch and Windward, operate a route from City X to City Y, transporting a mix of passengers and freight. They must file their schedules with the National Transportation Board each year and cannot alter them during that year. Those schedules are revealed only after both companies have filed. Each airline must choose between a morning and an evening departure. The relevant payoff matrix appears below, with the first entry in each cell indicating Airtouch's daily profit and the second entry in each cell indicating Windward's daily profit.

		Windward: Morning	Windward: Evening
Airtouch	Morning	\$1,000, \$700	\$700, \$600
	Evening	\$750, \$950	\$900, \$800

(a) In which market structure do these firms operate? Explain.

(b) If Windward chooses an evening departure, which departure time is better for Airtouch?

(c) Identify the dominant strategy for Windward.

(d) Is choosing an evening departure a dominant strategy for Airtouch? Explain.

(e) If both firms know all of the information in the payoff matrix but do not cooperate, what will be Windward's daily profit?

3. For each of the following statements, indicate whether it is true, false, or uncertain and explain why.

(a) Average total cost is always greater than average variable cost by a constant amount.

(b) In the short run, a perfectly competitive firm always maximizes profit when average total cost is at minimum.

(c) If a firm shuts down in the short run, its profits will equal zero.

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3. For each of the following statements, indicate whether it is true, false, or uncertain and explain why.
   (a) Average total cost is always greater than average variable cost by a constant amount.
   (b) In the short run, a perfectly competitive firm always maximizes profit when average total cost is at minimum.
   (c) If a firm shuts down in the short run, its profits will equal zero.

1. A patent gives inventors the exclusive right to produce and market a product for a period of time. GCR Company is a profit-maximizing firm. It has a patent for a unique antispyware computer program called Aspy.
   (a) Assume that GCR is making economic profit. Draw a correctly labeled graph and show the profit-maximizing price and quantity.
   (b) Assume that the government imposes a lump-sum tax on GCR.
      (i) What will happen to output and market price? Explain.
      (ii) What will happen to GCR's profits?
   (c) Assume instead that the government grants a per-unit subsidy to GCR for Aspy.
      (i) What will happen to output and market price? Explain.
      (ii) What will happen to GCR's profits?
   (d) Now assume that GCR's patent on Aspy expires. What will happen to GCR's economic profits in the long run? Explain.

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Number of Unskilled Workers Hired	Quantity of Radios Produced (per day)
0	0
1	20
2	45
3	60
4	70
5	75
6	79
7	80

2. Assume that HZRad Company produces clock radios as shown in the short-run production function in the table above. HZRad can sell all the clock radios it produces at a market price of $20 each and can hire all the unskilled labor it needs at a wage of $90 per day per worker. Assume also that labor is the only variable input.

   (a) Using the specific information above, draw a correctly labeled graph of HZRad's current supply curve for unskilled labor.

   (b) What is HZRad's profit-maximizing output level? Explain.

   (c) Suppose that HZRad is the first company to use a new technology that increases the productivity of its unskilled workers.

      (i) How will the new technology affect the quantity of unskilled labor HZRad hires? Explain.

      (ii) How will the new technology affect the wage paid to HZRad's unskilled workers?

3. Two bus companies, Roadway and Rankin Wheels, operate a route from Greensboro to Spring City, transporting a mix of passengers and freight. They must file their schedules with the local transportation board each year and cannot alter them during that year. Those schedules are revealed only after both companies have filed. Each company must choose between an early and a late departure. The relevant payoff matrix appears below, with the first entry in each cell indicating Roadway's daily profit and the second entry in each cell indicating Rankin Wheels' daily profit.

		Rankin Wheels: Early	Rankin Wheels: Late
Roadway	Early	\$1,000, \$900	\$950, \$850
Roadway	Late	\$750, \$650	\$700, \$800

(a) In which market structure do these firms operate? Explain.

(b) If Roadway chooses an early departure, which departure time is better for Rankin Wheels?

(c) Identify the dominant strategy for Roadway.

(d) Is choosing an early departure a dominant strategy for Rankin Wheels? Explain.

(e) If both firms know all of the information in the payoff matrix but do not cooperate, what will be Rankin Wheels' daily profit?

1. Callahan's Orchard grows apples and operates in a constant-cost, perfectly competitive apple industry. Callahan's Orchard is currently in long-run equilibrium.

q1 micro micro 2008

(a) Draw correctly labeled side-by-side graphs for the apple market and Callahan's Orchard, and show each of the following.

(i) Market output and price, labeled as "Q_M" and "P_M", respectively

(ii) Callahan's output and price, labeled as "Q_F" and "P_F", respectively

(b) Now assume that the government provides farm support to apple growers by granting an annual lump-sum subsidy to all apple growers. Indicate the effect the subsidy would have on each of the following in the short run.

(i) Callahan's quantity of output. Explain.

(ii) Callahan's profit

(iii) The number of firms in the industry

(c) Indicate how each of the following will change in the long run as a result of the lump-sum subsidy.

(i) The number of firms in the industry. Explain.

(ii) Price

(iii) Industry output

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2. Utility and price elasticity of demand are important concepts in explaining consumer behavior.

(a) Define marginal utility.

q2 micro micro 2008

(b) The table below shows the quantities, prices, and marginal utilities of two goods, fudge and coffee, which Mandy purchases.

	Fudge	Coffee
Quantity of purchase	10 pounds	7 pounds
Price per pound	$2	$4
Marginal utility of last pound	12	20

Mandy spends all her money and buys only these two goods. In order to maximize her utility, should Mandy purchase more fudge and less coffee, purchase more coffee and less fudge, or maintain her current consumption? Explain.

(c) Assume that consumers always buy 20 units of good R each month regardless of its price.

(i) What is the numerical value of the price elasticity of demand for good R?

(ii) If the government implements a per-unit tax of $2 on good R, how much of the tax will the seller pay?

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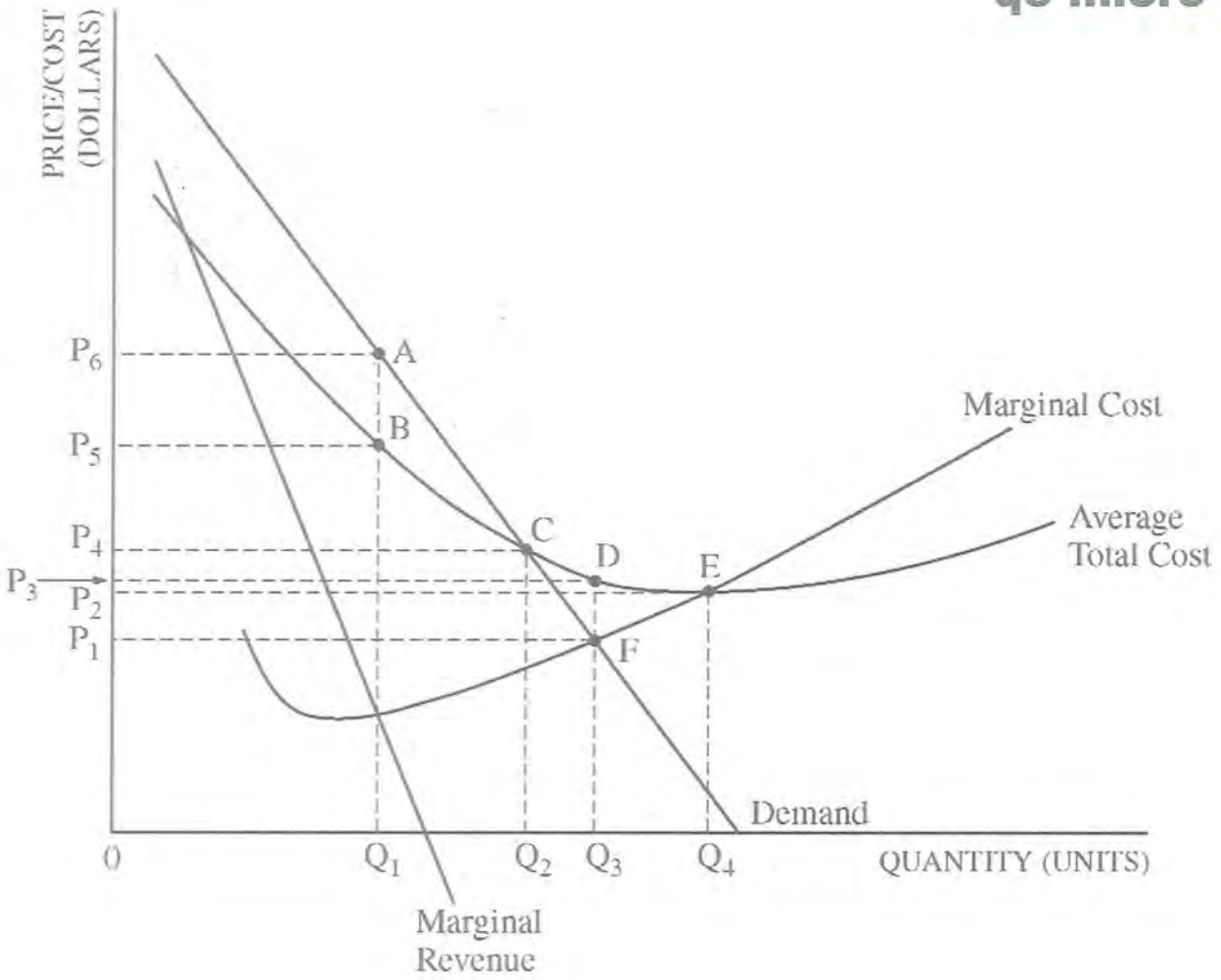
3. Social efficiency is affected by government policy and the structure of markets.

(a) For a competitive market for which there is a binding (effective) price ceiling, draw a correctly labeled graph and label the price ceiling "P_C", the quantity sold "Q_A", and the socially efficient output "Q_B".

(b) The graph below shows a natural monopoly.

q3 micro micro 2008



(i) Using the labeling in the graph, identify each of the following.

(1)The profit-maximizing output

(2)The socially efficient output

(ii) At the socially efficient output, is the monopoly making a profit or incurring a loss? Using the labeling on the graph, identify the area of profit/loss.

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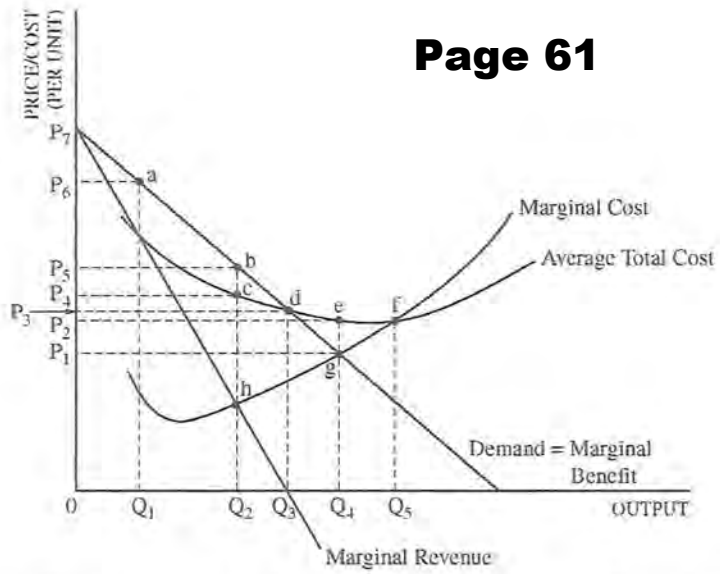

1. The graph above shows the demand and cost curves of a firm that does not price discriminate.

   (a) Suppose the firm produces at the profit-maximizing output. Using the labeling on the graph, identify each of the following.

   (i) Level of output. Explain.

   (ii) Price

   (b) Suppose the firm produces at the revenue-maximizing output. Using the labeling on the graph, identify each of the following.

   (i) Level of output. Explain.

   (ii) Price

   (c) Suppose the government regulates the firm's price to produce the allocatively efficient level of output. Using the labeling on the graph, identify each of the following.

   (i) The price the government would require the firm to set

   (ii) The allocatively efficient level of output

   (d) Suppose the firm produces at the allocatively efficient level of output.

   (i) Would it be earning a profit or incurring a loss? Explain.

   (ii) Using the labeling on the graph, identify the area of the profit or loss at the allocatively efficient level of output.

   (e) Using the labeling on the graph, identify the consumer surplus at the allocatively efficient level of output.

   (f) Suppose the regulators establish a price that allows the firm to just cover all its opportunity costs. Using the labeling on the graph, identify the price the regulators would set to achieve this objective.

2. Vaccinations for contagious diseases benefit the consumers as well as others in the community. Assume that vaccines are produced in a competitive market.

   (a) Draw a correctly labeled graph of supply and demand, and

      (i) label the market price "P_m", and label the market output "Q_m".

      (ii) label the socially efficient level of output "Q_s".

      (iii) shade the area of the deadweight loss.

   (b) Is marginal social cost greater than, less than, or equal to marginal social benefit at the market output?

   (c) How will a tax on producers of the vaccines affect the deadweight loss that you identified in part (a) (iii) ? Explain.

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3. GW Company produces and sells hats in a perfectly competitive market at a price of $2 per hat. Assume that labor is the only variable input and the wage rate is $15 per unit of labor per day. The table below shows GW's short-run production function for hats.

Number of workers per day	0	1	2	3	4	5	6
Output of hats per day	0	10	26	36	44	49	52

(a) After which worker do diminishing marginal returns begin?

(b) Calculate the marginal physical product of the fifth worker.

(c) Calculate the marginal revenue product of the third worker.

(d) How many workers will GW hire to maximize profit?

(e) If GW Company has fixed costs equal to $20, what will be the company's short-run economic profits from hiring two workers?

(f) If the price of hats increases, what will happen to the number of workers hired in the short run? Explain.

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1. CableNow is the only supplier of cable TV services offering a wide range of TV channels. CableNow is an unregulated firm and is currently earning an economic profit. Assume that CableNow does not practice price discrimination.

   (a) Draw a correctly labeled graph for CableNow and show each of the following. Make sure your graph is large enough to be legible.

      (i) The profit-maximizing quantity of cable services, labeled as Q*

      (ii) The profit-maximizing price, labeled as P*

      (iii) The area of economic profit, completely shaded

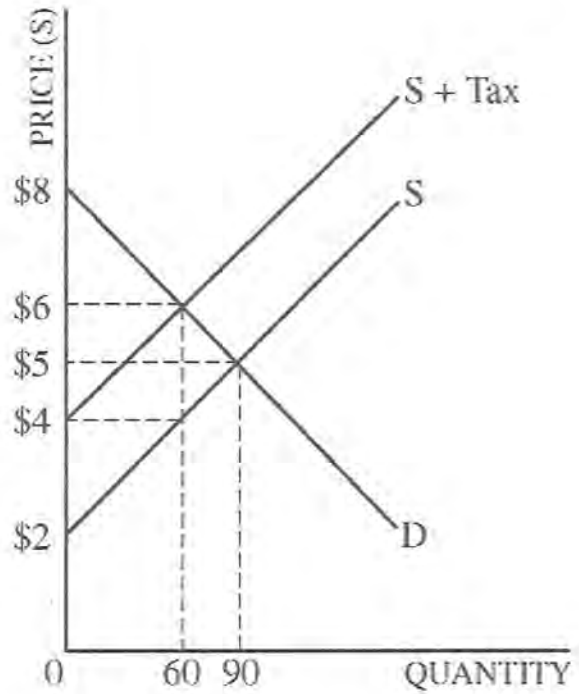
      (iv) The socially optimal level of cable services, assuming no externalities, labeled as Q_S

   (b) Assume that the government grants CableNow a lump-sum subsidy of $1 million. Will this policy change CableNow's profit-maximizing quantity of cable services? Explain.

   (c) Instead of granting a subsidy, assume now that the government chooses to require CableNow to produce the quantity at which CableNow earns zero economic profit. On the graph you drew in part (a), label this quantity Q_R.

   (d) At Q_R, is the firm's accounting profit positive, negative, or zero? Explain.

   (e) Assume that a new study reveals there are external benefits associated with watching TV. Will the socially optimal quantity of cable services now be larger than, smaller than, or equal to the Q_S you identified in part (a)(iv) ?



2. The graph above illustrates the market for calculators. S denotes the current supply curve, and D denotes the demand curve.
   (a) Calculate the producer surplus before the tax.
   (b) Now assume a per-unit tax of $2 is imposed whose impact is shown in the graph above.
      (i) Calculate the amount of tax revenue.
      (ii) What is the after-tax price that the sellers now keep?
      (iii) Calculate the producer surplus after the tax.
   (c) Is the demand price elastic, inelastic, or unit elastic between the prices of $5 and $6 ? Explain.
   (d) Assuming no externalities, how does the tax affect allocative efficiency? Explain.

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3. Two competing retail firms, Red Shop and Blue Mart, are studying potential locations for new stores in the suburbs of a major city. Each firm must choose between a location north of the city and a location south of the city. The payoff matrix is shown below, with the first entry in each cell indicating Red Shop's daily profit and the second entry indicating Blue Mart's daily profit. Both firms know all of the information in the payoff matrix.

		Blue Mart: North	Blue Mart: South
Red Shop	North	\$900, \$1,800	\$3,000, \$3,500
	South	\$5,000, \$4,000	\$1,500, \$1,000

(a) If Red Shop chooses a location south of the city, which location is better for Blue Mart? Explain.

(b) Is choosing a location to the south of the city a dominant strategy for Red Shop? Explain.

(c) If the two firms cooperate in choosing locations, where will each firm locate?

(d) Assume that the south suburb has enacted an incentive package to attract new business. Any firm that locates south of the city will receive a subsidy of \$2,000 per day. Redraw the payoff matrix to include the subsidy.

1. Mary & Company, operating in a monopolistically competitive industry, produces a cleaning product called BriteKlean. The company currently produces the profit-maximizing quantity of BriteKlean but is operating at a loss.

q1 micro mico 2009 form b

(a) Draw a correctly labeled graph for Mary & Company and show each of the following.

(i) The profit-maximizing output and price, labeled as Q_M and P_M, respectively

(ii) The area of loss, shaded completely

(b) What must be true in the short run for the company to continue to produce at a loss?

(c) Assume now that the demand for cleaning products increases and that the company is now earning short-run economic profits. Relative to this short-run situation, how does each of the following change in the long run?

(i) The number of firms

(ii) The company's profit

(d) In the long run, if the company continues to produce, will it produce the allocatively efficient level of output? Explain.

(e) In the long run, will the company be operating in a region where economies of scale exist? Explain.

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2. Sasha is a utility-maximizing consumer who spends all of her income on peanuts and bananas, both of which are normal goods.

q2 micro micro 2009 form b

(a) Assume that the last unit of peanuts consumed increased Sasha's total utility from 40 utils to 48 utils and that the last unit of bananas consumed increased her total utility from 52 utils to 56 utils.

(i) If the price of a unit of peanuts is $1 and Sasha is maximizing utility, calculate the price of a unit of bananas.

(ii) If the price of a unit of peanuts increases and the price of a unit of bananas remains unchanged from the price you determined in part (a)(i), how will Sasha's purchase of peanuts change?

(b) Assume that the cross-price elasticity of demand between peanuts and bananas is positive. A widespread disease has destroyed the banana crop. What will happen to the equilibrium price and quantity of peanuts in the short run? Explain.

(c) Assume that the price of bananas increases.

(i) Will the substitution effect increase, decrease, or have no effect on the quantity of bananas demanded?

(ii) What happens to Sasha's real income?

3. Two interdependent bus companies—City Wheels and Easy Ride—provide transportation services in the same city. Following a change in costs that affects both companies, each company must decide whether to lower its fare or maintain its current fare. In the payoff matrix below, the first entry in each cell indicates the daily profit to Easy Ride and the second entry indicates the daily profit to City Wheels. Both companies know all of the information in the matrix.

q3 micro micro 2009 form b

		City Wheels: Maintain Fare	City Wheels: Lower Fare
Easy Ride	Maintain Fare	\$150, \$180	\$130, \$120
Easy Ride	Lower Fare	\$120, \$130	\$140, \$110

(a) If Easy Ride chooses to maintain its current fare, which strategy is better for City Wheels? Explain.

(b) Is there a dominant strategy for Easy Ride? Explain.

(c) Assume that the companies must make their decisions simultaneously and do not cooperate. What will be the daily profit for each firm?

(d) If these two firms could cooperate, which strategy would each firm choose?

(e) Suppose that the local government decides to provide a subsidy of \$40 per day to the bus companies. However, only a company that agrees to lower its fare is eligible to receive the subsidy. Draw a new payoff matrix to reflect the change in government policy.

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1. Assume that corn is produced in a perfectly competitive market. Farmer Roy is a typical producer of corn.
   (a) Assume that Farmer Roy is making zero economic profit in the short run. Draw a correctly labeled side-by-side graph for the corn market and for Farmer Roy and show each of the following.
      (i) The equilibrium price and quantity for the corn market, labeled as P_{M1} and Q_{M1}, respectively
      (ii) The equilibrium quantity for Farmer Roy, labeled as Q_{F1}
   (b) For Farmer Roy's corn, is the demand perfectly elastic, perfectly inelastic, relatively elastic, relatively inelastic, or unit elastic? Explain.
   (c) Corn can be used as an input in the production of ethanol. The demand for ethanol has significantly increased.
      (i) Show on your graph in part (a) the effect of the increase in demand for ethanol on the market price and quantity of corn in the short run, labeling the new equilibrium price and quantity as P_{M2} and Q_{M2}, respectively.
      (ii) Show on your graph in part (a) the effect of the increase in demand for ethanol on Farmer Roy's quantity of corn in the short run, labeling the quantity as Q_{F2}.
      (iii) How does the average total cost for Farmer Roy at Q_{F2} compare with P_{M2}?
   (d) Corn is also used as an input in the production of cereal. What is the effect of the increased demand for ethanol on the equilibrium price and quantity in the cereal market in the short run? Explain.

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2. The John Lamb Company, a profit-maximizing firm producing widgets, is in a perfectly competitive widget market. Assume John Lamb employs a fixed number of employees and rents a machine for a variable number of hours from a perfectly competitive market.

   (a) Using correctly labeled side-by-side graphs of the factor market for machines and the John Lamb Company, show each of the following.

      (i) The equilibrium rental price of machines in the factor market, labeled as P_R

      (ii) John Lamb's equilibrium rental quantity of machines, labeled as Q_L

   (b) Assume that the popularity of widgets declines, decreasing the demand for widgets. What will happen to each of the following?

      (i) Marginal product curve for machine-hours

      (ii) Marginal revenue product curve for machine-hours. Explain.

   (c) John Lamb is employing the cost-minimizing combination of inputs. The marginal product of labor is 28 widgets per worker hour and the wage rate is $14 per hour. The marginal product of the machine is 60 widgets per machine-hour. What is the hourly rental price of a machine?

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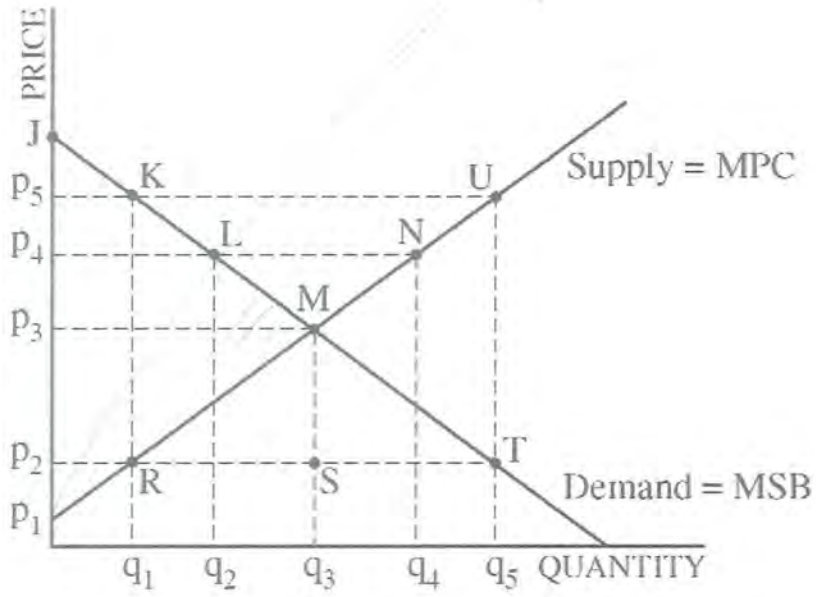


3. The graph above shows the perfectly competitive market for hard candies in Country Alpha. In the graph the letters correspond to points, not areas. MPC denotes marginal private cost and MSB denotes marginal social benefit.

   (a) Using the labeling on the graph, identify the area representing each of the following at the market equilibrium.

      (i) The consumer surplus

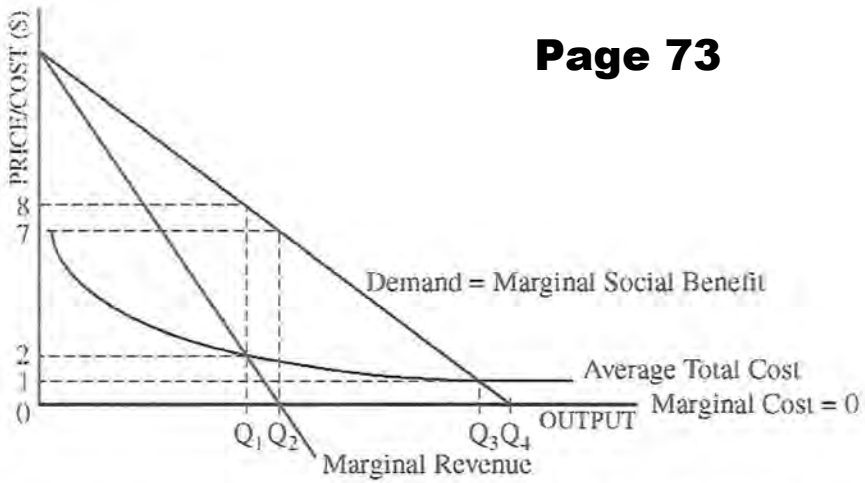
      (ii) The producer surplus

   (b) Assume that the production of each unit of candy creates a negative externality equal to (p_5-p_2). Using the labeling on the graph, identify the socially optimal quantity.

   (c) Assume that the government imposes a per-unit tax of (p_5-p_2) to correct for the negative externality. Using the labeling on the graph, identify the area representing each of the following.

      (i) The consumer surplus

      (ii) The deadweight loss



1. The diagram above shows the cost and revenue curves for a bridge to a popular island. The marginal cost of crossing the bridge is zero and is indicated in the diagram as the horizontal axis. The price is the toll to cross the bridge, and the output is the number of autos that cross the bridge each day.

   (a) Assume that a private firm owns the bridge and maximizes profits. Based on the diagram, determine each of the following.

   (i) Output

   (ii) Price

   (b) Now assume that a municipality owns the bridge and sets the price to achieve allocative efficiency. Based on the diagram, determine each of the following.

   (i) Output

   (ii) Price

   (c) At a price of $1, is the municipality's accounting profit positive, negative, or zero? Explain.

   (d) Suppose that the municipality sets a break-even price that generates revenues to just cover all economic costs.

   (i) Based on the diagram, determine the break-even output.

   (ii) At the output you determined in part (d)(i), is the demand relatively elastic, relatively inelastic, unit elastic, perfectly elastic, or perfectly inelastic?

   (e) If a company begins to provide access to the island via commercial watercraft, what will happen to each of the following in the diagram?

   (i) The demand curve for bridge crossings

   (ii) The profit-maximizing output

   (f) Suppose the long-run average total cost is strictly downward sloping. Would it be efficient to build a second bridge? Explain.

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Number of Workers	Marginal Revenue Product per Day
1	$450
2	$500
3	$450
4	$400
5	$300
6	$100

$50
$50
$50
$100
$100

2. The table above gives the short-run marginal revenue product of labor per day for a perfectly competitive firm. The firm is currently selling its product at the market price of $5.

   (a) Calculate the marginal (physical) product of the third worker.

   (b) Define the law of diminishing marginal returns and explain why it occurs.

   (c) Diminishing marginal returns first occur with the hiring of which worker for the firm? $50

   (d) What is the highest daily wage that the firm is willing to pay to hire the fifth worker? $300

   (e) What will happen to the demand for labor if the market price of the product increases? Explain.

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3. (a) The table below gives the quantity of good X demanded and supplied at various prices.

Price (dollars)	Quantity Demanded (units)	Quantity Supplied (units)
30	1	3
20	3	3
10	4	3

(i) Is the demand for good X relatively elastic, relatively inelastic, unit elastic, perfectly elastic, or perfectly inelastic when the price decreases from \$30 to \$20 ? Explain.

(ii) Is the supply of good X relatively elastic, relatively inelastic, unit elastic, perfectly elastic, or perfectly inelastic when the price decreases from \$30 to \$20 ? Explain.

(iii) If a per-unit tax is imposed on good X, how is the burden of the tax distributed between the buyers and sellers of good X?

(b) Assume that the income elasticity of demand for good Y is –2. Using a correctly labeled graph of the market for good Y, show the effect of a significant increase in income on the equilibrium price of good Y in the short run.

75

1. Suppose that roses are produced in a perfectly competitive, increasing-cost industry in long-run equilibrium with identical firms.
   (a) Draw correctly labeled side-by-side graphs for the rose industry and a typical firm and show each of the following.
      (i) Industry equilibrium price and quantity, labeled P_m and Q_m, respectively
      (ii) The firm's equilibrium price and quantity, labeled P_f and Q_f, respectively
   (b) Is P_m larger than, smaller than, or equal to P_f?
   (c) Assume that there is an increase in the demand for roses. On your graphs in part (a), show each of the following.
      (i) The new short-run industry equilibrium price and quantity, labeled P_{m2} and Q_{m2}, respectively
      (ii) The new short-run profit-maximizing price and quantity for the typical firm, labeled P_{f2} and Q_{f2}, respectively
   (d) As the industry adjusts to a new long-run equilibrium,
      (i) what will happen to the number of firms in the industry? Explain.
      (ii) will the firm's average total cost curve shift upward, shift downward, or remain unchanged?
   (e) In the long run, compare the firm's profit-maximizing price to each of the following.
      (i) P_f in part (a)(ii)
      (ii) P_{f2} in part (c)(ii)

2. Suppose research shows that the more college education individuals receive, the more responsible citizens they become and the less likely they are to commit crimes.

   (a) Draw a correctly labeled graph for the college education market and show each of the following.

      (i) Private market equilibrium quantity and price of college education, labeled Q_m and P_m, respectively

      (ii) Socially optimal quantity of education, labeled Q_s

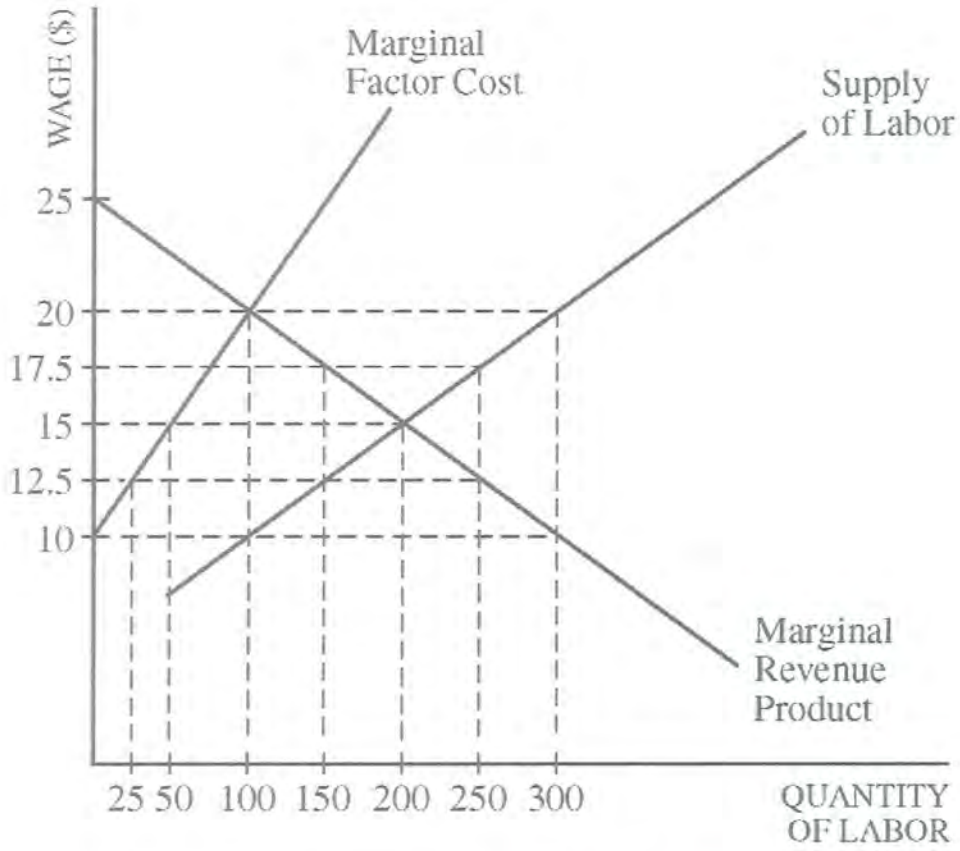
      (iii) Deadweight loss at the market equilibrium, completely shaded

   (b) Assume that the government imposes an effective (binding) price ceiling on the price of college education.

      (i) Show the price ceiling on your graph in part (a), labeling the price ceiling P_c.

      (ii) Does this price ceiling increase, decrease, or have no impact on the deadweight loss in this industry? Explain.

   (c) Assume that instead of the price ceiling, the government grants each student a subsidy for each unit of college education purchased. Will the new equilibrium quantity of college education purchased be greater than, less than, or equal to Q_m from part (a) ?



3. Woodland is a small town in which everyone works for TreeMart, the local lumber company. TreeMart is a monopsonist in the labor market and a perfect competitor in the lumber market. In the short run, labor is the only variable input. The labor market for TreeMart is given in the graph above.

   (a) Identify the profit-maximizing quantity of labor for TreeMart.

   (b) Identify the wage rate TreeMart pays to hire the profit-maximizing quantity of labor.

   (c) Identify the quantity of labor hired in each of the following situations.

      (i) TreeMart operates in a competitive labor market.

      (ii) The government imposes a minimum wage of $12.5. Explain.

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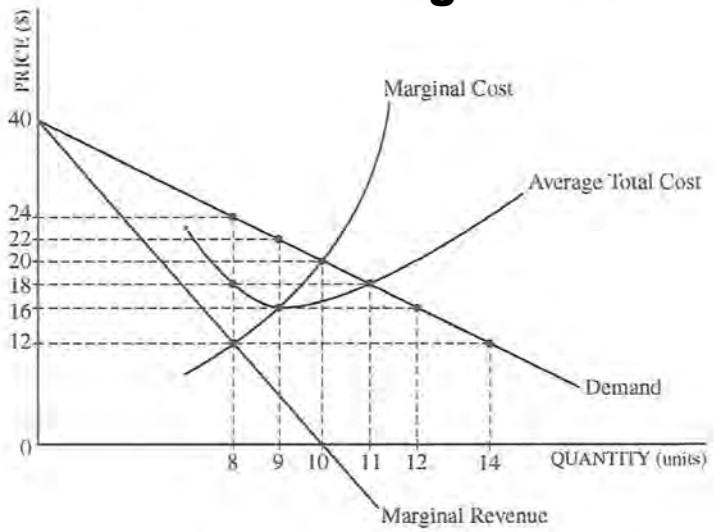
1. A monopolist's demand, marginal revenue, and cost curves are shown in the diagram below.



(a) Assume that the monopolist wants to maximize profit. Using the labeling on the graph, indicate the monopolist's price.

(b) When the output is 8 units, what is the profit per unit?

(c) Assume that the monopolist is maximizing profit. Is allocative efficiency achieved? Explain.

(d) Between the prices of $16 and $18, is the monopolist in the elastic, inelastic, or unit elastic portion of its demand curve? Explain.

(e) Assume that regulators set an output of 11 units.

(i) Is the monopolist earning positive economic profit? Explain.

(ii) Is the monopolist earning positive accounting profit?

(f) Assume instead that regulators impose a price ceiling of $22.

(i) What is the marginal revenue for the eighth unit?

(ii) What quantity will be produced?

(g) Assume instead that the monopolist practices perfect price discrimination (also called first-degree price discrimination).

(i) What quantity will be produced?

(ii) What will be the value of the consumer surplus?

2. Assume that the market for avocados is perfectly competitive. The typical firm is earning positive economic profit in the short-run equilibrium.

   (a) Draw a correctly labeled graph for the typical firm, illustrating the short-run equilibrium and labeling the equilibrium market price and output P_E and Q_E, respectively.

   (b) Assume there is an increase in the market wage rate for labor, a variable input. Show on your graph in part (a) the effect of the wage increase on the marginal cost curve in the short run.

   (c) Assume that avocado producers hire workers from a perfectly competitive labor market. Draw a graph of labor supply and demand for the typical firm and label the supply curve MFC and the demand curve MRP. Assume the market wage rate increases from w_1 to w_2. Show the effect of the wage increase on the graph, labeling the initial quantity of labor hired QL_1 and the new quantity of labor hired QL_2.

3. Assume that the market for good X is perfectly competitive and that the production of good X creates a negative externality.

   (a) Draw a correctly labeled graph of the market for good X and show each of the following.

      (i) The marginal private cost and marginal social cost of good X, labeled MPC and MSC, respectively

      (ii) The market quantity, labeled Q_m

      (iii) The allocatively efficient quantity, labeled Q_s

      (iv) The area of deadweight loss, shaded completely

   (b) Assume that a lump-sum tax is imposed on the producers of good X. What happens to the deadweight loss? Explain.

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1. Steverail, the only provider of train service operating between two cities, is currently incurring economic losses.

(a) Using a correctly labeled graph, show each of the following. **q1 micro micro 2012**

(i) Steverail's loss-minimizing price and quantity, labeled P_m and Q_m, respectively

(ii) The area of economic losses, shaded completely

(iii) The allocatively efficient quantity, labeled Q_e

(b) If Steverail raised the price above P_m identified in part (a)(i), would total revenue increase, decrease, or not change? Explain.

(c) Assume a per-unit subsidy is provided to Steverail.

(i) Will Steverail's quantity increase, decrease, or not change? Explain.

(ii) Will consumer surplus increase, decrease, or not change?

(d) Assume instead that a lump-sum subsidy is provided to Steverail. For the short run, answer the following.

(i) Will the deadweight loss increase, decrease, or not change? Explain.

(ii) Will Steverail's economic losses increase, decrease, or not change?

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2. Theresa consumes both bagels and toy cars.

q2 micro micro 2012

Quantity of Bagels	Marginal Utility from Bagels (utils)	Quantity of Toy Cars	Marginal Utility from Toy Cars (utils)
1	8	1	10
2	7	2	8
3	6	3	6
4	5	4	4
5	4	5	3
6	3	6	2

(a) The table above shows Theresa's marginal utility from bagels and toy cars.

(i) What is her total utility from purchasing three toy cars?

(ii) Theresa's weekly income is \$11, the price of a bagel is \$2, and the price of a toy car is \$1. What quantity of bagels and toy cars will maximize Theresa's utility if she spends her entire weekly income on bagels and toy cars? Explain your answer using marginal analysis.

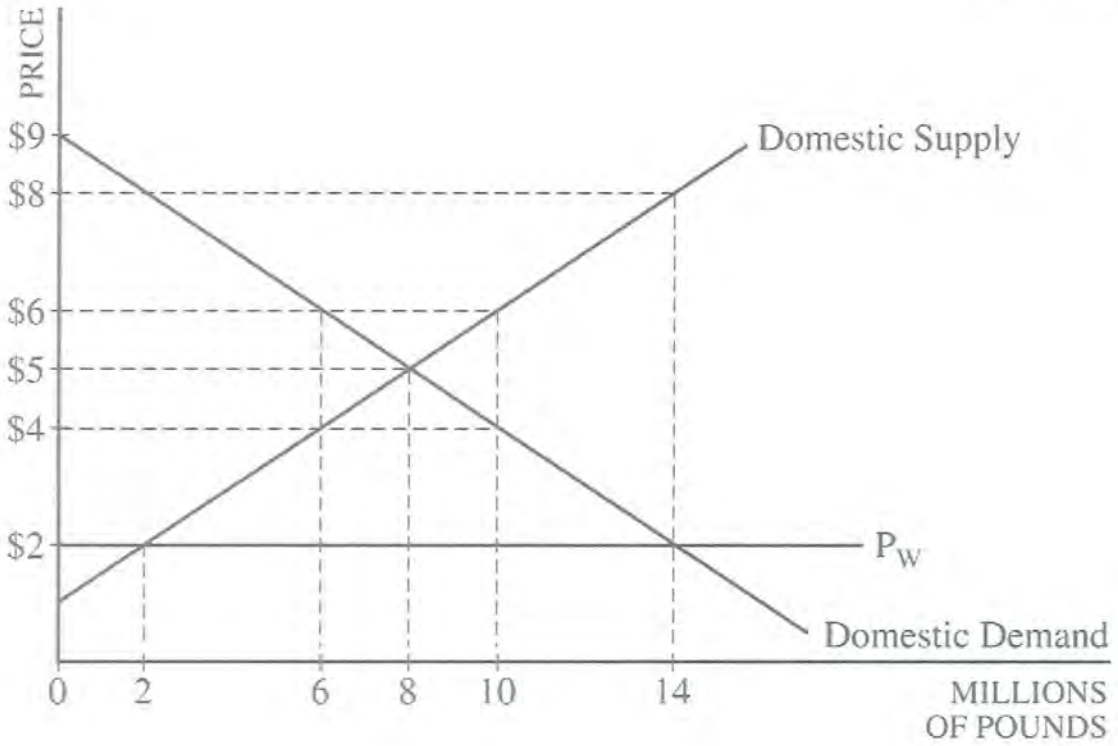
(b) Assume that the price of wheat, an input for the production of bagels, increases. Will Theresa's demand for bagels increase, decrease, or not change? Explain.

(c) Suppose that Theresa's income elasticity for bagels is –0.2. Does the value of Theresa's income elasticity indicate that bagels are normal goods, inferior goods, substitutes, or complements?

(d) Suppose that when the price of toy cars increases by 10 percent, Theresa buys 5 percent fewer toy cars and 4 percent less of a different toy, blocks. Calculate the cross-price elasticity for toy cars and blocks and indicate if it is positive or negative.

3. Sugar is freely traded in the world market. Assume that a country, Loriland, is a price taker in the world market for sugar. Some of the sugar consumed in Loriland is produced domestically while the rest is imported. The world price of sugar is \$2 per pound. The graph below shows Loriland's sugar market, and P_W represents the world price.

q3 micro micro 2012



(a) At the world price of \$2 per pound, how much sugar is Loriland importing?

(b) Suppose that Loriland imposes a per-unit tariff on sugar imports and the new domestic price including the tariff is \$4.

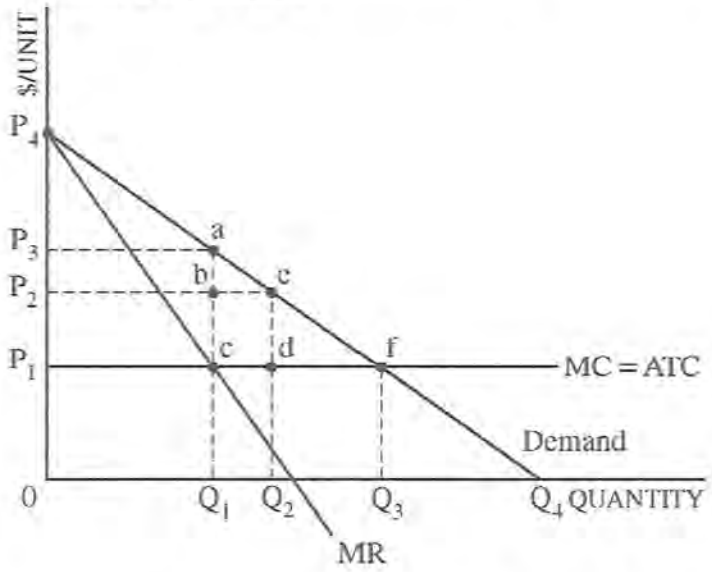
(i) Identify the new level of domestic production.

(ii) Calculate the domestic consumer surplus for Loriland. You must show your work.

(iii) Calculate the total tariff revenue collected by the government. You must show your work.

(c) Given the world price of \$2, what per-unit tariff maximizes the sum of Loriland's domestic consumer surplus and producer surplus?

1. The graph below illustrates the demand, marginal revenue (MR), marginal cost (MC), and average total cost (ATC) curves for a profit-maximizing monopolist.



ap13_microeconomics_q1

(a) Assume that the profit-maximizing monopolist is unregulated. Using the labeling in the graph, identify each of the following.

(i) The monopolist's quantity of output

(ii) The monopolist's price

(iii) The profit earned by the monopolist

(iv) The deadweight loss

(b) Now assume that the monopolist can perfectly price discriminate. Using the labeling of the graph, identify each of the following.

(i) The quantity produced

(ii) The total revenue received by the monopolist

(c) Instead, assume the monopolist charges a single price and is regulated to produce the socially efficient quantity. Using the labeling of the graph, identify each of the following.

(i) The socially efficient quantity

(ii) The consumer surplus at the socially efficient quantity

(d) Is the monopolist facing the regulation in part (c) earning a positive economic profit, earning zero economic profit, or incurring a loss? Explain.

(e) Is point f in the elastic, inelastic, or unit elastic portion of the demand curve? Explain.

2. There are two pizza restaurants in College Town, PieCrust and LaPizza. Each company must decide whether to advertise or to not advertise. In the payoff matrix below, the first entry in each cell indicates PieCrust's daily profit, and the second entry indicates LaPizza's daily profit. Both firms have complete information.

		LaPizza	
		Advertise	Not Advertise
PieCrust	Advertise	\$250, \$200	\$450, \$300
	Not Advertise	\$180, \$500	\$390, \$400

(a) What strategy should PieCrust choose if LaPizza chooses to advertise? Explain using the dollar values in the payoff matrix.

(b) What is the dominant strategy, if any, for LaPizza? Explain using the dollar values in the payoff matrix.

(c) In the Nash equilibrium, determine each of the following.

(i) PieCrust's daily profit

(ii) LaPizza's daily profit

(d) Suppose that advertising costs increase by \$60 per day. Redraw the payoff matrix to reflect the effect of the higher advertising costs.

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3. For special occasions some people purchase and set off fireworks in their backyards. Assume the market for fireworks is perfectly competitive.
   (a) Draw a correctly labeled graph of the market for fireworks and show the market equilibrium price and quantity, labeled P_E and Q_E.
   (b) Assume that the noise from the fireworks disturbs all of the neighbors. On your graph in part (a), show each of the following.
      (i) The marginal social cost curve, labeled MSC
      (ii) The marginal social benefit curve, labeled MSB
      (iii) The deadweight loss, if any, shaded completely
   (c) Now instead assume that all of the neighbors enjoy watching the fireworks.
      (i) In this case, is the market equilibrium quantity of fireworks greater than, less than, or equal to the socially optimal quantity? Explain.
      (ii) In this case, if the government bans fireworks, will the deadweight loss increase, decrease, or remain unchanged?

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Directions: Please complete each FRQ question, search for the answers using google.com and compare your answers with the answer key.

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