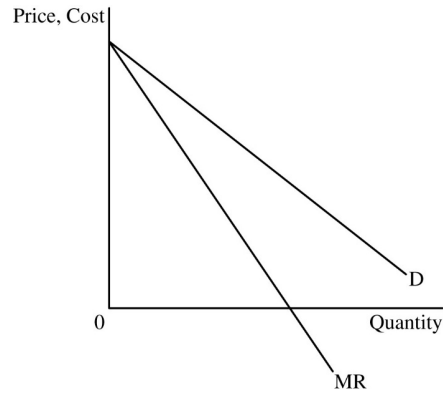
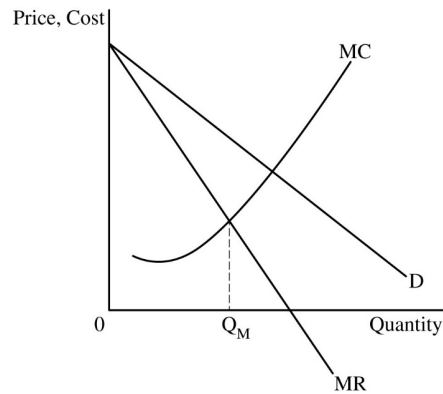


Question 1: Long**10 points**

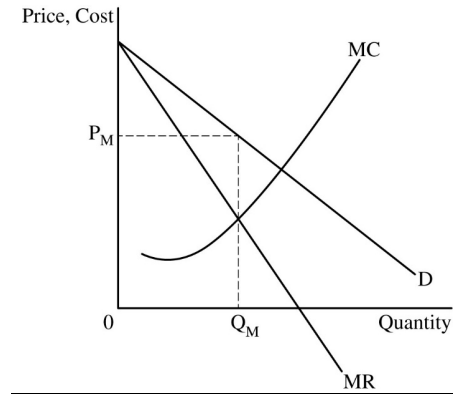
- A** Draw a correctly labeled graph for Voda Reservoir with a downward-sloping demand (D) curve and a downward-sloping marginal revenue (MR) curve with the MR curve below the D curve. **1 point**
- Point 1



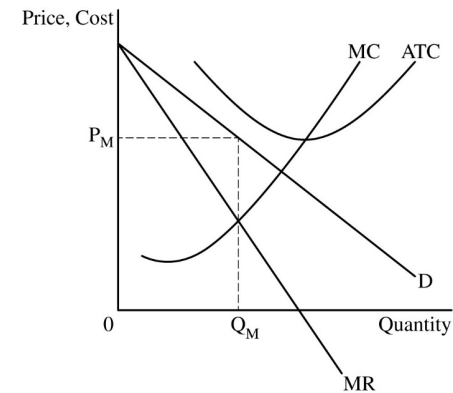
- Point 2 The graph must show a rising marginal cost (MC) curve and the profit-maximizing quantity, labeled Q_M , where $MR = MC$. **1 point**



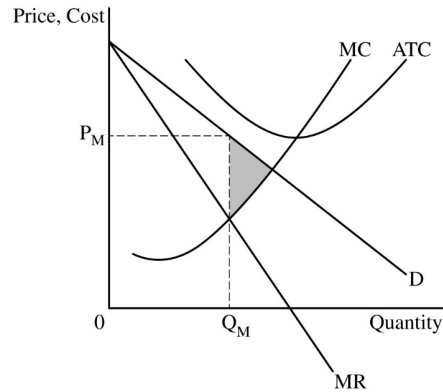
- Point 3 The graph must show the profit-maximizing price, labeled P_M , from the D curve at Q_M . **1 point**



- Point 4 The graph must show the average total cost (ATC) curve above the D curve and show the MC curve passing through the minimum point of the ATC curve. **1 point**

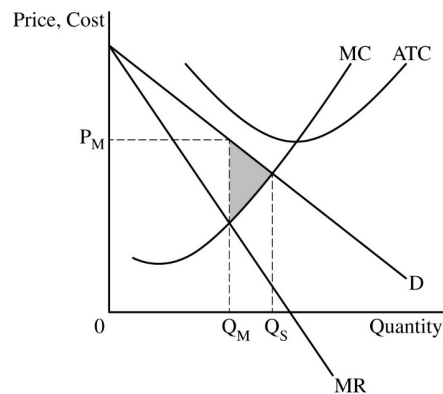


Point 5 The graph must show the area of deadweight loss, shaded completely. **1 point**



B The graph from part A must show the socially optimal quantity of bottled water, labeled Q_S , from the intersection of the D and MC curves. **1 point**

Point 6



C State that Voda Reservoir's profit-maximizing quantity of bottled water will increase and explain with **ONE** of the following: **1 point**

Point 7

- The per-unit subsidy decreases the firm's marginal cost, which shifts the MC curve to the right (down), intersecting the MR curve at a greater quantity.
- The per-unit subsidy increases the firm's marginal revenue, which shifts the MR curve to the right, intersecting the MC curve at a greater quantity.

D State that the demand for Voda Reservoir's bottled water will become more elastic. **1 point**

Point 8

E (i) State that Voda Reservoir's demand for labor will increase and explain that the **1 point**

Point 9

increase in demand for bottled water will increase the price and marginal revenue of bottled water, increasing the marginal revenue product of labor.

(ii) State that the market wage will increase in the short run and explain that the new **1 point**

Point 10

regulation will decrease the supply of workers.

Question 2: Short

5 points

(a) State that Southland has a comparative advantage in producing wheat and **1 point**

explain that the opportunity cost of producing one bushel of wheat in Southland is 1/2 yard of cloth, which is less than the opportunity cost of producing one bushel of wheat in Northland, which is 3 yards of cloth.

(b) Identify any specific number between 5 and 30 yards of cloth. **1 point**

(c) State no and explain that Southland's opportunity cost to produce one yard of cloth is **1 point**

1.5 bushels of wheat, which is greater than Northland's opportunity cost of producing cloth, which is 1/3 of a bushel of wheat.

(d)(i) State no, the market results in an inefficient allocation of resources and explain with **1 point**

ONE of the following:

- The negative externality causes the marginal social cost to be greater than the marginal social benefit ($MSC > MSB$) at the market equilibrium.
- The negative externality in production causes the marginal social cost to be greater than the marginal private cost ($MSC > MPC$) at the market equilibrium.

(ii) State that a lump-sum tax will not change the market equilibrium price and quantity in **1 point**

the short run.

Total for part (d) 2 points

Total for question 2 5 points

Question 3: Short**5 points**

- (a) Calculate the total fixed cost as \$72 and show your work. **1 point**

$$\text{Total Fixed Cost} = (\text{Average Total Cost} - \text{Average Variable Cost}) \times \text{Quantity}$$

$$\text{Total Fixed Cost} = (\$26 - \$8) \times 4 = (\$18 \times 4) = \$72$$

OR

$$\text{Total Fixed Cost} = (\$21 - \$9) \times 6 = (\$12 \times 6) = \$72$$

OR

$$\text{Total Fixed Cost} = (\$20 - \$11) \times 8 = (\$9 \times 8) = \$72$$

- (b) Identify the price as \$14 and the profit-maximizing quantity as 6 units. **1 point**

- (c) Calculate Hansel Hangout's economic profit at the profit-maximizing quantity as -\$42 and show your work. **1 point**

$$\text{Economic Profit} = (\text{Price} - \text{Average Total Cost}) \times \text{Quantity}$$

$$= (\$14 - \$21) \times 6 \text{ units} = (-\$7 \times 6) = -\$42$$

OR

$$\text{Economic Profit} = \text{Total Revenue} - \text{Total Cost}$$

$$= (\$14 \times 6) - (\$21 \times 6) = \$84 - \$126 = -\$42$$

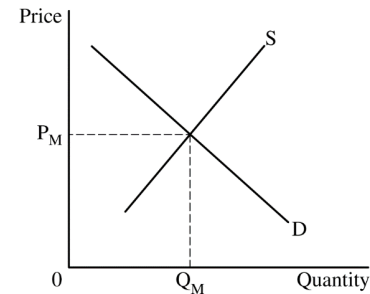
- (d) State that the market price of Good X will increase in the long run and explain that some firms will exit the market due to the negative economic profits, causing the market supply curve to shift to the left, increasing the market equilibrium price. **1 point**

- (e) State that the quantity demanded of Good C will increase and explain that a positive cross-price elasticity of demand indicates that the two goods are substitutes in consumption, and an increase in the price of Good X will increase the demand for Good C, causing an increase in the quantity demanded of Good C. **1 point**

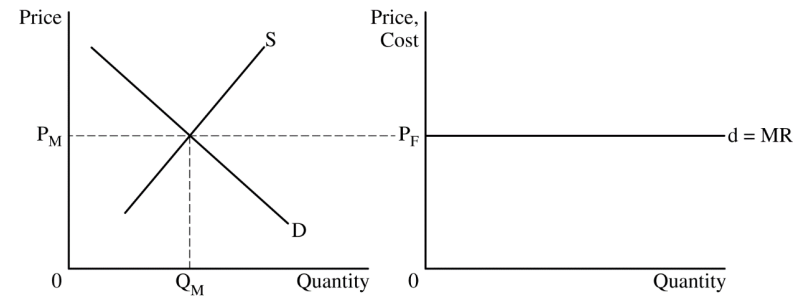
Total for question 3 5 points**Question 1: Long****10 points**

- (a) State that Anderson Company's accounting profit must be greater than its economic profit. **1 point**

- (b) Draw a correctly labeled graph of the market for Good G with a downward-sloping demand (D) curve and upward-sloping supply (S) curve and label the market equilibrium price as P_M and the market equilibrium quantity as Q_M . **1 point**

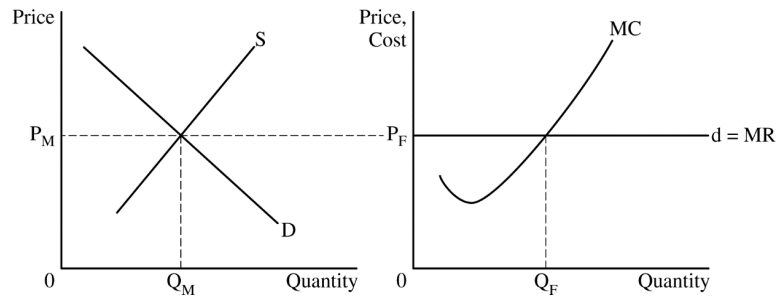


- For the second point, draw a correctly labeled graph for the firm and show the firm's horizontal demand and marginal revenue ($d=MR$) curve extended from the market equilibrium price (P_M), and label the firm's price as P_F . **1 point**



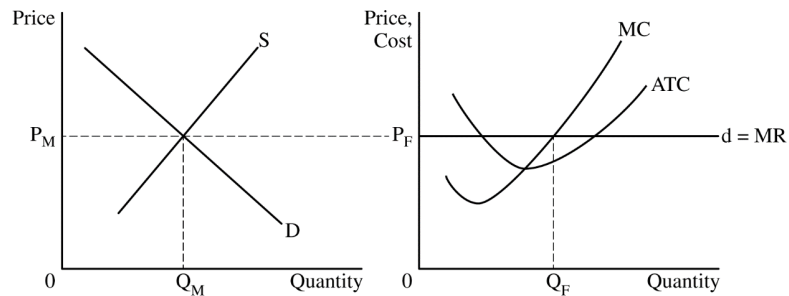
For the third point, the firm's graph must show a rising marginal cost (MC) curve and the profit-maximizing quantity, labeled Q_F where $MR = MC$.

1 point



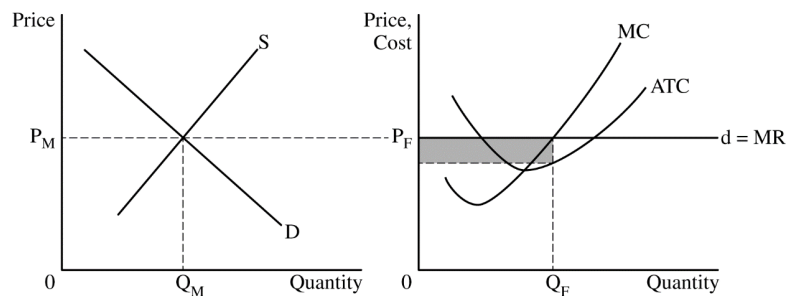
For the fourth point, the firm's graph must show the average total cost (ATC) curve below the firm's demand curve at Q_F and show the MC curve passing through the minimum point of the ATC curve.

1 point



For the fifth point, the firm's graph must show the area representing positive economic profit, shaded completely.

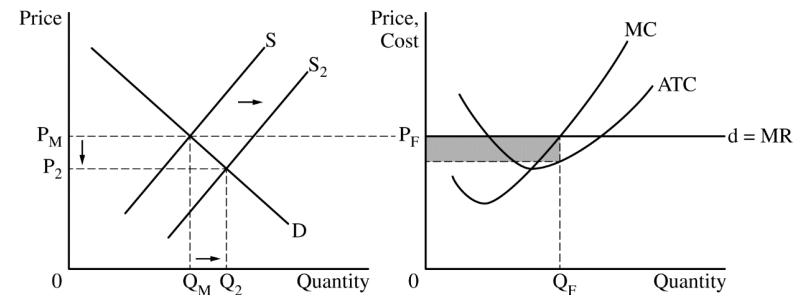
1 point



Total for part (b) 5 points

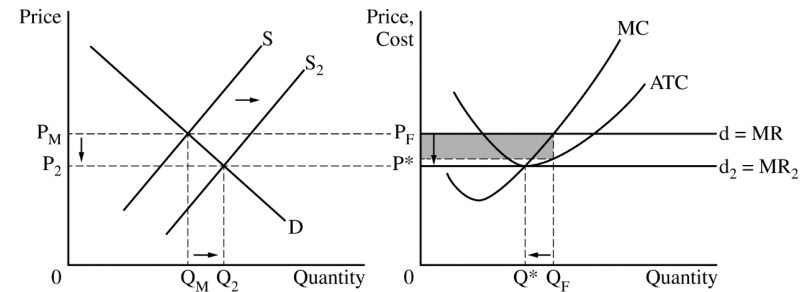
- (c)(i) On the market graph from part (a), show a rightward shift in the market supply curve, resulting in a lower market equilibrium price, labeled P_2 , and a greater market equilibrium quantity, labeled Q_2 .

1 point



- (ii) On the firm's graph from part (a), show a lower price, labeled P^* , extended from the new market equilibrium price, P_2 , and show a lower quantity produced, Q^* , at the new intersection point of $P^* = MR_2 = MC = \text{minimum ATC}$.

1 point



Total for part (c) 2 points

- (d)(i) State that the market equilibrium quantity will be less than the allocatively efficient quantity and explain that the positive externality in production causes the marginal social cost to be less than the marginal private cost ($MSC < MPC$) at the market equilibrium.

1 point

- (ii) State that total economic surplus will increase and explain with **ONE** of the following:

1 point

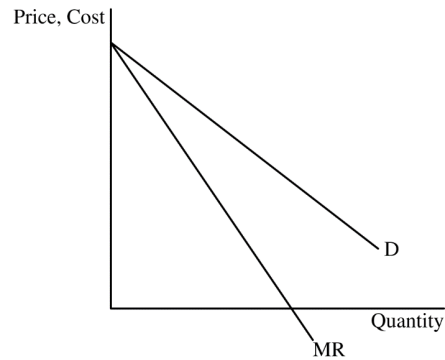
- The quantity produced will increase to the allocatively efficient quantity.
- Deadweight loss will decrease to \$0.
- The marginal private cost will equal the marginal social cost, causing the externality to be internalized.

Total for part (d) 2 points

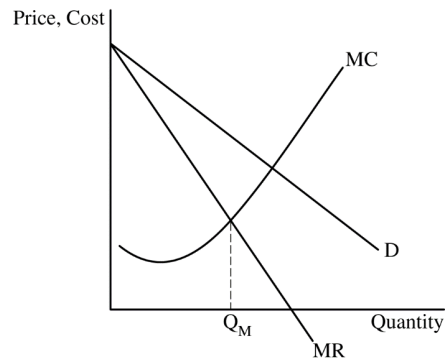
Total for question 1 10 points

Question 1: Long**10 points**

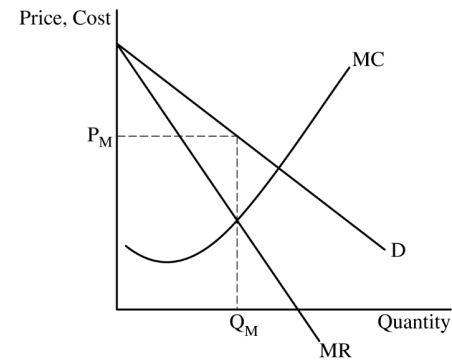
- (a) Draw a correctly labeled graph for a monopoly showing downward-sloping demand (D) and marginal revenue (MR) curves with the MR curve below the demand curve. **1 point**



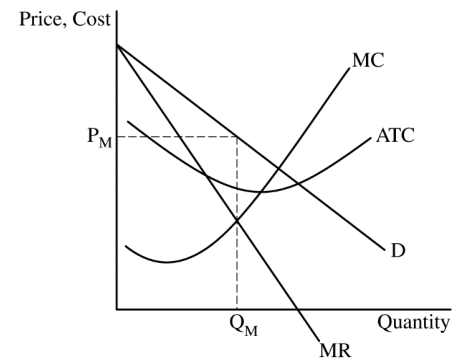
For the second point, the graph must show the marginal cost (MC) curve and the profit-maximizing quantity, labeled Q_M , where $MR=MC$. **1 point**



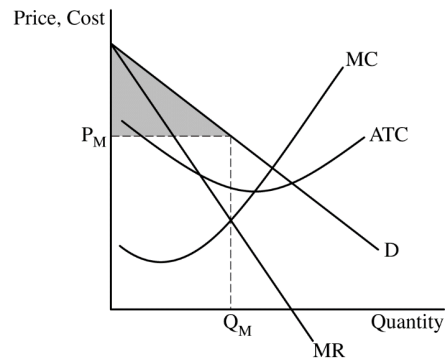
For the third point, the graph must show the profit-maximizing price, labeled P_M , from the demand curve at Q_M . **1 point**



For the fourth point, the graph must show the average total cost (ATC) curve below the demand curve at Q_M and show the MC curve passing through the minimum point of the ATC curve. **1 point**



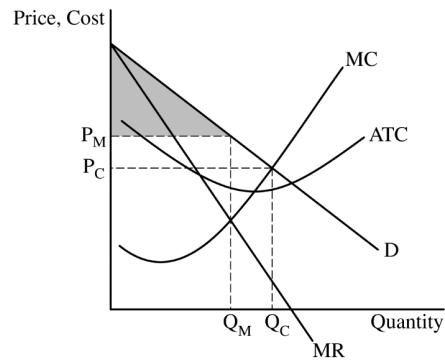
For the fifth point, the graph must show a completely shaded area of the consumer surplus.

1 point

Total for part (a) 5 points

(b)(i) State no and explain that a per-unit tax would shift the MC curve upward and intersect the MR curve at a lower quantity, which decreases the firm's profit-maximizing quantity, not increases it to the socially optimal quantity where $MC=D$. **1 point**

(ii) On your graph from part (a), show the socially optimal quantity labeled as Q_C and the price ceiling labeled as P_C at $MC=D$. **1 point**



(iii) State that the firm is earning positive economic profit and explain that ATC is less than P_C at Q_C , as shown. **1 point**

Scoring Note: The answer should be consistent with the position of the ATC curve with respect to the demand curve at Q_C on the graph drawn in part (b)(ii). The firm will not earn positive economic profit if the ATC curve is drawn such that $ATC > P_C$ or $ATC = P_C$ at Q_C .

Total for part (b) 3 points

(c)(i) State that marginal revenue will be negative and explain that after total revenue is maximized, TR decreases since the firm moves onto the inelastic portion of the demand curve. **1 point**

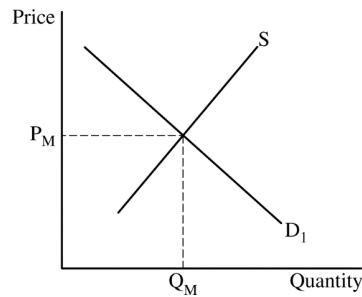
(ii) State that the percentage increase in quantity demanded will be less than 10%. **1 point**

Total for part (c) 2 points

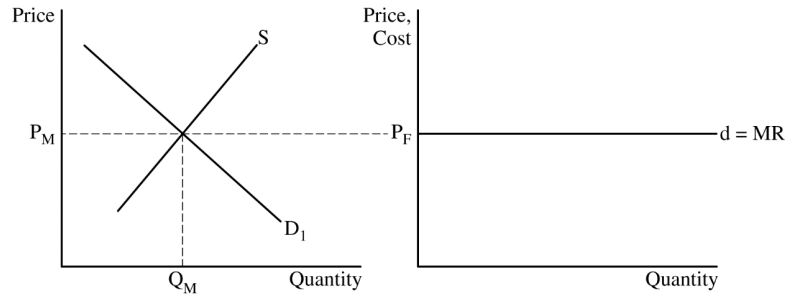
Total for question 1 10 points

Question 1: Long**10 points**

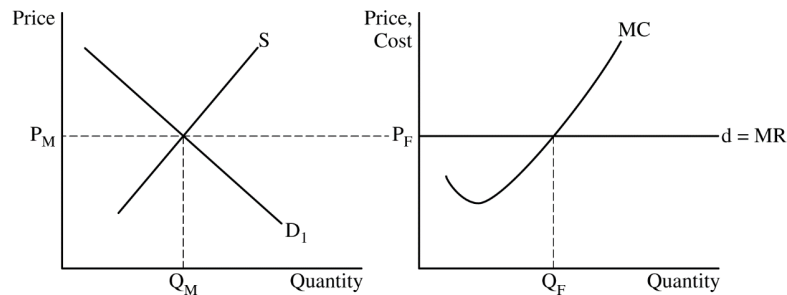
- (a) Draw a correctly labeled graph of the market for sugar and show the equilibrium price and quantity, labeled P_M and Q_M , respectively. **1 point**



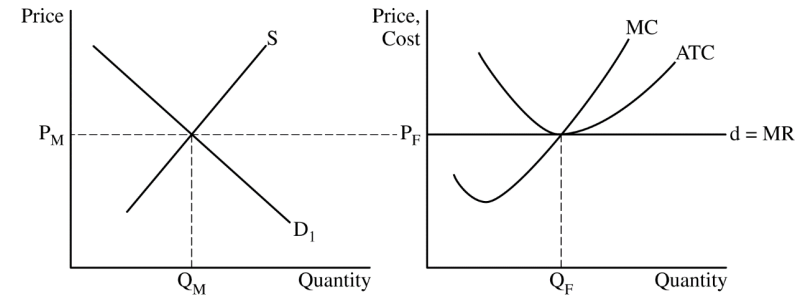
For the second point, the graph must show a horizontal demand curve ($d = MR$) for Frank Sugar Co. and label the firm's profit-maximizing price P_F at P_M . **1 point**



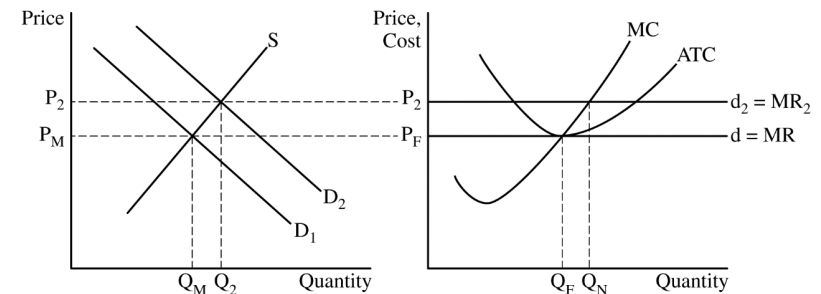
For the third point, the firm's graph must show the marginal cost (MC) curve and show the profit-maximizing quantity, labeled Q_F where $MR = MC$. **1 point**



For the fourth point, the firm's graph must show the average total cost (ATC) curve tangent to the firm's demand curve at Q_F and show the MC curve passing through the minimum point of the ATC curve. **1 point**

**Total for part (a) 4 points**

- (b) On your market graph from part (a), show a rightward shift in the market demand curve with a higher market price, labeled P_2 , and show an upward shift in the firm's demand curve with a greater quantity sold by Frank Sugar Co., labeled Q_N . **1 point**

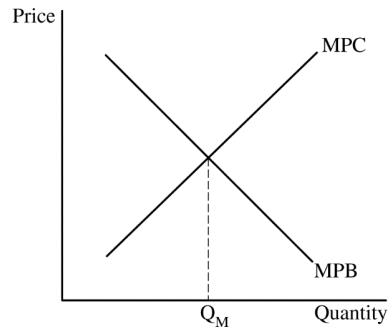


State that the profit earned by Frank Sugar Co. will increase in the short run. **1 point**

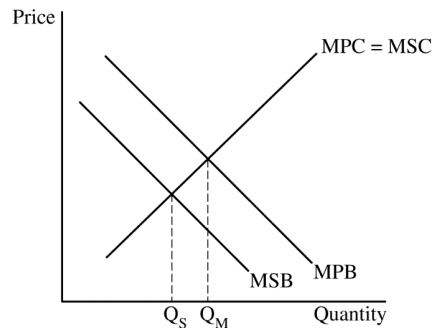
State that the market price in long-run equilibrium will be lower than P_2 and explain that new firms will enter the market, which increases the market supply, lowering the market price back to P_M where firms earn zero economic profit in the long run. **1 point**

Total for part (b) 3 points

- (c) Draw a correctly labeled graph with an upward-sloping supply curve, labeled MPC, a downward-sloping demand curve, labeled MPB, and show the market equilibrium quantity, labeled Q_M at the intersection of the MPB and MPC curves. **1 point**



For the second point, the graph must show a downward-sloping marginal social benefit (MSB) curve below the MPB curve, label the upward sloping curve $MPC = MSC$, and show the socially optimal quantity, labeled Q_S , at the intersection of the MSB and MSC curves. **1 point**



Total for part (c) 2 points

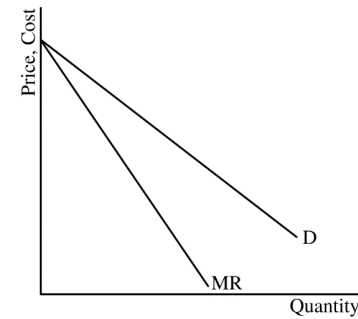
- (d) State that the government would impose a per-unit tax and explain that the tax would raise the price paid per unit **AND** decrease market equilibrium quantity to move it closer to the socially optimal quantity. **1 point**

Total for question 1 10 points

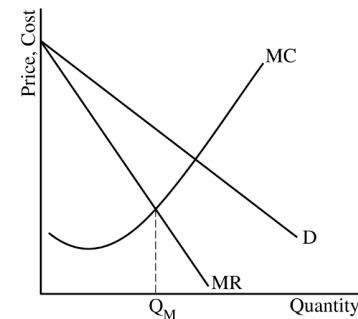
Question 1: Long

10 points

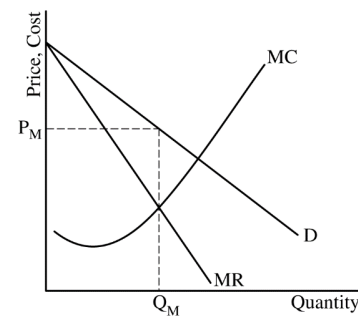
- (a) Draw a correctly labeled graph for SkyRunner Airlines showing downward sloping demand (D) and marginal revenue (MR) curves with the MR curve below the demand curve. **1 point**



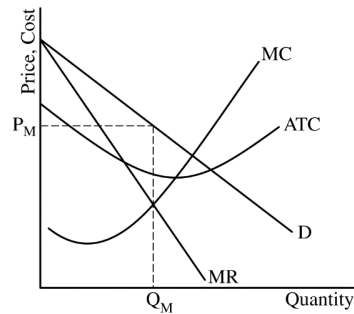
For the second point, the graph must show the marginal cost (MC) curve and the profit-maximizing quantity, labeled Q_M , where $MR=MC$. **1 point**



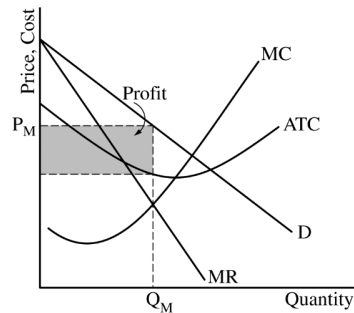
For the third point, the graph must show the profit-maximizing price, labeled P_M , from the demand curve at Q_M . **1 point**



For the fourth point, the graph must show the ATC curve below the demand curve at Q_M with the MC curve rising and intersecting the ATC at its minimum point. **1 point**

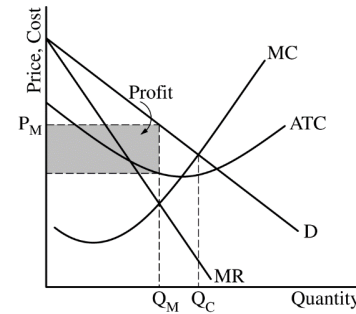


For the fifth point, the graph must show a completely shaded area of profit representing $(P_M - \text{ATC at } Q_M) \times Q_M$. **1 point**



Total for part (a) 5 points

(b) On your graph from part (a), show the quantity that is consistent with the goal of eliminating all deadweight loss as Q_C . **1 point**



- (c) (i) State that the number of tickets SkyRunner sells will decrease and explain that the entry of new firms will reduce the demand for SkyRunner's service. **1 point**
- (ii) State that the price elasticity of demand for SkyRunner Airlines' service will increase and explain that the entry of new firms will increase the number of substitutes available to consumers. **1 point**
- (iii) State that SkyRunner Airlines' profit will be zero or decrease toward zero. **1 point**
- (iv) State that the deadweight loss will decrease and explain that the entry of new firms increases the total market output (services provided) and moves the output closer to the socially optimal output. **1 point**

Total for part (c) 4 points

Total for question 1 10 points

2019

AP CollegeBoard

AP[®] Microeconomics

Scoring Guidelines

Set 1

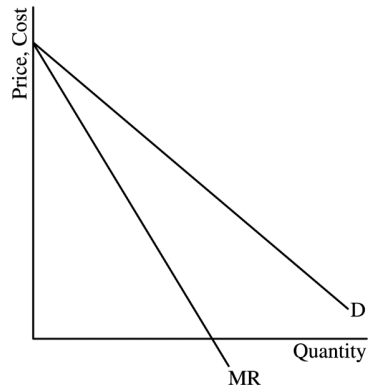
2019 SCORING GUIDELINES

Question 1

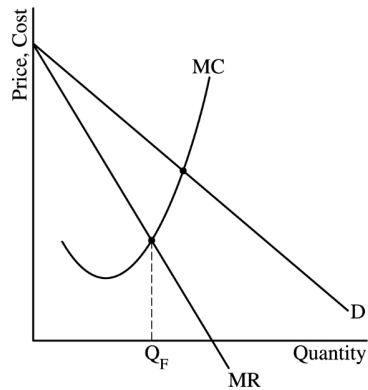
9 points (5 + 2 + 2)

(a) 5 points

- One point is earned for drawing a correctly labeled graph of the monopoly showing downward-sloping demand (D) and marginal revenue (MR) curves with the MR curve below the demand curve.



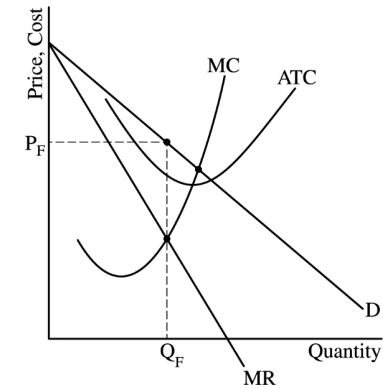
- One point is earned for showing the profit-maximizing quantity, labeled Q_F , where $MR = MC$.



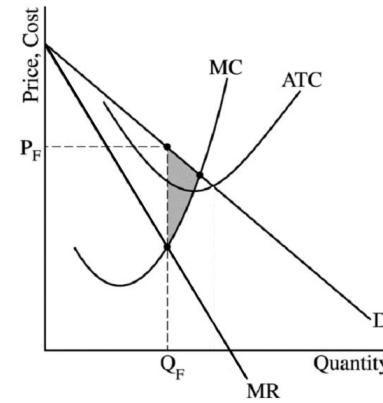
2019 SCORING GUIDELINES

Question 1 (continued)

- One point is earned for showing the profit-maximizing price, labeled P_F , from the demand curve at Q_F , and above the average total cost curve (ATC).



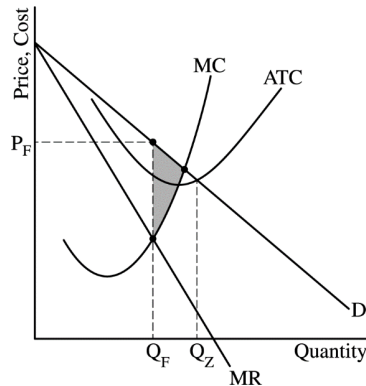
- One point is earned for completely shading the area representing the deadweight loss.



2019 SCORING GUIDELINES

Question 1 (continued)

- One point is earned for showing the quantity where economic profits are zero, labeled Q_Z , where ATC intersects the demand curve.



(b) 2 points

- One point is earned for stating the deadweight loss will remain unchanged, and for explaining that changes in fixed costs do not affect MC or do not change the profit-maximizing quantity of the firm.
- One point is earned for stating that FillUp's economic profit will decrease.

(c) 2 points

- One point is earned for stating that the price must be greater than AVC at the profit-maximizing level of output.
- One point is earned for stating that the profit-maximizing quantity and price will both decrease.

2019 SCORING GUIDELINES

Question 2

5 points (1 + 1 + 3)

(a) 1 point:

- One point is earned for calculating Dana's total benefit from purchasing 2 bottles of water and 1 unit of good X as \$66 and for showing the work.

$$\$24 + \$18 + \$24 = \$66 \text{ OR } \$42 + \$24 = \$66$$

(b) 1 point:

- One point is earned for calculating Dana's total consumer surplus from purchasing 3 units of good X as \$39 and for showing the work.

$$(\$24 - \$5) + (\$18 - \$5) + (\$12 - \$5) = \$39 \text{ OR } \$54 - \$15 = \$39$$

(c) 3 points:

- One point is earned for explaining that Dana does not maximize her benefit because the marginal benefit per dollar spent on bottles of water is greater than the marginal benefit per dollar spent on good X.

$$(18/\$3 > 6/\$6; \text{ OR } 6 > 1; \text{ OR } 6 \neq 1; \text{ OR } MB_w/P_w > MB_x/P_x)$$

- One point is earned for stating that the optimal quantities of good X and bottles of water are 3 units and 4 bottles respectively.

- One point is earned for correctly determining the optimal quantity of water, calculating the cross-price elasticity of demand for bottles of water with respect to the price of good X, showing the work, and for stating that the goods are complements. Answer must be consistent with (c)(ii).

$$(\% \text{ change in the quantity of bottles of water})/(\% \text{ change in the price of good X}) \\ = (25\%/-50\%) = -0.5$$

(Using the midpoint formula is also acceptable: $(1/4.5)/(-3/4.5) = -0.33$)

2019 SCORING GUIDELINES

Question 3

6 points (1 + 1 + 1 + 1 + 2)

(a) 1 point

- One point is earned for stating the actions that maximize the combined profits are for Patrick's Pie to "Advertise" and for Dee's Pizzeria to "Stay Out."

(b) 1 point

- One point is earned for stating that neither firm has an incentive to cheat and for explaining that Dee's Pizzeria profits would decrease from \$0 to -\$2 if Dee cheated and that Patrick's Pie's profits would decrease from \$175 to \$100 if Patrick cheated.

(c) 1 point

- One point is earned for stating that Patrick's Pie does not have a dominant strategy.

(d) 1 point

- One point is earned for stating two Nash equilibria as:
 - Patrick's Pie "Do Not Advertise" and Dee's Pizzeria "Enter"
 - Patrick's Pie "Advertise" and Dee's Pizzeria "Stay Out"

(e) 2 points

- One point is earned for correctly redrawing the payoff matrix and showing the effect of the side payment.

		Dee's Pizzeria	
		Enter	Stay Out
Patrick's Pie	Advertise	\$50, -\$2	\$155, \$20
	Do Not Advertise	\$150, \$15	\$80, \$20

- One point is earned for stating that the Nash equilibrium is for Patrick's Pie to "Advertise" and for Dee's Pizzeria to "Stay Out."

2018

AP Microeconomics

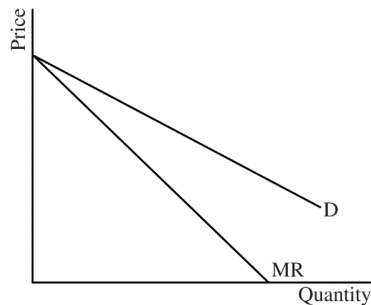
Scoring Guidelines

2018 SCORING GUIDELINES

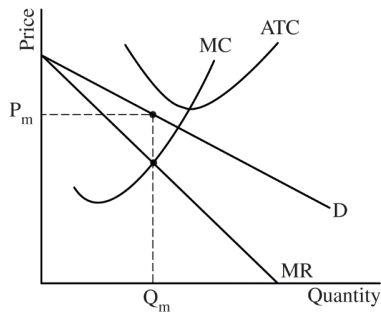
Question 1

9 points (5 + 1 + 1 + 2)

(a) 5 points:



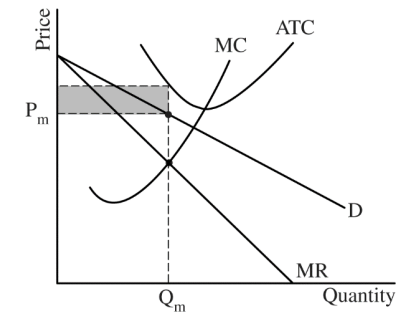
- One point is earned for drawing a correctly labeled graph for a monopoly showing a downward sloping demand (D) curve with the marginal revenue (MR) curve below the demand curve.



- One point is earned for showing the marginal cost (MC) curve rising and passing through the minimum of the average total cost (ATC) curve.
- One point is earned for showing the profit-maximizing quantity, Q_m , where $MR = MC$.
- One point is earned for showing the price, P_m , from the demand curve at Q_m .

2018 SCORING GUIDELINES

Question 1 (continued)



- One point is earned for completely shading the area representing negative economic profit and showing the ATC curve above the demand curve for all quantities.

(b) 1 point:

- One point is earned for stating that the price must be greater than average variable cost, OR total revenue must be greater than total variable cost, OR the firm's current economic loss is less than its fixed cost, which is equal to the firm's loss if it shuts down.

(c) 1 point:

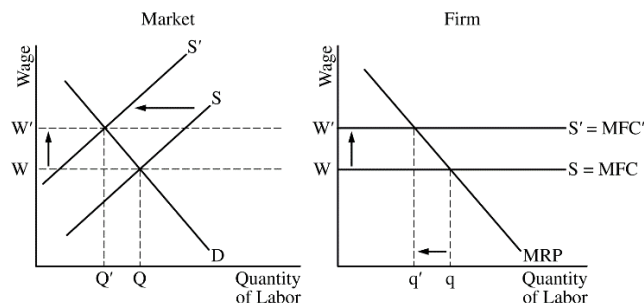
- One point is earned for stating that total revenue will decrease and explaining with one of the following reasons.
 - The monopolist is operating on the elastic portion of the demand curve.
 - The quantity effect is greater than the price effect.
 - The percentage change in quantity demanded is greater than the percentage change in price.
 - MR is positive.

(d) 2 points:

- One point is earned for stating or graphically showing that the wage rate will increase because the market supply of labor decreases (shifts left).
- One point is earned for stating the marginal revenue product (MRP) of the last worker hired will increase and explaining with one of the following reasons.
 - The firm is hiring fewer workers now and therefore the marginal product of the last worker hired increases (diminishing marginal product).
 - The market wage (marginal factor cost or MFC) increased and the profit-maximizing firm will hire where $MRP = MFC$.
 - There is an upward movement along the firm's MRP curve as wage or MFC increases (shifts up).

2018 SCORING GUIDELINES

Question 1 (continued)



2018 SCORING GUIDELINES

Question 2

6 points (1 + 1 + 1 + 1 + 2)

(a) 1 point:

- One point is earned for stating positive externality, and for explaining that either marginal social benefit is greater than marginal private benefit ($MSB > MPB$) or the equilibrium quantity is less than the socially optimal quantity.

(b) 1 point:

- One point is earned for identifying the market equilibrium price as \$6 and the market equilibrium quantity as 16 units.

(c) 1 point:

- One point is earned for identifying the area of the deadweight loss as DEF.

(d) 1 point:

- One point is earned for identifying \$4 as the dollar value of the per-unit subsidy.

(e) 2 points:

- One point is earned for identifying 8 units.
- One point is earned for stating no and explaining with one of the following reasons:
 - The quantity exchanged in the market will be less than the socially optimal quantity.
 - $MSB > MSC$ at a quantity of 8 units.
 - Deadweight loss increased after the price floor.

2018 SCORING GUIDELINES

Question 3

5 Points (1 + 1 + 1 + 1 + 1)

(a) 1 point:

- One point is earned for correctly calculating the gain, 20 points.

(b) 1 point:

- One point is earned for correctly calculating the opportunity cost, 6 points for that hour (or 6/20).

(c) 1 point:

- One point is earned for stating that the opportunity cost increases and for using one the following explanations:
 - The expected score on microeconomics decreases at an increasing rate with each additional hour spent studying history.
 - The marginal cost is rising (expected score on microeconomics decreases) for each additional hour spent studying history.

(d) 1 point:

- One point is earned for stating that Nirali should spend 2 hours on studying microeconomics and 3 hours on studying history to maximize the sum of expected scores.

(e) 1 point:

- One point is earned for stating that Nirali will spend the additional hour studying microeconomics because studying microeconomics will increase her expected total score by 8 points compared to 5 points if spent studying history.

2017

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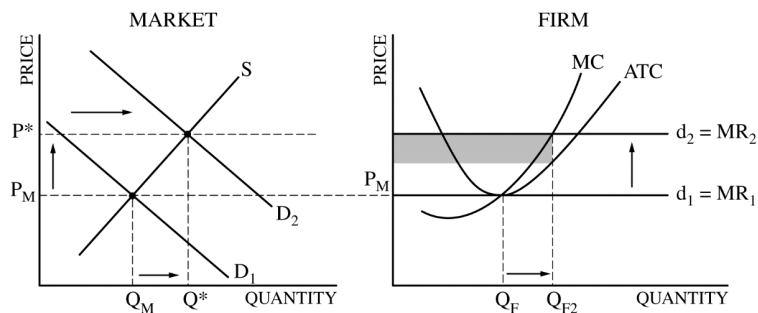
AP Microeconomics

Scoring Guidelines

2017 SCORING GUIDELINES

Question 1

10 points (4 + 2 + 1 + 1 + 2)



(a) 4 points:

- One point is earned for drawing a correctly labeled graph of the corn market with P_M and Q_M . The market demand curve must be downward sloping and the market supply curve must be upward sloping.
- One point is earned for showing a horizontal demand curve on the firm's graph extended from the market equilibrium price, P_M .
- One point is earned for identifying the firm's profit-maximizing quantity, Q_F , at marginal cost equal to marginal revenue ($MC=MR_1$).
- One point is earned for showing the firm's average total cost (ATC) curve and marginal cost (MC) passing through the minimum point of ATC, and $P = ATC = MC$ at Q_F .

Note: All quantities and prices should be labeled on the axes and connected to the intersection points by dashed lines.

(b) 2 points:

- One point is earned for showing a rightward shift of the market demand curve and a higher price and quantity, P' and Q' .
- One point is earned for completely shading the area representing the profit for a representative corn farmer.

(c) 1 point:

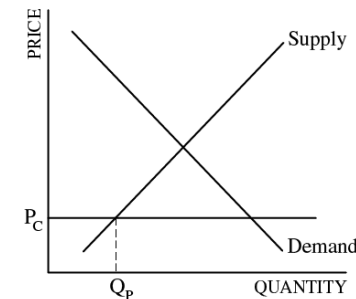
- One point is earned for stating that the market quantity will increase and the market's price will decrease in the long run, and for explaining that new corn farmers will enter the market, which will increase the market supply curve.

2017 SCORING GUIDELINES

Question 1 (continued)

(d) 1 point:

- One point is earned for stating that the price of soybeans in the next planting season will increase, and for explaining that the supply of soybeans will decrease because the higher price of corn encourages farmers to substitute corn for soybeans in production.



(e) 2 points:

- One point is earned for showing a correctly labeled graph of the corn market, with the price ceiling, P_C , below the equilibrium price of corn.
- One point is earned for showing the quantity purchased by consumers in the corn market labeled as Q_p where P_C intersects the supply curve.

2017 SCORING GUIDELINES

Question 2

5 points (1 + 4)

(a) 1 point:

- One point is earned for stating that the firm would be operating with increasing returns to scale and for explaining that doubling inputs will more than double output (output increases from 10 units to 50 units as a result of doubling labor and capital) **or** for explaining that average total cost decreases from \$27.50 to \$11 when labor and capital double.

(b) 4 points:

- One point is earned for correctly calculating the marginal product (MP) for the third unit of labor as 25 units and showing the work: $\frac{75-50}{3-2} = 25$.
- One point is earned for answering yes and for explaining that the MP of the third unit of labor (25 units) is less than the MP of the second unit of labor (30 units).
- One point is earned for correctly calculating the firm's average total cost (ATC) and showing the work: $\frac{75 \cdot 2}{75} + \frac{200 \cdot 3}{75} = 2 + 8 = \10 **or** $\frac{(75 \cdot 2) + (200 \cdot 3)}{75} = \frac{750}{75} = \10 .
- One point is earned for identifying the lowest output price as \$8 at which the third unit of labor would be hired.

2017 SCORING GUIDELINES

Question 3

7 points (2 + 1 + 1 + 2 + 1)

(a) 2 points:

- One point is earned for correctly identifying the monopolist's profit-maximizing quantity, Q_3 .
- One point is earned for correctly identifying the monopolist's profit-maximizing price, P_4 .

(b) 1 point:

- One point is earned for stating that $MSC > MPC$ **or** that the MSC curve exceeds, is above, or is greater than the MPC curve.

(c) 1 point:

- One point is earned for correctly identifying the socially optimal quantity, Q_3 .

(d) 2 points:

- One point is earned for correctly identifying the dollar value of the tax, $P_4 - P_1$.
- One point is earned for correctly identifying the profit-maximizing quantity associated with the tax, Q_2 .

(e) 1 point:

- One point is earned for correctly stating that the deadweight loss increases because the monopolist's profit-maximizing quantity is equal to the socially optimal quantity before the tax and is less than the socially optimal quantity after the tax.