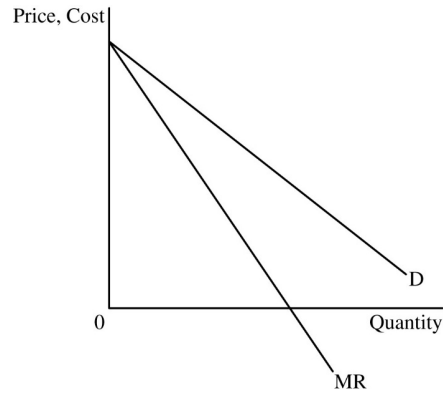
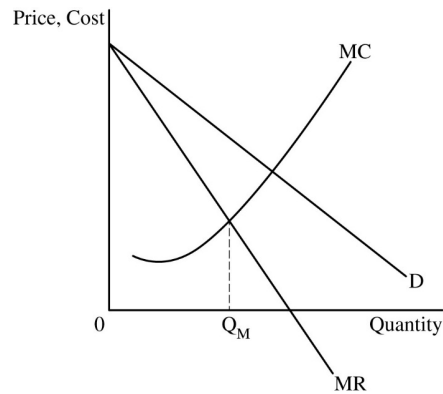


Question 1: Long**10 points**

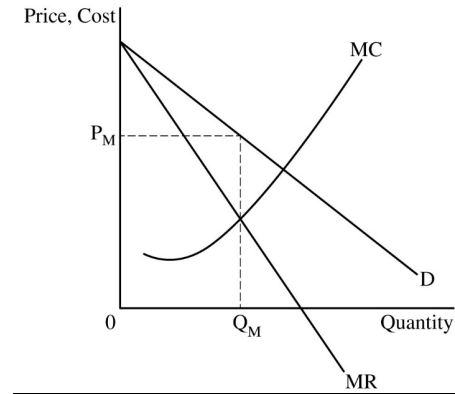
- A** Draw a correctly labeled graph for Voda Reservoir with a downward-sloping demand (D) curve and a downward-sloping marginal revenue (MR) curve with the MR curve below the D curve. **1 point**
- Point 1



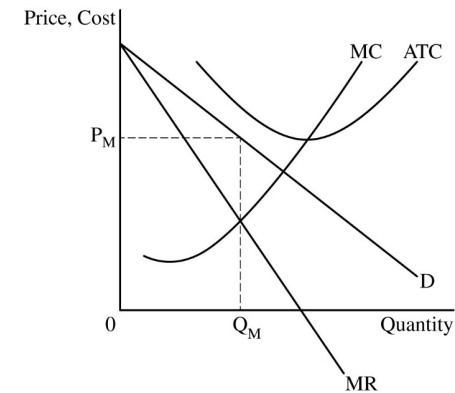
- Point 2 The graph must show a rising marginal cost (MC) curve and the profit-maximizing quantity, labeled Q_M , where $MR = MC$. **1 point**



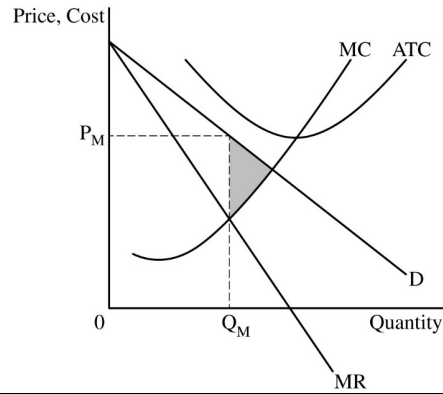
- Point 3 The graph must show the profit-maximizing price, labeled P_M , from the D curve at Q_M . **1 point**



- 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**

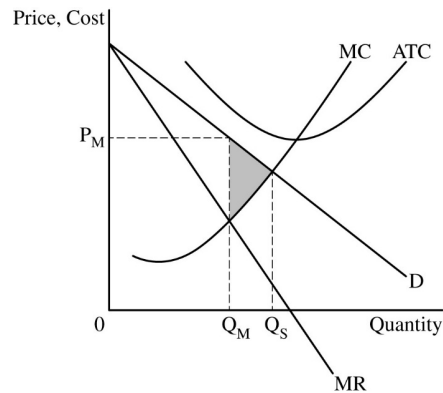


Point 5 The graph must show the area of deadweight loss, shaded completely. **1 point**



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 the profit-maximizing number of miners is 4. **1 point**

Point 1

B State that Quartz Excavations will pay a wage rate that is less than \$15 and explain **1 point**

Point 2

that the wage rate paid by a monopsonist is determined by the supply of labor at the quantity of labor hired. Thus, the wage rate associated with the hiring of 4 miners is \$10.

C Calculate the total wage bill as \$50 and show your work. **1 point**

Point 3

Total Wage Bill = $\$25 \times 2 = \50

D (i) State that the marginal revenue product of miners will increase and explain that the **1 point**

Point 4

increase in demand for quartz will increase the price and marginal revenue of quartz.

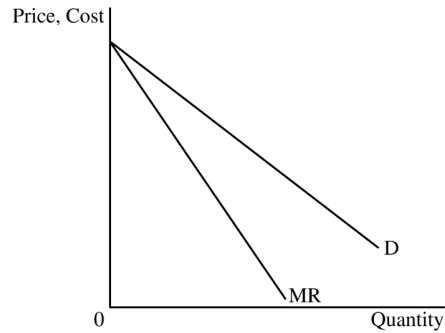
(ii) State that the marginal factor cost of the last miner hired will be greater than the **1 point**

Point 5

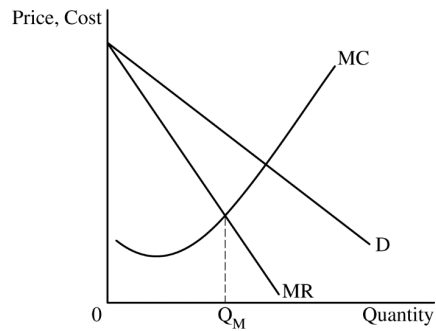
marginal factor cost of the last miner hired before the increase in the demand for quartz.

Question 1: Long**10 points**

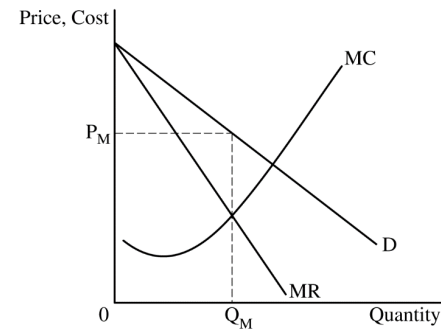
- (a) Draw a correctly labeled graph of a monopoly with a downward-sloping demand (D) curve and a downward-sloping marginal revenue (MR) curve with the MR curve below the D curve. **1 point**



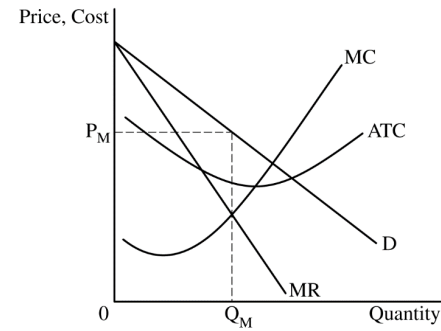
For the second point, the graph must show a marginal cost (MC) curve and the profit-maximizing quantity, labeled Q_M , where $MR = MC$. **1 point**



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

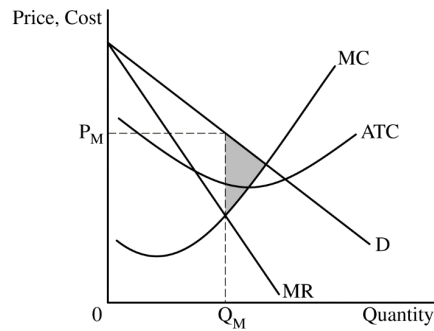


For the fourth point, the graph must show the average total cost (ATC) curve below P_M at Q_M and the MC curve passing through the minimum point of the ATC curve. **1 point**



For the fifth point, the graph must show the area of the deadweight loss, shaded completely.

1 point

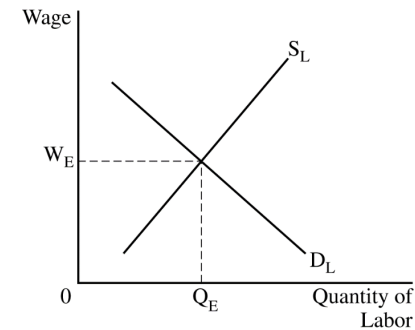


Total for part (a) 5 points

- | | | |
|-----|---|---------|
| (b) | State that the government would impose a binding price ceiling. | 1 point |
| (c) | State that the profit-maximizing quantity will decrease and explain that the demand for the device will decrease, causing the MR curve to shift to the left, intersecting the MC curve at a lower quantity. | 1 point |

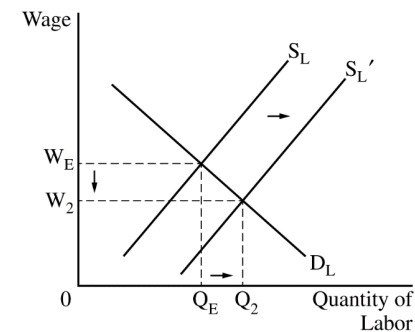
- (d)(i) Draw a correctly labeled graph of a perfectly competitive labor market with a downward-sloping demand (D) curve and an upward-sloping supply (S) curve and show the equilibrium wage and quantity of labor, labeled W_E and Q_E , respectively.

1 point



- (d)(ii) The graph from part (d)(i) must show a rightward shift in the labor supply curve, resulting in a lower equilibrium wage rate, labeled W_2 , and a higher equilibrium quantity of labor, labeled Q_2 .

1 point



- (d)(iii) Calculate the wage rate as \$200 and show your work.

1 point

$$\frac{\text{Marginal Product of Capital}}{\text{Rental Price}} = \frac{\text{Marginal Product of Labor}}{\text{Wage Rate}}$$

$$\frac{2,500}{\$500} = \frac{1,000}{\text{Wage Rate}}$$

$$\text{Wage Rate} = \$200$$

Total for part (d) 3 points

Total for question 1 10 points

Question 2: Short

5 Points

- (a) Calculate the marginal revenue product of the second worker as \$120 and show your work. **1 point**
- Marginal Revenue Product = $(20-8)/(2-1) \times \$10$ or $(\$200-\$80)/(2-1) = \$120$
- (b) State that Schmitt Inc. will hire 4 workers and explain that Schmitt will not hire the 5th worker because the marginal revenue product of the 5th worker is \$90 $((54-45) \times \$10)$ which is less than the wage of \$100. **1 point**
- (c) Calculate Schmitt's daily profit as \$0 and show your work. **1 point**
- Profit = $(TR - TC) = (\$10 \times 45) - (\$50 + (4 \times \$100)) = \$450 - \$450 = \0
- (d) (i) State that the wage will increase. **1 point**
- (ii) State that the number of workers employed by a typical firm will decrease and explain that the market supply of workers will decrease, which causes the marginal factor cost (marginal resource cost) to increase, leading to a lower quantity of workers for the typical firm where $MRP = MFC$. **1 point**

Total for part (d) 2 points

Total for question 2 5 points

2019

AP[®] CollegeBoard

AP[®] Microeconomics

Scoring Guidelines

Set 2

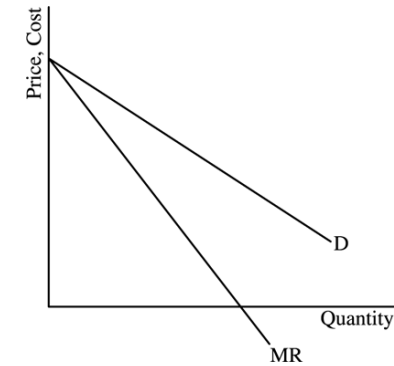
2019 SCORING GUIDELINES

Question 1

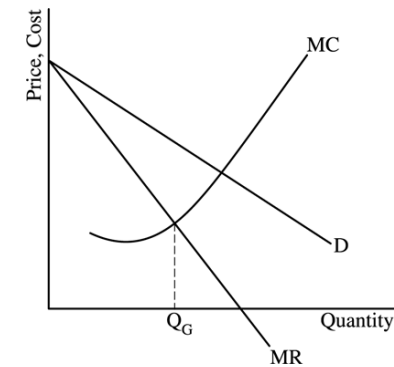
9 points (5 + 2 + 2)

(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.

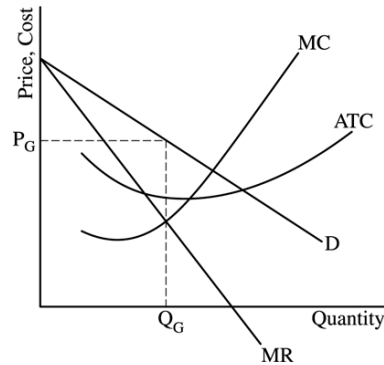


- One point is earned for showing the profit-maximizing quantity, labeled Q_G , where $MR=MC$.

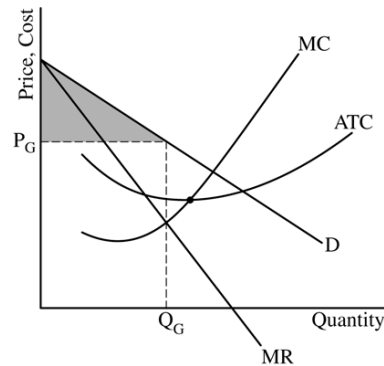


2019 SCORING GUIDELINES**Question 1 (continued)**

- One point is earned for both showing the profit-maximizing price, labeled P_G , from the demand curve at Q_G , and above the average total cost (ATC) curve.
- One point is earned for showing the marginal cost (MC) curve rising and passing through the minimum point of the ATC curve.



- One point is earned for completely shading the area of the consumer surplus.

**2019 SCORING GUIDELINES****Question 1 (continued)**

(b) 2 points

- One point is earned for stating that Gigantic Pharmaceutical Corporation's demand for warehouse workers will increase and for explaining that the marginal revenue product of labor increases because of the increase in the product price.
- One point is earned for stating that the wage rate Gigantic pays to its warehouse workers will not change and the number of workers hired will increase.

(c) 2 points

- One point is earned for stating that Gigantic's producer surplus will decrease.
- One point is earned for stating that the consumer surplus will increase and for explaining that because of the increased competition the price will decrease and the quantity will increase.

2019 SCORING GUIDELINES**Question 2****5 points (2 + 2 + 1)**

(a) 2 points

- One point is earned for identifying the after-tax price paid by consumers as P_3 and the after-tax quantity as Q_2 .
- One point is earned for identifying the area representing the total tax revenue as:
 P_1P_3SZ , or
 $(P_3 \times Q_2) - (P_1 \times Q_2)$, or
 $(P_3 - P_1) \times Q_2$

(b) 2 points

- One point is earned for stating that the price paid by consumers will be higher.
- One point is earned for stating that the tax revenue received by the government will be higher because the tax does not reduce the quantity purchased when the demand is perfectly inelastic, while the quantity does fall when demand is downward sloping (i.e., $Q_3 > Q_2$).

(c) 1 point

- One point is earned for stating that the producer surplus will stay the same, and for explaining that this is because both the price received by sellers (P_2) and the quantity sold (Q_3) do not change. It is also acceptable to explain that producer surplus stays the same because the consumer bears the full burden of the tax.

2019 SCORING GUIDELINES

Question 3

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

(a) 1 point

- One point earned for stating that Jackpot Florist's dominant strategy is to close at 6 p.m.

(b) 1 point

- One point is earned for stating that this is not the profit-maximizing action by Boulevard Gardens and for explaining that Boulevard will earn \$30 by choosing Delivery instead of \$20 choosing No Delivery.

(c) 1 point

- One point is earned for identifying the profit for Boulevard Gardens in the Nash equilibrium as \$30.

(d) 1 point

- One point is earned for stating that they would choose to close at 9 p.m. and offer No Delivery.

(e) 2 points

- One point is earned for redrawing the payoff matrix showing the effect of the agreement.

		Boulevard	
		Delivery	No Delivery
Jackpot	6 p.m.	\$35,\$30	\$43,\$32
	9 p.m.	\$37,\$38	\$45,\$40

- One point is earned for stating that Boulevard will agree to Jackpot's proposal and for explaining that Boulevard will be better off because this will increase the payoff from \$30 to \$40.

2018

AP Microeconomics

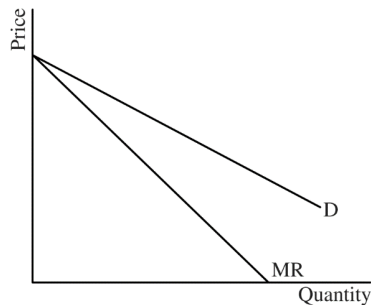
Scoring Guidelines

2018 SCORING GUIDELINES

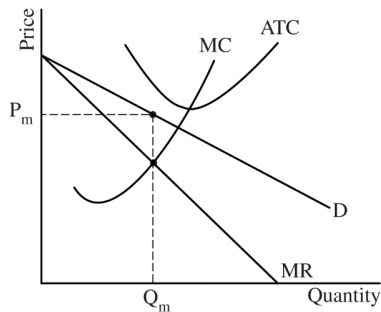
Question 1

9 points (5 + 1 + 1 + 2)

(a) 5 points:



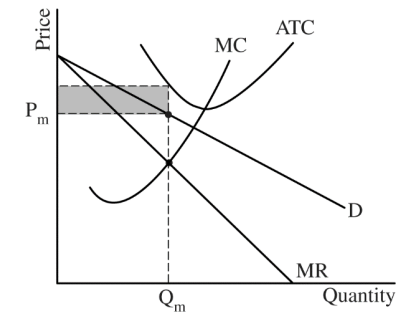
- One point is earned for drawing a correctly labeled graph for a monopoly showing a downward sloping demand (D) curve with the marginal revenue (MR) curve below the demand curve.



- 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:

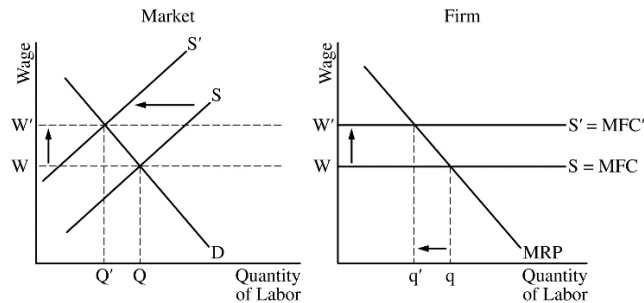
- One point is earned for stating that total revenue will decrease and explaining with one of the following reasons.
 - The monopolist is operating on the elastic portion of the demand curve.
 - The quantity effect is greater than the price effect.
 - The percentage change in quantity demanded is greater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