2023

AP® Microeconomics

Sample Student Responses and Scoring Commentary Set 2

Inside:

Free-Response Question 1

- ☑ **Scoring Guidelines**
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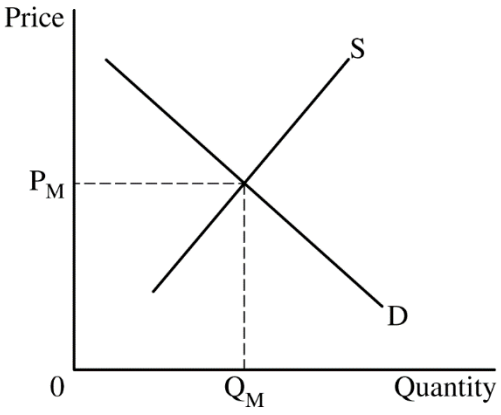
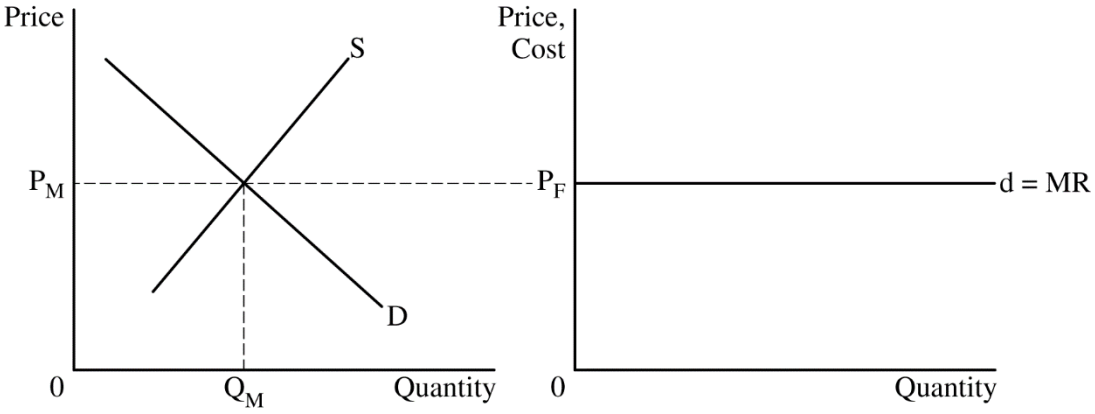
Question 1: Long — 10 points

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

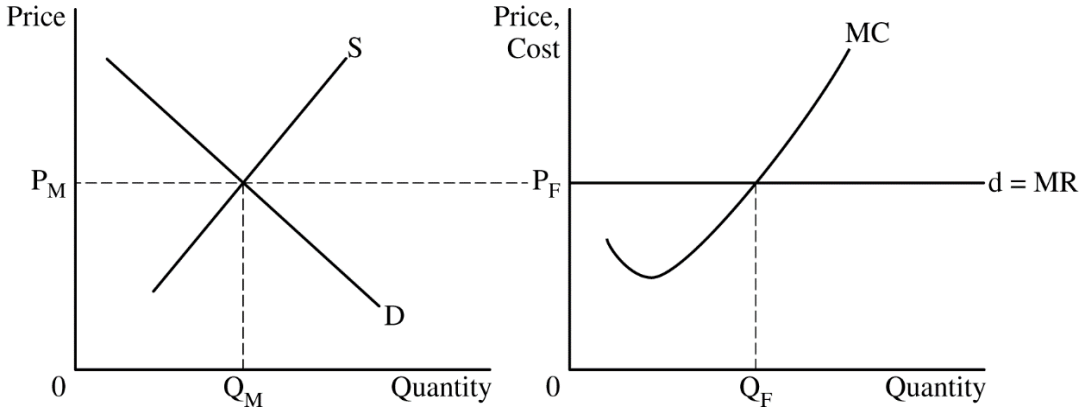
(b) Draw a correctly labeled graph of the market for Good G with a downward-sloping demand (D) curve and upward-sloping supply (S) curve and label the market equilibrium price as P_M and the market equilibrium quantity as Q_M. **1 point**



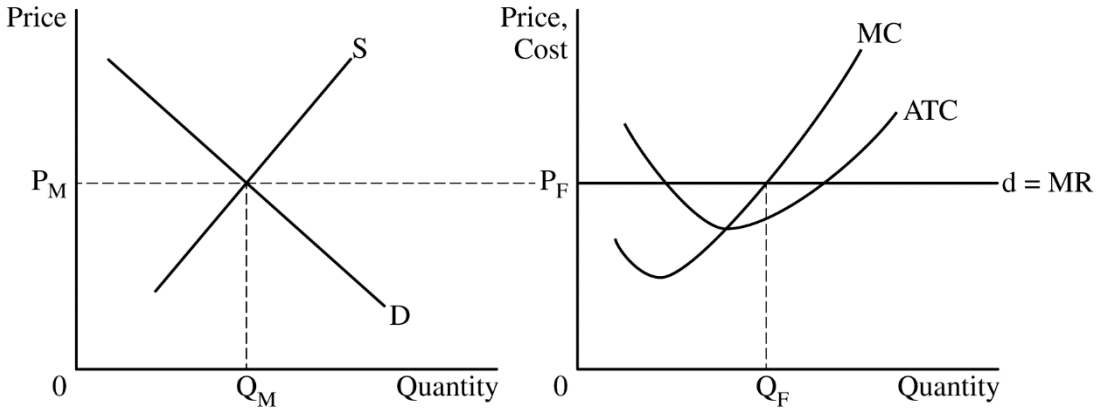
For the second point, draw a correctly labeled graph for the firm and show the firm's horizontal demand and marginal revenue (d=MR) curve extended from the market equilibrium price (P_M), and label the firm's price as P_F. **1 point**



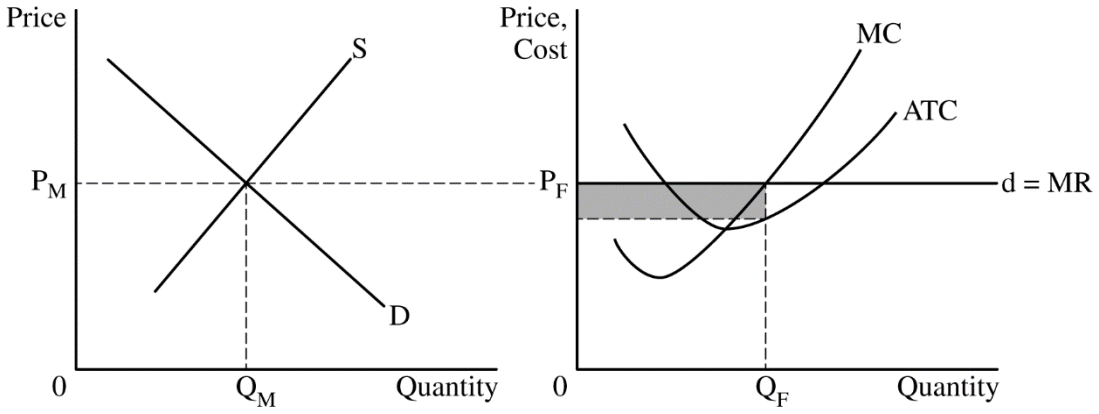
For the third point, the firm's graph must show a rising marginal cost (MC) curve and the profit-maximizing quantity, labeled Q_F where MR = MC. **1 point**



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**

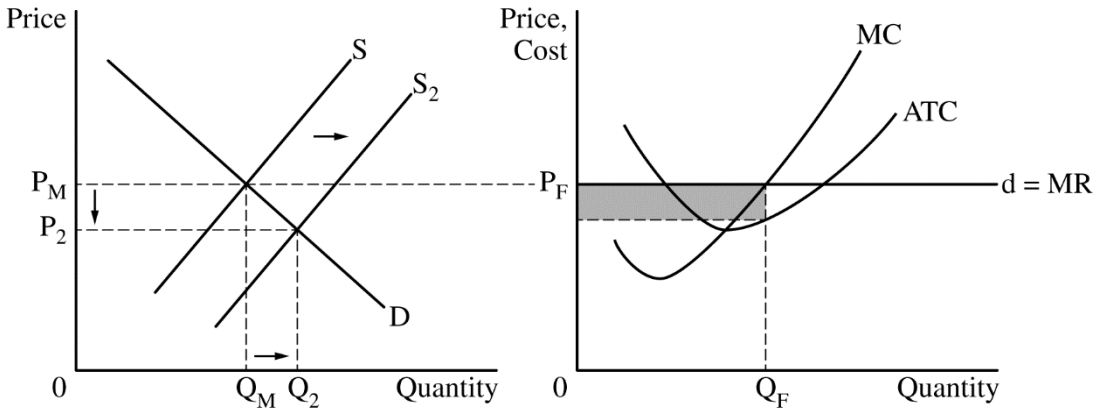


For the fifth point, the firm's graph must show the area representing positive economic profit, shaded completely. **1 point**

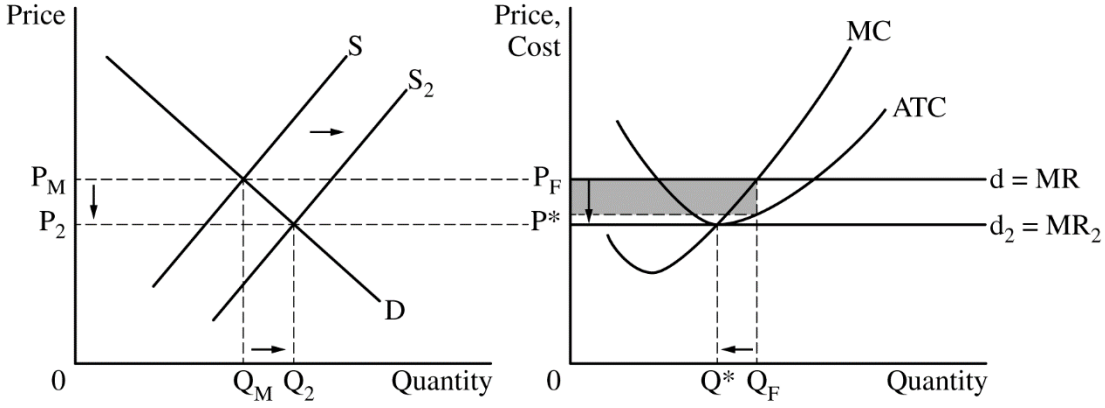


Total for part (b) 5 points

(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 = 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**

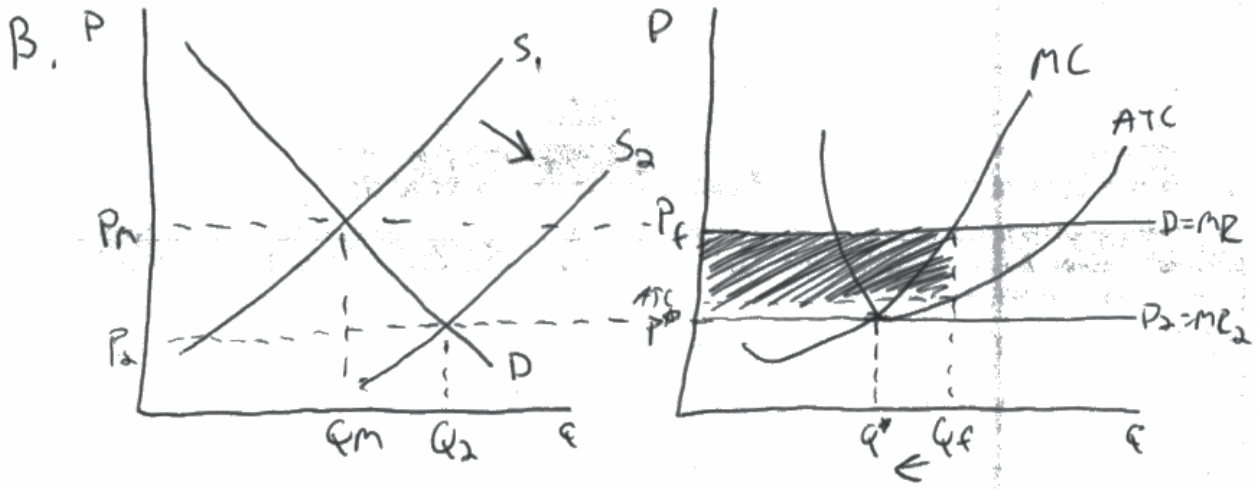
Important: Completely fill in the circle that corresponds to the question you are answering on this page.

Question 1 ● Question 2 ○ Question 3 ○

Begin your response to each question at the top of a new page.

A. Anderson Company's accounting profit will be greater than its economic profit.

B.



D. i. The market equilibrium quantity will be less than the allocatively efficient quantity because there is a positive production externality, so MPC is greater than MSC.

ii. Total economic surplus increases since MPC shifts to MSC and consumer surplus increases.

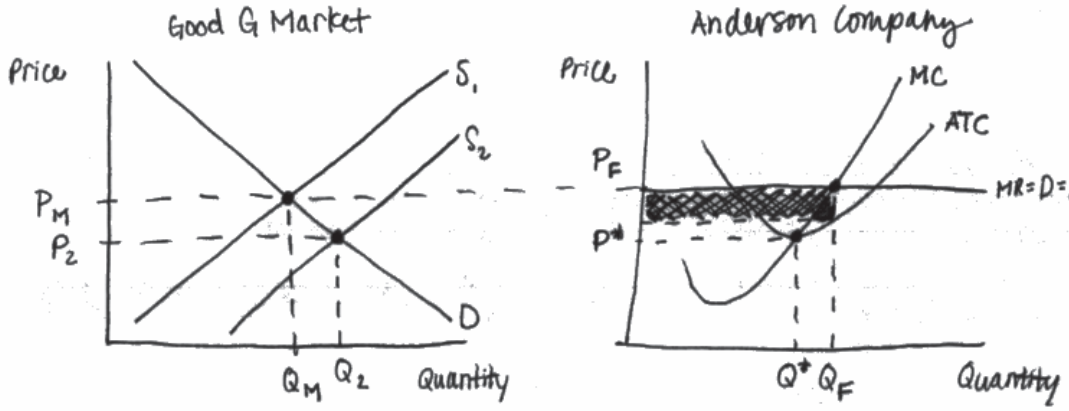
Important: Completely fill in the circle that corresponds to the question you are answering on this page.

Question 1 ● **Question 2** ○ **Question 3** ○

Begin your response to each question at the top of a new page.

a) The economic profit must be less than the accounting profit because of implicit costs.

b)



c) As more firms enter the market, supply increases which decreases price. This causes Anderson company to make normal profits in the long-run.

d) (i) the market equilibrium ~~will be~~ quantity will be less than the allocatively efficient quantity because the third party benefit increases demand.

(ii) total economic surplus increases because there is greater social benefit with the third party so by taking that away there is more surplus.

Use a pen with black or dark blue ink only. Do NOT write your name. Do NOT write outside the box.

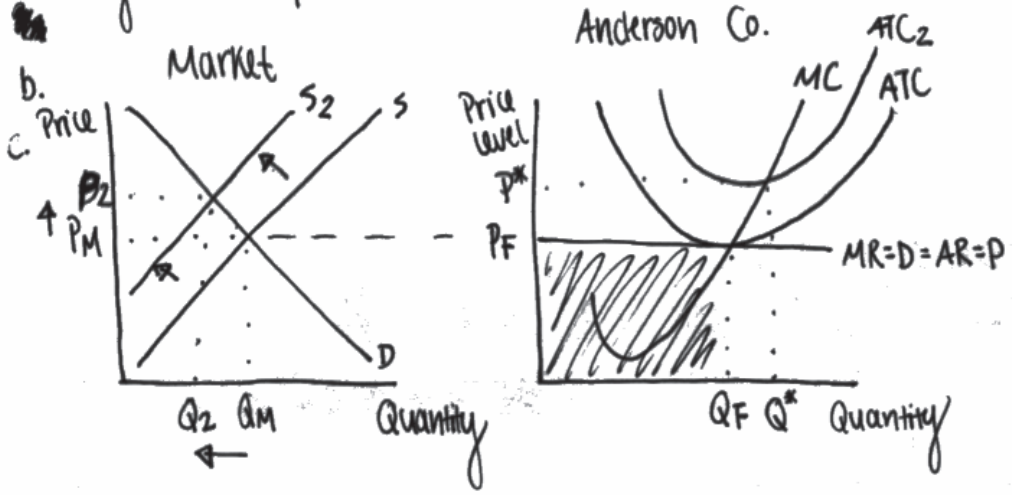
Important: Completely fill in the circle that corresponds to the question you are answering on this page.

Question 1 ● Question 2 ○ Question 3 ○

Begin your response to each question at the top of a new page.

a. They must be equal.

b.



c. i. greater than; producer and consumer surplus aren't being maximized and the firm is producing at a quantity less than market equilibrium

ii. increase, because they will have more supply w/ a corrected externality.

Use a pen with black or dark blue ink only. Do NOT write your name. Do NOT write outside the box.

Question 1

Note: Student samples are quoted verbatim and may contain spelling and grammatical errors.

Overview

The question assessed students' understanding of how a firm in a perfectly competitive market would maximize profit in the short run, how the firm adjusts to the long-run equilibrium, and the implication of, and policy to correct for, an externality.

The question stated that Anderson Company was a typical firm in a constant-cost, perfectly competitive market for Good G, currently earning positive economic profit. In part (a) students were asked what must be true about the relationship between accounting profit and economic profit if Anderson Company incurs both explicit and implicit production costs. This part assessed students' knowledge about the difference between accounting profit and economic profit. Because economic profit subtracts implicit and explicit costs from total revenue while accounting profit only subtracts explicit costs, accounting profit will be greater than economic profit.

In part (b) students were asked to draw correctly labeled side-by-side graphs for the market and Anderson Company. In the graph for the market, students were asked to show the equilibrium price (P_M) and quantity (Q_M). Part (b)(ii) asked students to show the profit-maximizing price (P_F) and quantity (Q_F) for Anderson Company. These parts of the question assessed students' knowledge of market conditions for perfect competition and their ability to illustrate these concepts using a graph. This task included demonstrating knowledge of revenue and cost conditions by drawing a downward-sloping demand curve (D) and an upward-sloping supply curve (S) for the market, a horizontal demand (d) and marginal revenue (MR) curve for the firm where d = MR, and the firm's rising marginal cost (MC) curve and U-shaped average total cost (ATC) curve. Students were required to show that P_M and Q_M occur where market demand and market supply curves intersect, that d = MR is horizontal at $P_F = P_M$, and that Q_F is the quantity where MR = MC. These tasks required students to demonstrate marginal analysis in a graphical format. Part (b)(iii) asked students to completely shade Anderson Company's area of positive economic profit. This task required students to draw ATC consistent with the given positive economic profit condition by having ATC below P_F at Q_F, MC curve passing through the minimum of ATC curve, and shading the rectangle of economic profit.

In part (c) students were asked to show in the graph what happens in the market in the long run and how this affects the firm's price and quantity. Students were required to demonstrate knowledge of how a perfectly competitive market adjusts to positive short-run profits and how this adjustment influences the production decisions of a representative firm. Part (c)(i) asked students to show the new lower market equilibrium price, P_2, and greater market equilibrium quantity, Q_2, occurring where the increased market supply, S_2, intersects market demand. Part (c)(ii) asked students to show that Anderson Company's profit-maximizing price, P*, represents the new $d_2 = MR_2$ curve and the profit-maximizing quantity, Q*, where the new MR_2 = MC = min ATC.

In part (d) students were given the information that the production of Good G creates benefits for third parties. Part (d)(i) asked students to determine if the market equilibrium quantity would be

Question 1 (continued)

greater than, less than, or equal to the allocatively efficient quantity and explain their response. Students were required to recognize that a positive externality in production causes marginal private cost (MPC) to be greater than the marginal social cost (MSC). When this happens, the market equilibrium quantity will be less than the allocatively efficient quantity. Part (d)(ii) introduced a government intervention to correct the externality. Students were asked to determine whether total economic surplus will increase, decrease, or stay the same because of this action and explain their response. Students had to demonstrate an understanding that the government action taken to correct the positive externality in production would increase total economic surplus, since it would increase the quantity of Good G produced to the allocatively efficient quantity and reduce deadweight loss.

Sample: 1A
Score: 10

Part (a): 1 point

The response earned the point in part (a) because the response states accounting profit is greater than economic profit.

Part (b): 5 points

The response earned the first point in part (b) because the response shows a correctly labeled graph of the market with the equilibrium price and quantity labeled as P_M and Q_M respectively. The response earned the second point in part (b) because the response shows the horizontal demand curve for the firm labeled as D=MR at P_M with price labeled as P_F. The response earned the third point in part (b) because the response shows Q_F where MR=MC. The response earned the fourth point in part (b) because the response shows ATC below the demand curve at Q_F with the MC curve intersecting ATC at its minimum. The response earned the fifth point in part (b) because the response shows a correctly shaded area of economic profit.

Part (c): 2 points

The response earned the point in part (c)(i) because the response shows a rightward shift of the market supply, resulting in a lower price P_2 and higher quantity Q_2. The response earned the point in part (c)(ii) because the response shows a lower price P* from the new market equilibrium price P_2, and shows a lower quantity produced Q* at the intersection of P* = MR_2 = MC = minimum ATC.

Part (d): 2 points

The response earned the point in part (d)(i) because the response states the market equilibrium quantity will be less than the allocatively efficient quantity and explains the MPC is greater than the MSC in a market with a positive externality in production. The response earned the point in part (d)(ii) because the response correctly asserts total surplus increases and explains, “MPC shifts to MSC.”

Question 1 (continued)

Sample: 1B
Score: 7

Part (a): 1 point

The response earned the point in part (a) because the response states economic profit is less than accounting profit.

Part (b): 5 points

The response earned the first point in part (b) because the response shows a correctly labeled graph of the market with the equilibrium price and quantity labeled as P_M and Q_M respectively. The response earned the second point in part (b) because the response shows the horizontal demand curve for the firm labeled as D=MR at P_M with price labeled as P_F. The response earned the third point in part (b) because the response shows the profit-maximizing quantity labeled as Q_F, where MR=MC. The response earned the fourth point in part (b) because the response shows P_F above ATC at the profit-maximizing quantity Q_F. The response earned the fifth point in part (b) because the response shows a correctly shaded area of economic profit.

Part (c): 2 points

The response earned the point in part (c)(i) because the response shows a rightward shift of the market supply, resulting in a lower price P_2 and higher quantity Q_2. The response did not earn the point in part (c)(ii) because the response does not show the firm's price P* extended from the new market equilibrium price P_2, and P* is not drawn with a solid horizontal line to the point where MC=ATC.

Part (d): 2 points

The response did not earn the point in part (d)(i) because the response does not explain the MSC is less than the MPC in a market with a positive externality in production. The response did not earn the point in part (d)(ii) because the response does not explain that the government intervention would eliminate the deadweight loss or increase the quantity produced to the allocatively efficient quantity.

Sample: 1C
Score: 3

Part (a): 1 point

The response did not earn the point in part (a) because the response states economic profit is equal to accounting profit.

Question 1 (continued)

Part (b): 5 points

The response earned the first point in part (b) because the response shows a correctly labeled graph of the market with the equilibrium price and quantity labeled as P_M and Q_M respectively. The response earned the second point in part (b) because the response shows the horizontal demand curve for the firm labeled as D=MR at P_M with price labeled as P_F. The response earned the third point in part (b) because the response shows the profit-maximizing quantity labeled as Q_F, where MR=MC. The response did not earn the fourth point in part (b) because the response does not show the firm's price P_F above ATC. The response did not earn the fifth point in part (b) because the response does not shade the area of economic profit given Q_F and P_F.

Part (c): 2 points

The response did not earn the point in part (c)(i) because the response does not show the rightward shift of market supply with lower price P_2 and greater quantity Q_2. The response did not earn the point in part (c)(ii) because the response does not show the firm's price P* drawn from the market price P_2.

Part (d): 2 points

The response did not earn the point in part (d)(i) because the response states the equilibrium quantity is greater than the allocatively efficient quantity. The response did not earn the point in part (d)(ii) because the response does not explain that the government intervention would eliminate the deadweight loss or increase the quantity produced to the allocatively efficient quantity.