AP® Microeconomics

Sample Student Responses and Scoring Commentary
Set 2

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Free-Response Question 3

☑ **Scoring Guidelines**

☑ **Student Samples**

☑ **Scoring Commentary**

Question 3: Short | 5 points

(a)	State yes and explain that this firm is a natural monopoly because it experiences decreasing average total costs over the entire effective demand for its product.	**1 point**
(b)	State the area of deadweight loss is equal to **ONE** of the following areas:	**1 point**

- bfg
- $\frac{1}{2} \times (P_5 - P_1) \times (Q_4 - Q_2)$

(c)(i)	State the regulated price is P_3 and the regulated quantity is Q_3.	**1 point**
(ii)	State no and explain with **ONE** of the following.	**1 point**

- Area cjg is the remaining deadweight loss.
- The deadweight loss is reduced by area bfjc but is not eliminated completely.
- P_3 is greater than (or not equal to) marginal cost at Q_3.
- Q_3 is less than (or not equal to) the socially optimal quantity Q_4.

	Total for part (c)	**2 points**
(d)	State the firm will earn negative economic profit and explain with **ONE** of the following:	**1 point**

- At the socially optimal quantity, Q_4, average total cost (P_2) is greater than price (P_1).
- At the socially optimal quantity, Q_4, the area of negative economic profit is P_1P_2dg.
- At the socially optimal quantity, Q_4, the area of negative economic profit is $(P_2 - P_1) \times Q_4$.

Total for question 3	**5 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.

3. a This graph is a natural monopoly because ATC is decreasing for the entire portion of the given demand.

b, The area representing deadweight loss is fbg.

c. i. The price will be P3 and the quantity Q3

ii. This will not eliminate deadweight loss as the firm does not produce at the allocatively efficient point of P1 and Q4 (where $MC = D$) resulting in a deadweight loss of jcg.

d. The firm will earn negative economic profit because at the socially optimal point, $ATC > P$. This results in a loss of $(P2 - P1) \cdot Q4$.

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

a) Yes because marginal cost is constant.

b) fbg

c) i) P_3 and Q_3

   ii) No but it will decrease it, it will go from fbg to cjg. Because the firm will operate where ATC = Demand but in the graph that still leaves a deadweight loss of cjg.

d) Positive economic profit because the socially optimal point is at point b, and point b is above the ATC line.

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

3.a. Yes, the low marginal cost but the high starting ATC implies low variable costs and high fixed costs. Since this firm has a negative economic profit, no other firms will pay the high fixed cost to enter the market.

3.b. $P_7 F_9$

3.c.i. $\text{Am } P_3 Q_3$
  c.ii. Yes, the company will be satisfying the demand.

3.d. the firm will have a negative economic profit, because the socially optimal price and quantity is $P_1 Q_4$, which is below ATC.

Question 3

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

Overview

The question assessed students' understanding of natural monopoly and regulation. The concepts in the question included decreasing average total costs over the entire effective demand, deadweight loss, socially optimal quantity, and economic profit.

The question provided a graph showing a natural monopoly with a demand (D) curve, marginal revenue (MR) and marginal cost (MC) curves, and an average total cost (ATC) curve that is downward sloping through the relevant range of market demand.

In part (a) students were asked to assert whether the firm shown in this graph is a natural monopoly and to explain their assertion. Students were required to state yes and explain that the firm is experiencing decreasing average total costs over the entire effective demand for its product.

In part (b) students were asked to identify the area representing the deadweight loss for this profit-maximizing monopoly. Students were required to identify the area of deadweight loss as bfg.

In part (c) a government regulation on price was introduced that resulted in the firm earning zero economic profits. Part (c)(i) required students to identify the price and resulting quantity the firm would produce in order to improve resource allocation. Students were required to state the regulated price is P_3, and the regulated quantity is Q_3. In part (c)(ii) students were asked if this government policy eliminates the deadweight loss and to explain using labeling from the graph. Students were required to answer no and explain that the area cjg is the remaining deadweight loss.

In part (d) students were asked to state whether the firm will earn positive, negative, or zero economic profit if the government decides to set a price that results in the socially optimal quantity of output, and then to explain using labeling from the graph. Students were required to state that the firm will earn negative economic profit and explain that at the socially optimal quantity (Q_4), average total cost is greater than price (P_1).

Sample: 3A
Score: 5

Part (a): 1 point

The response earned the point in part (a) because the response correctly states the firm shown in the graph is a natural monopoly and explains the average total cost is decreasing for the entire portion of the given demand.

Part (b): 1 point

The response earned the point in part (b) because the response correctly identifies the deadweight loss as fbg.

Question 3 (continued)

Part (c): 2 points

The response earned the point in part (c)(i) because the response states the price is P_3, and the quantity is Q_3. The response earned the point in part (c)(ii) because the response states the regulation will not eliminate the deadweight loss and explains the remaining deadweight loss is jcg.

Part (d): 1 point

The response earned the point in part (d) because the response states the firm will earn negative economic profit and explains the area of economic loss is $(P_2 - P_1) \times Q_4$.

Sample: 3B
Score: 3

Part (a): 1 point

The response did not earn the point in part (a) because the response does not explain that a natural monopoly experiences decreasing average total costs over the entire effective demand.

Part (b): 1 point

The response earned the point in part (b) because the response identifies the deadweight loss as fbg.

Part (c): 2 points

The response earned the point in part (c)(i) because the response states the price is P_3 and the quantity is Q_3. The response earned the point in part (c)(ii) because the response states the regulation will not eliminate the deadweight loss and explains the remaining deadweight loss is cjg.

Part (d): 1 point

The response did not earn the point in part (d) because the response does not state negative profits.

Sample: 3C
Score: 2

Part (a): 1 point

The response did not earn the point in part (a) because the response does not explain that a natural monopoly experiences decreasing average total costs over the entire effective demand for its product.

Question 3 (continued)

Part (b): 1 point

The response did not earn the point in part (b) because the response does not identify the deadweight loss as bfg.

Part (c): 2 points

The response earned the point in part (c)(i) because the response states the price is P_3 and the quantity is Q_3. The response did not earn the point in part (c)(ii) because the response asserts yes.

Part (d): 1 point

The response earned the point in part (d) because the response states negative economic profit is being earned at the socially optimal quantity of output, Q_4, and the price P_1 is below ATC.