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# AP<sup>®</sup> Microeconomics

## Sample Student Responses and Scoring Commentary Set 2

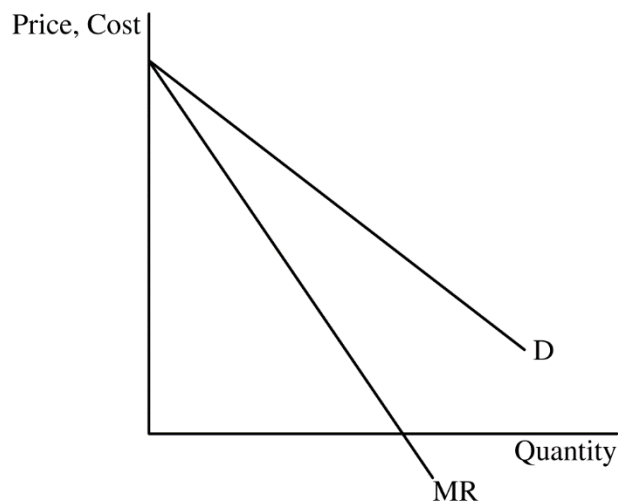
### **Inside:**

#### **Free-Response Question 1**

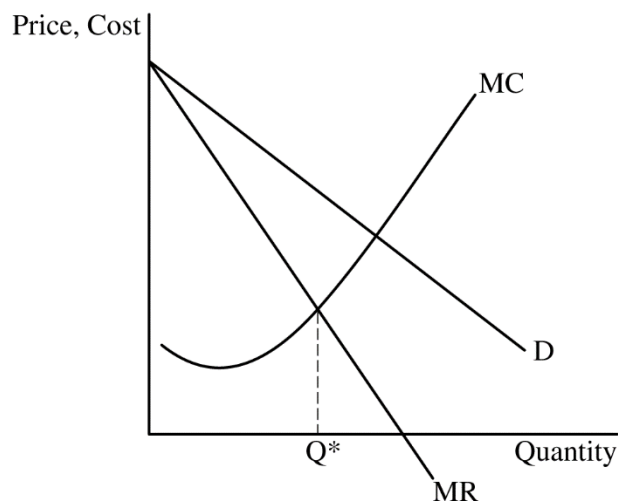
- ☒ **Scoring Guidelines**
- ☒ **Student Samples**
- ☒ **Scoring Commentary**

**Question 1: Long****10 points**

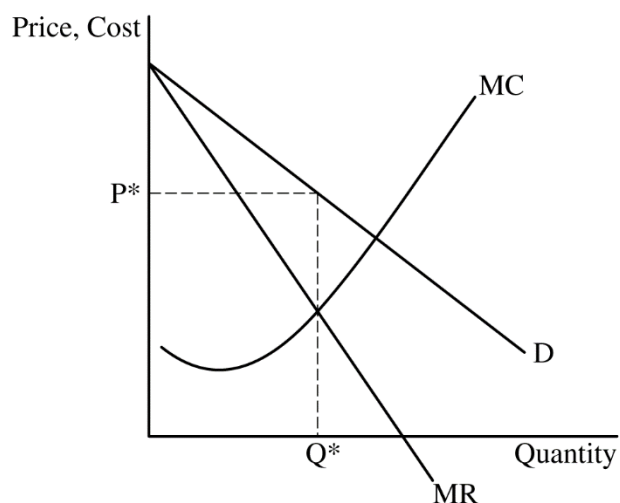
- (a) Draw a correctly labeled graph of Arzeye Pharma with a downward-sloping demand (D) curve and a downward-sloping marginal revenue (MR) curve with the MR curve below the D curve. **1 point**



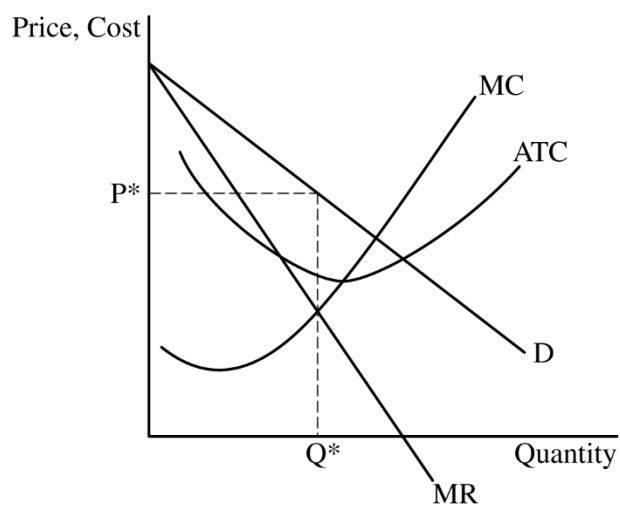
- For the second point, the graph must show a rising marginal cost (MC) curve and the profit-maximizing quantity, labeled  $Q^*$ , where  $MR = MC$ . **1 point**



For the third point, the graph must show the profit-maximizing price, labeled  $P^*$ , from the downward-sloping demand curve at  $Q^*$ . **1 point**

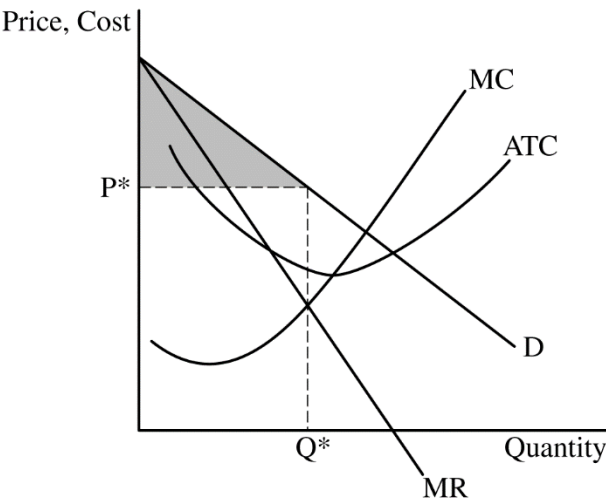


For the fourth point, the graph must show the average total cost (ATC) curve below  $P^*$  at  $Q^*$  and the marginal cost curve passing through the minimum point of the ATC curve. **1 point**



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

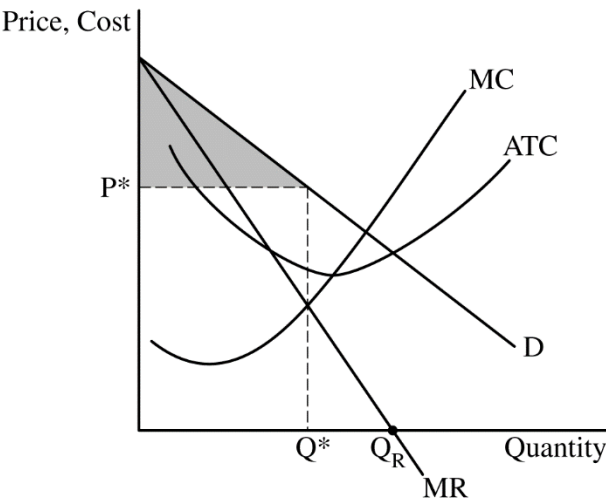
1 point



Total for part (a) 5 points

(b) (i) The graph from part (a) must show the quantity that maximizes total revenue, labeled  $Q_R$ , where marginal revenue equals 0.

1 point

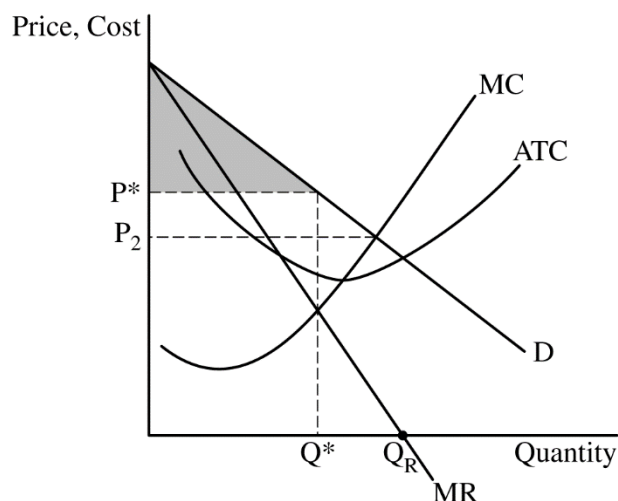


(ii) State that demand is unit elastic.

1 point

Total for part (b) 2 points

- (c) (i) The graph from part (a) must show the lowest price that Arzeye Pharma would charge if it engaged in perfect price discrimination, labeled  $P_2$ , from the intersection of the demand and marginal cost curves. **1 point**



- (ii) State that consumer surplus would decrease to \$0 and explain that Arzeye is able to charge the maximum price each consumer is willing to pay. **1 point**

**Total for part (c) 2 points**

- (d) State that Arzeye Pharma's demand will become more elastic and explain that as the patent expires more firms will enter the market which increases the number and availability of substitutes, causing consumers to be more responsive to changes in the price of eye treatments. **1 point**

**Total for question 1 10 points**

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

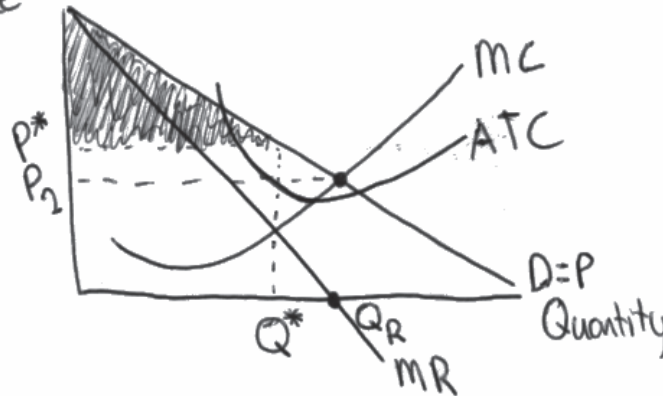
Question 1

Question 2

Question 3

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

1.  
a) Price



b)  
ii) Unit Elastic

c) Consumer Surplus would decrease to zero because in perfect price discrimination every consumer pays the most amount they are willing to so there is no consumer surplus.

d) More Elastic. The patent is a barrier to entry. Without the patent more firms can enter the industry. This gives consumers more options to choose from making the demand for any individual firm (like Arzeye Pharma) more elastic. More substitutes = more elasticity.

Page 2

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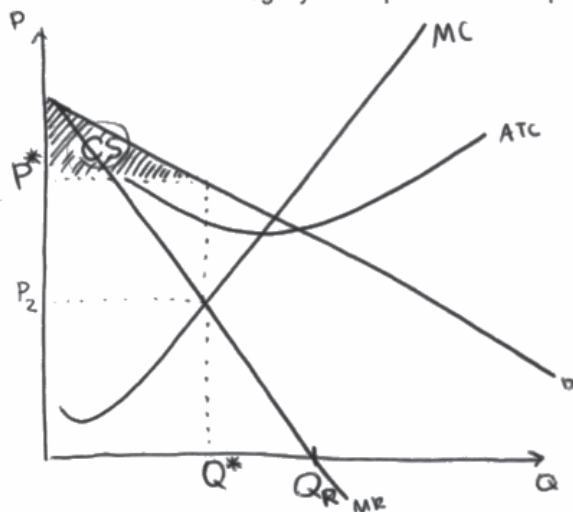
**Important:** Completely fill in the circle that corresponds to the question you are answering on this page.

Question 1

Question 2

Question 3

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



- b) ii. The demand for eye treatments is inelastic because  $Q_R$  is when MR reaches zero and becomes negative.
- c) ii. Consumer surplus would increase because most would be willing to pay for the new price.
- d) If the Arzeve Pharma's patent expires, then the demand for Arzeve Pharma's treatment will become more elastic since consumers will bear less of the tax burden instead of the producers.

Page 2

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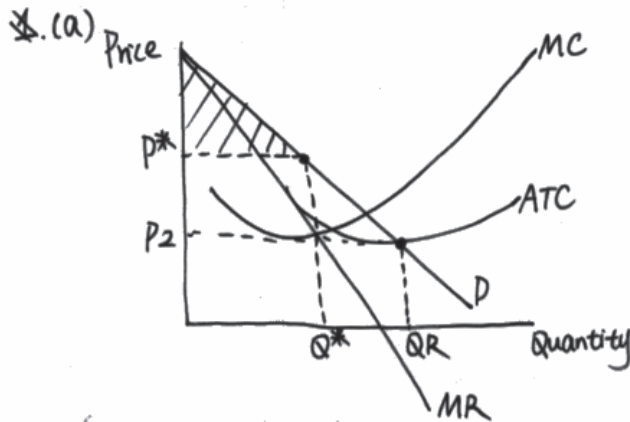
**Important:** Completely fill in the circle that corresponds to the question you are answering on this page.

Question 1

Question 2

Question 3

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



(b) (ii) The demand for eye treatments is elastic.

(c) The consumer surplus increase, because there is a price discrimination cause price decrease.

(d) Will be more elastic; Because the Arzeze Pharma's treatment is a elastic product.

Page 2

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 monopoly could maximize profits, how instead it could maximize revenue, the relationship between marginal revenue and elasticity, and the effects of price discrimination on consumer surplus. The question also assessed students' understanding of how a loss of barriers to entry would affect the elasticity of demand.

The question stated that “Arzeve Pharma has a patent, a legal barrier to entry, on its newly developed eye treatment that cures common eye problems. Arzeve Pharma is currently earning positive economic profits and is producing the profit-maximizing quantity of eye treatments.”

In part (a) students were asked to draw a correctly labeled graph for a monopoly earning positive economic profit. Parts (a)(i) and (a)(ii) asked students to show the profit-maximizing quantity and price, respectively. The question tested students' knowledge of market conditions for a monopoly and their ability to illustrate these concepts using a graph. This task required demonstrating knowledge of revenue and cost conditions by drawing a downward-sloping demand curve (D), a downward-sloping marginal revenue curve (MR) that lies below the demand curve, and by drawing the marginal cost (MC) curve. Students were required to show that the profit-maximizing quantity ( $Q^*$ ) occurs where MR equals MC and that the profit-maximizing price ( $P^*$ ) is determined by identifying the price that corresponds to this quantity on the D curve. These tasks required students to demonstrate marginal analysis in a graphical format. Part (a)(iii) asked students to draw the average total cost (ATC) curve consistent with the given positive economic profit condition by having the ATC curve below  $P^*$  at  $Q^*$  and with the rising MC curve passing through the minimum point of the ATC curve. Part (a)(iv) asked students to completely shade the area of consumer surplus (CS). This task required students to demonstrate their understanding that CS is value net of the price paid for the consumers who purchase the good, and so corresponds to the area that lies below the D curve down to  $P^*$  and over to  $Q^*$ .

Part (b) of this question redirected students to consider that Arzeve Pharma wanted to charge a price that maximized total revenue instead of maximizing profit. Part (b)(i) asked students to label on their graphs in part (a) the revenue-maximizing quantity labeled as  $Q_R$ . This task required students to demonstrate knowledge that the revenue-maximizing quantity is located where  $MR=0$ . Part (b)(ii) asked students to determine whether demand at their labeled  $Q_R$  was elastic, inelastic, or unit elastic. This task required students to demonstrate their understanding of the relationship between marginal revenue and elasticity by stating that the demand at  $Q_R$  was unit elastic.

Part (c) of this question redirected students to consider that Arzeve Pharma engaged in perfect price discrimination. In part (c)(i) students were asked to label on their graphs in part (a) the lowest price the firm would charge as  $P_2$ . This task required students to understand that the lowest price a perfectly price discriminating monopolist charges is from where  $D=MC$ , similar to the  $P=MC$  condition in a perfectly competitive market. In part (c)(ii) students were asked to determine that CS would decrease to zero and explain that the monopolist would charge the maximum price each consumer is willing to pay. This task tested their understanding that a perfectly price discriminating monopolist extracts all economic surplus.

**Question 1 (continued)**

Part (d) redirected students by stating that Arzeve Pharma's patent had expired. Students were asked to conclude the demand would become more elastic since new firms would enter the market and provide substitutes. This part of the question assessed students' understanding that a change in the availability of substitutes would increase consumers' sensitivity to a change in price.

**Sample: 1A****Score: 10**

Part (a): 5 points

The response earned the first point in part (a) because the response shows a downward-sloping demand (D) curve and a downward-sloping marginal revenue (MR) curve with the MR curve below the D curve. The response earned the second point in part (a) because the response shows a rising marginal cost (MC) curve and the profit-maximizing quantity, labeled  $Q^*$ , where  $MR=MC$ . The response earned the third point in part (a) because the response shows the profit-maximizing price, labeled  $P^*$ , from the downward-sloping demand curve at  $Q^*$ . The response earned the fourth point in part (a) because the response shows the average total cost curve below  $P^*$  at  $Q^*$  and the MC curve intersecting average total cost at its minimum point. The response earned the fifth point in part (a) because the response shows the area of consumer surplus shaded completely.

Part (b): 2 points

The response earned the first point in part (b) because the response shows the quantity that maximizes total revenue, labeled  $Q_R$ , where  $MR=0$ . The response earned the second point in part (b) because the response correctly states demand is unit elastic.

Part (c): 2 points

The response earned the first point in part (c) because the response shows  $P_2$  from the intersection of the demand and marginal cost curves. The response earned the second point in part (c) because the response states consumer surplus would decrease to zero and correctly explains that "...every consumer pays the most amount they are willing to...".

Part (d): 1 point

The response earned the point in part (d) because the response asserts demand will become more elastic and correctly explains that firms will enter the industry, and there will be more substitutes available for consumers.

**Question 1 (continued)****Sample: 1B****Score: 6**

Part (a): 5 points

The response earned the first point in part (a) because the response shows a downward-sloping demand (D) curve and a downward-sloping marginal revenue (MR) curve with the MR curve below the D curve. The response earned the second point in part (a) because the response shows a rising marginal cost (MC) curve and the profit-maximizing quantity, labeled  $Q^*$ , where  $MR = MC$ . The response earned the third point in part (a) because the response shows the profit-maximizing price, labeled  $P^*$ , from the downward-sloping demand curve at  $Q^*$ . The response earned the fourth point in part (a) because the response shows the average total cost curve below  $P^*$  at  $Q^*$  and the MC curve intersecting average total cost at its minimum point. The response earned the fifth point in part (a) because the response shows the area of consumer surplus shaded completely.

Part (b): 2 points

The response earned the first point in part (b) because the response shows the quantity that maximizes total revenue, labeled  $Q_R$ , where  $MR=0$ . The response did not earn the second point in part (b) because the response incorrectly states demand is inelastic.

Part (c): 2 points

The response did not earn the first point in part (c) because the response incorrectly shows  $P_2$  from the intersection of the marginal revenue and marginal cost curves. The response did not earn the second point in part (c) because the response incorrectly states consumer surplus increases.

Part (d): 1 point

The response did not earn the point in part (d) because the response does not explain that demand will become more elastic since firms will enter the market and more substitutes are available.

**Sample: 1C****Score: 4**

Part (a): 5 points

The response earned the first point in part (a) because the response shows a downward-sloping demand (D) curve and a downward-sloping marginal revenue (MR) curve with the MR curve below the D curve. The response earned the second point in part (a) because the response shows a rising marginal cost (MC) curve and the profit-maximizing quantity, labeled  $Q^*$ , where  $MR = MC$ . The response earned the third point in part (a) because the response shows the profit-maximizing price, labeled  $P^*$ , from the downward-sloping demand curve at  $Q^*$ . The response did not earn the fourth point in part (a) because the response does not show the MC curve intersecting the average total cost curve at its minimum point. The response earned the fifth point in part (a) because the response shows the area of consumer surplus shaded completely.

### Question 1 (continued)

Part (b): 2 points

The response did not earn the first point in part (b) because the response incorrectly shows the quantity that maximizes total revenue, labeled  $Q_R$ , from the intersection of the demand and average total cost curves. The response did not earn the second point in part (b) because the response incorrectly states demand is elastic.

Part (c): 2 points

The response did not earn the first point in part (c) because the response incorrectly shows  $P_2$  from the intersection of the demand and average total cost curves. The response did not earn the second point in part (c) because the response incorrectly states consumer surplus will increase.

Part (d): 1 point

The response did not earn the point in part (d) because the response does not correctly explain why the demand for eye treatments will become more elastic.