2018

AP CollegeBoard

AP Microeconomics

Sample Student Responses and Scoring Commentary

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Free Response Question 1

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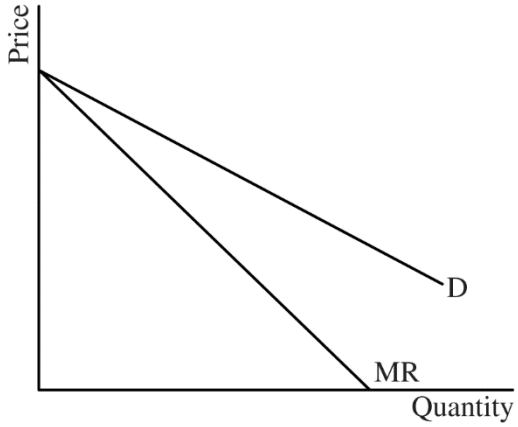
2018 SCORING GUIDELINES

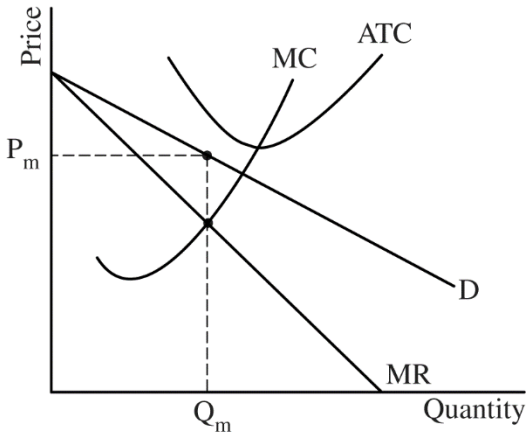
Question 1

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.

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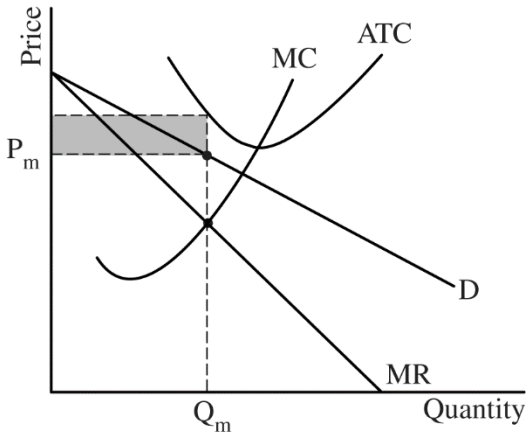
Question 1 (continued)



- 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.

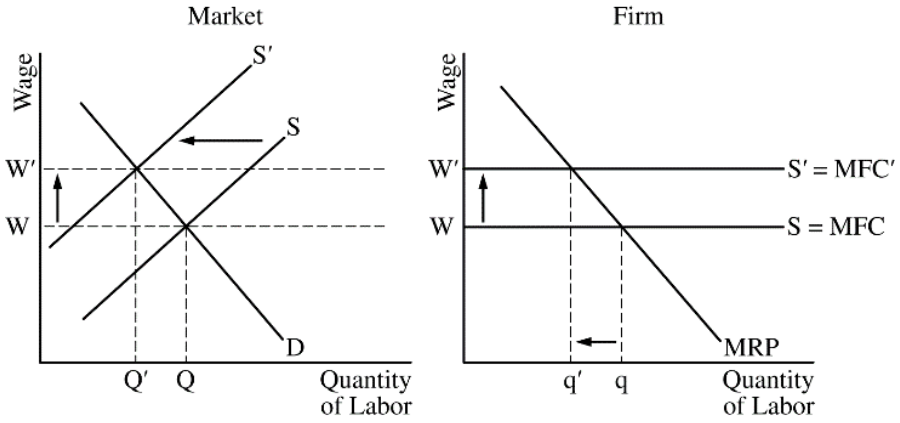
(c) 1 point:

- 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:

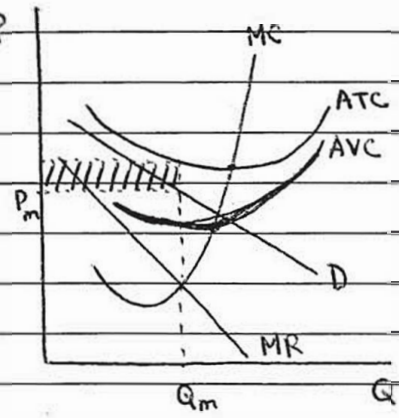
- One point is earned for stating or graphically showing that the wage rate will increase because the market supply of labor decreases (shifts left).
- One point is earned for stating the marginal revenue product (MRP) of the last worker hired will increase and explaining with one of the following reasons.
    - 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).

Question 1 (continued)



1A

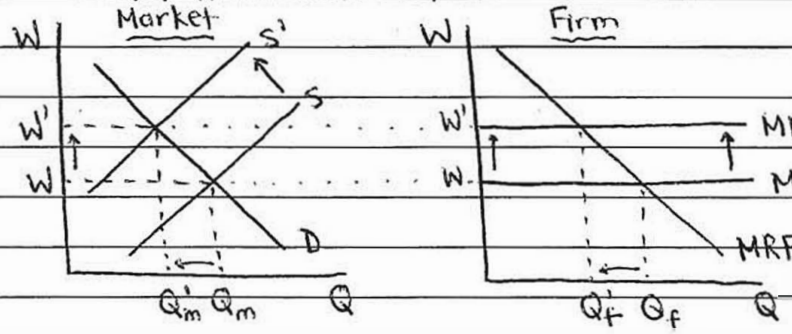
(a)



(b) Because the price is greater than the average variable cost, the economic losses are less than the total fixed costs in the short run, so the firm minimizes losses by operating in the short run.

(c) Single Cinema's total revenue would decrease because MR < 0 for that last ticket.

(d)



S↓ : W↑, Q_m↓ W↑ : Q_f↓

(i) Because supply of labor decreases, wage rate increases (as shown above).

(ii) As shown in the "Firm" graph, an increase in wage rate will cause fewer workers to be hired by Single Cinema and the marginal revenue product of the last worker hired to increase (by the same amount as the increase in wage rate).

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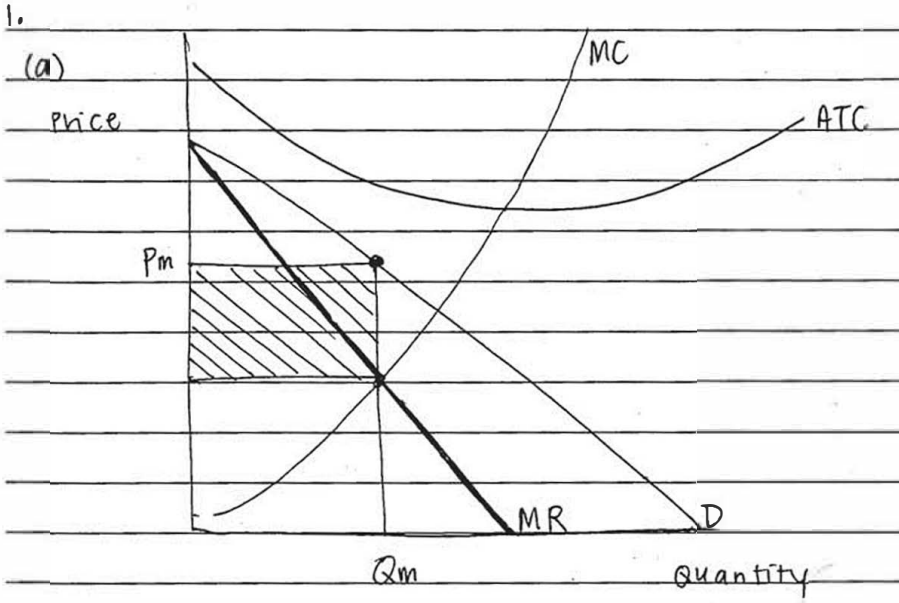
ANSWER PAGE FOR QUESTION 1

1B

1.

(a)



(b) Despite earning negative economic profit, Single Cinema continues to operate because it is ~~earning~~ still making revenue. It might also see/predict future positive upturns in profit.

(c) The total revenue would decrease because with one fewer ticket, the area of the total revenue box in the graph would decrease by the size of $1 \times P = P$. It is also selling 1 less than profit-maximizing quantity.

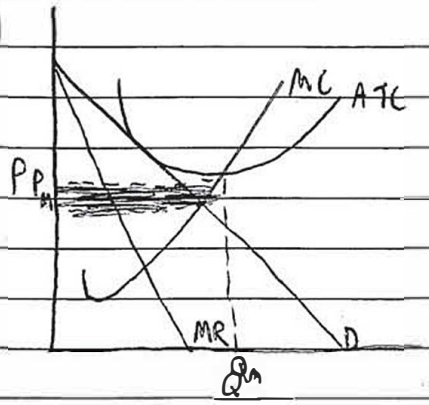
(d) (i) wage rate goes up - as supply of labor shifts left, price/wage goes up. Also, workers become more scarce and thus more valuable.

(ii) It will stay the same. MRP is not affected by the number of workers available in the market; rather it is determined by MPP (marginal physical product) times P (price of the product).

ANSWER PAGE FOR QUESTION 1

1C

a)



b) If they were to be operating in the Long Run they would go out of business so they are taking a brief loss because that is still better than going out of business

c) Total Revenue would decrease because they are missing out on the revenue from that one ticket.

di) Wage rate will increase in order to attract more workers.

dii) Increase; because wage rate increased so will productivity so more products will be produced per worker. (An increase in MRP)

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Question 1

Overview

The question assessed students' understanding of the market conditions for monopoly, how a monopoly would operate under those conditions, how a change in behavior would affect the outcome for the monopoly, and how changes in the labor market would affect wages. Students were expected to draw and label a graph for a monopoly earning negative economic profit, to analyze and explain the behavior of the firm, and to explain how a change in the labor market affected wages and the conditions for hiring labor.

The question states that Single Cinema has monopoly power and is a profit-maximizing firm currently operating with a negative economic profit in the short run. In part (a) students were asked to draw a correctly labeled graph for a monopoly. Part (a)(i) asked students to show the profit-maximizing price and quantity for the monopoly, and part (a)(ii) asked students to shade the area representing the negative economic profit. This part of the question tests students' knowledge of the market conditions for a monopoly and their ability to illustrate these concepts using graphs. This task includes showing revenue and cost conditions, a downward-sloping demand curve and a marginal revenue (MR) curve below the demand curve, and a marginal cost (MC) curve rising and crossing a U-shaped average total cost (ATC) curve at the minimum of that ATC curve. With those conditions students were asked to show that the profit-maximizing quantity is determined by equating marginal revenue and marginal cost and that the profit-maximizing price is determined by going up to the demand curve at the profit-maximizing quantity. This part of the question also asked students to shade the area of the negative economic profit, with ATC above the price at the profit-maximizing quantity and with the ATC curve drawn above the demand curve for all quantities.

Part (b) asked the students to explain why Single Cinema would continue to operate in the short run despite earning negative economic profit. This tested students' understanding of the shutdown condition, price (P)> average variable cost (AVC) or total revenue (TR) > total variable cost (TVC), for a firm earning negative economic profit and that the economic loss would be greater than fixed costs if the firm shuts down.

Part (c) asked the students to explain how selling a smaller quantity than Q_m would affect Single Cinema's total revenue. This part tested students' understanding of how total revenue varies at different quantities along a downward-sloping demand curve. Students were expected to describe a decrease in total revenue because the positive marginal revenue of the one unit no longer sold would not be included in the total revenue, or describe a decrease in total revenue as a result of the increase in price having a smaller relative effect on total revenue than the decrease in the quantity or referring to the change in quantity occurring in the elastic range of the demand curve.

Part (d) states that the number of workers available has decreased in the perfectly competitive labor market from which Single Cinema hires workers. Given the situation, students were asked to explain what happened to the wage rate and the marginal revenue product (MRP) of the last worker hired. In part (d)(i) students were expected to conclude that the decrease in the supply of labor resulted in an increase in the wage rate. Part (d)(ii) tested students' ability to explain the effect of the resulting increase in the wage rate on the firm's decision on hiring workers. The firm will hire fewer workers where the MRP of the last worker hired was equal to the increased wage rate because each worker no longer hired by Single Cinema had a lower marginal product of labor than the last worker hired (diminishing marginal product).

Question 1 (continued)

Sample: 1A
Score: 9

The student answers all parts of the question correctly and earned all 9 points.

Sample: 1B
Score: 5

The student did not earn 1 point in part (a) for incorrectly shading the area of negative economic profit because the shaded rectangle should be above P_m up to the average total cost at Q_m. The student did not earn 1 point in part (b) because the response does not provide the correct relationship between price and average variable cost (P>AVC) or state that the firm's economic loss is less than its total fixed cost (which is the firm's losses if it shuts down in the short run). The student did not earn 1 point in part (c) because the response does not explain that the decrease in quantity would cause an increase in price. The student did not earn 1 point in part (d)(ii) because marginal revenue product (MRP) is the marginal revenue (MR) times marginal product (MP) and the marginal product of each additional worker is diminishing so, with the increase in wage, Single Cinema hires fewer workers and with each fewer worker the marginal product of labor for the last worker hired will increase.

Sample: 1C
Score: 2

The student earned 1 point in part (a) for correctly drawing the demand and marginal revenue curves. The student earned 1 point in part (a) for correctly drawing the marginal cost curve rising and passing through the minimum of the U-shaped average total cost curve.