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2021

AP CollegeBoard

AP® Microeconomics

Sample Student Responses and Scoring Commentary Set 1

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Free Response Question 2

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Question 2: Short — 5 Points

(a)	Calculate the marginal revenue product of the second worker as $120 and show your work. Marginal Revenue Product = (20–8)/(2–1) × $10 or ($200–$80)/(2–1) = $120	**1 point**
(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) × $10) which is less than the wage of $100.	**1 point**
(c)	Calculate Schmitt's daily profit as $0 and show your work. Profit = (TR – TC) = ($10 × 45) – ($50 + (4 × $100)) = $450 – $450 = $0	**1 point**
(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**

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Question 1 ○ Question 2 ● Question 3 ○

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

a.) 20 - 8 = 12 12 × 10 = 120
The marginal revenue product of the second worker is $120.

b.) 4 workers maximises profits for Schmitt inc. Because the marginal revenue product for the fifth worker is $90, and because the daily market wage for each worker is $100, they would experience an overall net loss when hiring a fifth worker.

c.) 4 workers = 45 parked cars × $10/per car = $450 per day
4 workers × $100 per worker = $400 + $50 per day (fixed costs) = $450 per day
$450 - $450 = $0
At the profit maximising value of 4 workers, Schmitt inc. will make $0 per day.

d.) (i) The market wage will increase in the long run because workers will need to be paid more to offset the cost of buying insurance. If firms do not offer higher wages, then workers will leave the market because of the additional costs, decreasing worker supply and thus increasing market wage.
(ii) The number of workers hired will decrease because the wages will be higher, and firms won't be able to afford to pay all their workers with the same level of output.

Question 1 ○ Question 2 ● Question 3 ○

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

a) $20 \times 10 = 200$ $\quad 200 - 80 = \$120$
$8 \times 10 = 80$

b) Schmitt Inc. will hire 4 workers to maximize profit. Schmitt Inc. will not hire an additional worker because the marginal revenue that a 5th worker brings is not as high as the marginal cost.

c) $TR = 45 \times 10 = 450$ $\quad 450 - 450 = \$0$
$TC = 4 \times 100 = 400$
$400 + 50 = 450$

di) The market wage will increase in the long run.

dii) The number of workers will decrease in the short run because there is now an added expense of working and they won't be making as much money.

Question 1 ○ Question 2 ● Question 3 ○

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

(a) $2(100) = \$200$

(b) 6 workers because MU = 6 and 6 workers and 60 cars are equal to $600

(c) $\pi = TR - TC$

$\pi = 600 - 50$

$\pi = 550$

(d) (i) increase

(ii) decrease, because the workers have to pay at their expense

Question 2

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

Overview

The question assessed students' understanding of firms' production decisions in a perfectly competitive labor market and the impacts of a change in public policy. The concepts in the question included marginal revenue product, marginal analysis, profit maximization by a firm in a perfectly competitive market, calculating profit and analyzing the effect of a public policy change affecting the labor market.

The question presented a table showing the relationship between the number of workers hired and the number of cars parked by Schmitt Inc., a company that provides car parking services. In part (a) students were asked to calculate the marginal revenue product of the second worker. Students were expected to show the change in output (20 – 8) divided by the change in the number of employees between the second and first units of labor hired (2 – 1), multiplied by the per-unit price of the service ($10 per unit) to get the marginal revenue product of $120. Students were directed to show their work.

In part (b) students were asked to identify the number of workers Schmitt Inc. will hire to maximize profits. Students were asked to explain why Schmitt Inc. will not hire one more unit than the profit-maximizing amount identified, using marginal analysis and numbers from the table provided. In the answer, students had to assert that the profit maximizing level of input is four workers. Students were expected to explain that the marginal revenue product of the fourth worker is greater than the wage (marginal factor cost) ($110 > $100) while the marginal revenue product of the fifth unit is less than the wage ($90 < $100). Thus, Schmitt Inc. would hire a fourth worker but not a fifth worker.

Part (c) asked students to calculate Schmitt Inc.'s daily profit at the quantity identified in part (b). Students were expected to show that Schmitt Inc.'s profit from hiring four employees was $0: (($10*45) – ($50 + ($100*4)). Students were directed to show their work.

In part (d) students were asked to suppose there was an individual insurance mandate for employees in this industry and analyze the long-run and short-run impacts of the policy on the labor market. In part (i) students were expected to assert that the wage paid by a typical firm in this industry would increase. Firms in the industry hire labor in a perfectly competitive market, and so any increase in the cost of working in the market will decrease the supply of labor. Students were not expected to explain their assertion. In part (ii) students were expected to assert that the number of workers hired in the short run would decrease. Given the increase in the cost of providing labor, some workers will choose to take employment elsewhere. This decrease in supply will increase the marginal factor cost (marginal resource cost). The profit-maximizing firm will then hire fewer workers until the marginal factor cost of hiring one additional worker equals the marginal revenue product of that worker.

Sample: 2A
Score: 4

Part (a): 1 point

- The response earned the point because the response shows a correct calculation of MRP and shows work.

Part (b): 1 point

- The response earned the point because the response states that four workers will be hired and explains that the fifth worker will not be hired by indicating the MRP of $90 is less than the MFC of $100.

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Question 2 (continued)

Part (c): 1 point

- The response earned the point because the response shows a correct calculation of profit and shows work.

Part (d): 2 points

- The response earned the point in part (d)(i) because the response states that the wage will increase.
- The response did not earn the point in part (d)(ii) because the response does not explain why a typical firm will hire fewer workers based on MFC (or MRC) and MRP (or firm demand).

Sample: 2B
Score: 3

Part (a): 1 point

- The response earned the point because the response shows a correct calculation of MRP and shows work.

Part (b): 1 point

- The response did not earn the point because the response does not explain, using numbers, why the fifth worker is not hired.

Part (c): 1 point

- The response earned the point because the response shows a correct calculation of profit and shows work.

Part (d): 2 points

- The response earned the point in part (d)(i) because the response states that the wage will increase.
- The response did not earn the point in part (d)(ii) because the response does not explain why a typical firm will hire fewer workers based on MFC (or MRC) and MRP (or firm demand).

Sample: 2C
Score: 1

Part (a): 1 point

- The response did not earn the point because the response does not correctly calculate marginal revenue product.

Part (b): 1 point

- The response did not earn the point because the response states six workers will be hired.

Part (c): 1 point

- The response did not earn the point because the response does not correctly calculate profit.

Part (d): 2 points

- The response earned the point in part (d)(i) because the response states that the wage will increase.
- The response did not earn the point in part (d)(ii) because the response does not explain why a typical firm will hire fewer workers based on MFC (or MRC) and MRP (or firm demand).

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