2019

AP CollegeBoard

AP® Microeconomics

Sample Student Responses and Scoring Commentary Set 2

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Free Response Question 3

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AP® MICROECONOMICS
2019 SCORING GUIDELINES

Question 3

6 points (1 + 1 + 1 + 1 + 2)

(a) 1 point

- One point earned for stating that Jackpot Florist's dominant strategy is to close at 6 p.m.

(b) 1 point

- One point is earned for stating that this is not the profit-maximizing action by Boulevard Gardens and for explaining that Boulevard will earn $30 by choosing Delivery instead of $20 choosing No Delivery.

(c) 1 point

- One point is earned for identifying the profit for Boulevard Gardens in the Nash equilibrium as $30.

(d) 1 point

- One point is earned for stating that they would choose to close at 9 p.m. and offer No Delivery.

(e) 2 points

- One point is earned for redrawing the payoff matrix showing the effect of the agreement.

		Boulevard	
		Delivery	**No Delivery**
Jackpot	6 p.m.	$35,$30	$43,$32
	9 p.m.	$37,$38	$45,$40

- One point is earned for stating that Boulevard will agree to Jackpot's proposal and for explaining that Boulevard will be better off because this will increase the payoff from $30 to $40.

ANSWER PAGE FOR QUESTION 3

3A

a) Jackpot's dominant strategy is to close at 6:00 P.M.

b) This is not the profit-maximizing action by Boulevard because it will earn a profit of $20, while choosing Delivery would result in a profit of $30.

c) Boulevard will earn $30 profit in the Nash equilibrium.

d) The new company would choose to close at 9:00 P.M. and choose No Delivery.

e)

		Boulevard	
		Delivery	No Delivery
Jackpot	6:00 P.M.	$35, $30	$43, $32
	9:00 P.M.	$37, $38	$45, $40

Boulevard would agree to Jackpot's proposal because without it, Jackpot would always close at 6:00 P.M., so Boulevard could make $30 profit. However, with the plan, Boulevard could make $40 profit instead, and both firms would have dominant strategies leading to the $45, $40 values.

ANSWER PAGE FOR QUESTION 3

3B

a) Jackpot's dominant strategy is to close at 6:00 P.M.

b) No, because if Boulevard chooses No Delivery then it would result in 20 dollars of profit at 6:00 P.M. when we could earn 30 dollars of profit by choosing delivery at 6:00 P.M.

c) Boulevard will earn 40 dollars in Nash Equilibrium.

d) The strategies that the new company would choose would be to close at 9:00 P.M. with No Delivery, in order to maximize its combined profit.

e) (i) Boulevard

Jackpot \ Boulevard	Agree	Disagree
Agree	$45, $40	$57, $28
Disagree	$33, $52	$45, $40

(ii) Boulevard won't agree with Jackpot's proposal because they run short since the values in the matrix are pretty low which makes the proposal more beneficial to Jackpot than Boulevard.

ANSWER PAGE FOR QUESTION 3

3C

a) To close at 6:00 pm

b) The profit-maximizing action would benefit Jackpot because they would receive more money.

c) Boulevard would earn $40.

d) They would close at 9:00 pm and not do Delivery

e)

		Boulevard: Delivery	Boulevard: No Delivery
Jackpot	6:00	$43, $42	$43, $32
	9:00	$37, $38	$45, $40

ii) Boulevard would benefit if Jackpot were to cheat on the agreement. But if Boulevard were to cheat they would lose profit.

$55 + 12 = 43

$50 − 12 = 38

25 + 12 = 37

$35 − 12 = 23

30 + 12 = 42

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AP® MICROECONOMICS
2019 SCORING COMMENTARY

Question 3

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

Overview

The question assessed students' understanding of two-player (Boulevard and Jackpot) strategic games. In parts (a) through (d) of the question, the students were expected to identify a player's dominant strategy, identify the payoff for a player, explain why an alternative pair of actions was not profit maximizing, and identify the collective best result. In part (e), the students were expected to construct a new payoff matrix based on a proposal given by Jackpot. Students were expected to determine if Boulevard would agree to the proposal by comparing the Nash equilibrium of the original matrix with the Nash equilibrium of the new matrix.

Part (a) assessed students' understanding of a dominant strategy. Students needed to state that Jackpot's dominant strategy is to choose a closing time of 6 p.m.

In part (b) students were asked to determine whether an action is profit maximizing and to explain their answer using values from the matrix. Students needed to state that the proposed choice is not profit-maximizing and explain that Boulevard would earn more by choosing Delivery than No Delivery ($30>$20).

Part (c) tested students' ability to identify Nash equilibrium outcomes and to correctly identify the payoff for the player. Students needed to state that Boulevard would earn $30 in the Nash Equilibrium.

Students were told in part (d) the two firms merged to form one company with two locations while still facing the same choices. This part of the question tested students' ability to understand profit-maximizing behavior and the effect of a change in market conditions in the context of a given payoff matrix. Students needed to recognize the new best outcome maximized the sum of the two profits in each cell, and state the actions associated with the profit maximizing outcome (9 p.m. and No Delivery).

In part (e) students needed to construct a new payoff matrix based on a proposal given by Jackpot. Students were expected to determine if Boulevard would agree to the proposal by comparing the Nash equilibrium of the original matrix with the Nash equilibrium of the new matrix. Part (e)(i) tested students' ability to construct a payoff matrix given new strategic considerations. The second part, (e)(ii), tested students' ability to compare two separate Nash equilibria in order to explain that the optimal choice is for Boulevard to agree to Jackpot's proposal because it will be better off in the new game ($40 > $30).

Sample: 3A
Score: 6

The response answers all parts of the question correctly and earned all 6 points.

Sample: 3B
Score: 3

The response earned 1 point in part (a) for identifying the dominant strategy is to close at 6 p.m. The response earned 1 point in part (b) for recognizing the option is not profit maximizing and for using values to compare the profits ($30>$20). The response earned 1 point in part (d) for stating that the profit maximizing strategy for the new company would be for Jackpot to close at 9:00 p.m. and Boulevard to choose No Delivery.

Question 3 (continued)

Sample: 3C
Score: 2

The response earned 1 point in part (a) for identifying the dominant strategy is close at 6 p.m. The response earned 1 point in part (d) for stating the profit maximizing strategy for the new company is for Jackpot to close at 9 p.m. and Boulevard to choose No Delivery.