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# AP Microeconomics

## Sample Student Responses and Scoring Commentary

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#### **Free Response Question 3**

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# AP<sup>®</sup> MICROECONOMICS

## 2018 SCORING GUIDELINES

### Question 3

#### 5 Points (1 + 1 + 1 + 1 + 1)

(a) 1 point:

- One point is earned for correctly calculating the gain, 20 points.

(b) 1 point:

- One point is earned for correctly calculating the opportunity cost, 6 points for that hour (or 6/20).

(c) 1 point:

- One point is earned for stating that the opportunity cost increases and for using one the following explanations:
  - The expected score on microeconomics decreases at an increasing rate with each additional hour spent studying history.
  - The marginal cost is rising (expected score on microeconomics decreases) for each additional hour spent studying history.

(d) 1 point:

- One point is earned for stating that Nirali should spend 2 hours on studying microeconomics and 3 hours on studying history to maximize the sum of expected scores.

(e) 1 point:

- One point is earned for stating that Nirali will spend the additional hour studying microeconomics because studying microeconomics will increase her expected total score by 8 points compared to 5 points if spent studying history.

a) Nirali gains 20 points on her History Exam from the second hour spent studying.  $(60-40)$

b) Nirali's opportunity cost of the second hour studying history is 6 points on the Microeconomics exam.

c) The opportunity cost of studying history will increase. As Nirali forgoes more hours of studying microeconomics, her expected score on the exam drops at an increasing rate.

d) Nirali should study 2 hours of microeconomics and 3 hours of history to maximize the sum of her test scores.

e) Given an extra hour Nirali should study 1 more hour of microeconomics. The marginal benefit to the sum of her score if she studies microeconomics is  $+8$  points/hr. The marginal benefit of history is  $+5$  points per hour. Therefore, Nirali should spend the hour studying microeconomics.

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(a) She gains 20 points

(b) She could have studied 4 hours of Microeconomics

(c) ~~She will gain 20 points on her history exam~~ She will gain more points on her history exam

(d) 2 hours for Microeconomics and 3 hours for History

(e) She will allocate her extra hour to Microeconomics because she can gain 8 more points with an additional hour compared to studying history and gaining 5 more points with an additional hour

FRQ 3:

(a)  $60 - 40 = 20$  points gained.

(b)  $60 \div 2 = 30$

(c) Opportunity cost will increase because she could have done other things beside studying for history; she could have studied for the microeconomic exam, for example

(d) 2 hours

(e) Nirali should allocate the additional hour to studying history because currently her marginal value is  $20 < 22$  and she needs to get where  $MR = MC$ .

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## 2018 SCORING COMMENTARY

### Question 3

#### Overview

This question assessed students' ability to apply the concept of opportunity cost of allocating a fixed amount of study time between two activities. Students were provided with production possibilities data and were asked to differentiate between marginal benefit and the opportunity cost, demonstrate how to calculate opportunity cost applying marginal analysis, understand and recognize increasing opportunity cost, as well as how to allocate resources to maximize the outcome.

In this question, the concept of opportunity cost is tested using two tables showing the time (resource) and expected exam scores (outcome) in two courses: microeconomics and history. The expected score depends on the number of hours spent studying. More time spent studying for one exam causes an increase in the score of this exam at a decreasing rate, and a decrease of time available to study for the other exam causes the score for the other exam to decrease at an increasing rate.

In part (a) students were expected to use the table with the data for the history exam and calculate the marginal benefit (gain) by taking the difference between the original total benefit (the expected score after one hour of studying) and the total benefit after the second hour of studying history. The expected marginal benefit from the second hour spent studying history is 20 (60 points minus 40 points).

In part (b) using data in the table, students were expected to calculate the opportunity cost of the second hour studying history by recognizing it as the loss of the alternative, which is the expected score on the microeconomics exam (6 points; a decrease from 96 to 90). Increasing an exam score (outcome) of one course will cause a decrease of the score on the other exam when the time (resource) is limited.

Part (c) required students to recognize the opportunity cost of studying history increases because the expected score on microeconomics decreases at an increasing rate with each additional hour spent studying history. Students were expected to demonstrate an understanding of increasing opportunity cost which happens when the increase in production of one good causes a decrease in the production of the other good at **an increasing rate**, assuming fixed resources.

Part (d) tested whether students understand that in order to maximize the output (exam scores) they need to allocate the limited resources (time) by looking at the combination that provides the largest total outcome (exam score).

Finally, in part (e), students were expected to demonstrate how to allocate an additional hour of study in order to maximize the outcome (exam score). Students needed to use marginal analysis and demonstrate the understanding that the additional resource should be allocated to the activity that brings the largest **marginal benefit**.

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**2018 SCORING COMMENTARY**

**Question 3 (continued)**

**Sample: 3A**

**Score: 5**

The student answers all parts of the question correctly and earned all 5 points.

**Sample: 3B**

**Score: 3**

The student did not earn 1 point in part (b) because the response incorrectly states that the opportunity cost of the second hour spent studying history is 4 hours of microeconomics. The student did not earn 1 point in part (c) because the response does not correctly explain why the opportunity cost increases. **Note:** The opportunity cost increases because the expected score on microeconomics decreases at an increasing rate with each additional hour spent studying history.

**Sample: 3C**

**Score: 1**

The student earned 1 point in part (a) for correctly stating the gain as 20 points.