

**AP[®] MICROECONOMICS
2016 SCORING GUIDELINES**

Question 2

7 points (1+1+1+1+3)

(a) 1 point:

- One point is earned for stating that the marginal benefit is \$1.

(b) 1 point:

- One point is earned for correctly calculating the total consumer surplus from consuming 5 units of X.

$$CS = (\$16 - \$4) + (\$12 - \$4) + (\$8 - \$4) + (\$4 - \$4) + (\$1 - \$4) = \$21$$

OR

$$CS = \$41 - \$20 = \$21$$

(c) 1 point:

- One point is earned for explaining that this combination of X and Y is not optimal because the marginal benefit per dollar of good X ($MB_x/P_x = \$4/\$4 = 1$) is less than the marginal benefit per dollar of good Y ($MB_y/P_y = \$8/\$2 = 4$). (This can also be stated as $MB_x/MB_y < P_x/P_y$.)

$(MB_x/P_x = 1)$ is not equal to $(MB_y/P_y = 4)$ is acceptable.

MB_x/P_x is less than MB_y/P_y is acceptable.

MB_y/P_y is greater than MB_x/P_x is acceptable.

(d) 1 point:

- One point is earned for stating that Martha's optimal combination is 3 units of X and 4 units of Y.

(e) 3 points:

- One point is earned for stating that the optimal quantity of good Y will decrease.
- One point is earned for stating that the optimal quantity of good Y will decrease.
- One point is earned for stating that the optimal quantity of good Y will stay the same.

ANSWER PAGE FOR QUESTION 2

a) Martha's marginal benefit is \$1.

b) Total cost of 5 units = $5 \times \$4 = \20

Total benefit from 5 units = \$41

Consumer surplus = $\$41 - \$20 = \$21.$

$$c) \frac{MU_x}{P_x} = \frac{MU_y}{P_y} \quad \frac{\$4}{\$4} = \frac{\$8}{\$2}$$

$$1 \neq 4$$

The marginal benefit from purchasing the last unit of each good, divided by their respective prices, is not equal.
This means that the combination is not optimal.

d) Martha's optimal combination is to purchase 3 units of good X and 4 units of good Y.

e) i) optimal quantity of good Y decreases.

ii) optimal quantity of good Y decreases.

iii) optimal quantity of good Y stays the same.

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ANSWER PAGE FOR QUESTION 2

a) Marginal benefit of the fifth unit of good X is \$1.

b) $5 \times 41 \times \frac{1}{2} = \frac{205}{2} = 102.5$

c) Because marginal benefit is not maximized.

d) Buy 3 product X and 3 product Y.

e) i) Quantity of good Y will decrease.

ii) Quantity of good P will decrease.

iii) No change to optimal quantity of Y.

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ANSWER PAGE FOR QUESTION 2

(a.) Marginal benefit is equal to marginal revenue.

For 5 units, the marginal benefit is \$20
because $5 \text{ units} \times \$4 = \20 .

(b) The quantity of x is 0 and total benefit from x is \$0. The quantity of x is 5 and total benefit from x is \$41. $\$41 - \$0 = \$41$. There is a total consumer surplus of \$41.

(c) The benefit of consuming 4 units of x is \$40 and the benefit of consuming 2 units of y is \$18.

The marginal benefit of 4 units of x is \$6 and the marginal benefit of 2 units of y is \$4. The benefits are not equal so the combination is not optimal.

(d) 0(x) and 0(y).

(e) (i) The quantity increases.

(ii) ~~Stays the same~~. Decrease.

(iii) The quantity stays same.

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AP[®] MICROECONOMICS
2016 SCORING COMMENTARY

Question 2

Overview

This question assessed the students' ability to interpret and apply several economic concepts of consumer behavior, which includes the utility-maximization principle, marginal vs. total benefit, and consumer surplus. Students were presented with a table of hypothetical data on total benefits that Martha received for consuming up to five units of each of two goods, X and Y. Part (a) required students to calculate the marginal benefit from consuming a fifth unit of good X. Part (b) required students to calculate the consumer surplus from consuming five units of good X. Part (c) presented a possible consumption choice and required students to explain, using marginal analysis, why this choice was not optimal. Part (d) required students to determine Martha's optimal combination of X and Y, given her budget. Part (e) required students to determine how three separate changes in income and prices would affect her consumption of good Y.

Sample: 2A

Score: 7

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

Sample: 2B

Score: 4

The student did not earn 1 point in part (b) for incorrectly calculating the consumer surplus. The student did not earn 1 point in part (c) for not comparing the ratio of marginal benefits to price for the two goods. The student did not earn 1 point in part (d) for not determining the correct optimal combination of X and Y.

Sample: 2C

Score: 2

The student earned 1 point in part (e)(ii) for correctly indicating that the optimal quantity decreases. The student earned 1 point in part (e)(iii) for correctly indicating that the optimal quantity stays the same.