

## **2016 AP® MICROECONOMICS FREE-RESPONSE QUESTIONS**

### **MICROECONOMICS**

#### **Section II**

**Total Time—60 minutes**

**Reading Period—10 minutes**

**Writing Period—50 minutes**

**Directions:** You are advised to spend the first 10 minutes reading all of the questions and planning your answers. You will then have 50 minutes to answer all three of the following questions. You may begin writing your responses before the reading period is over. It is suggested that you spend approximately half your time on the first question and divide the remaining time equally between the next two questions. Include correctly labeled diagrams, if useful or required, in explaining your answers. A correctly labeled diagram must have all axes and curves clearly labeled and must show directional changes. Use a pen with black or dark blue ink.

1. The markets for bananas, muffins, and coffee are interrelated, and each market is perfectly competitive.
  - (a) In the market for bananas, the equilibrium price is \$1.00 per pound, and the equilibrium quantity is 1,000 pounds per week. Suppose the government imposes a price floor on bananas at \$1.20 per pound, causing the quantity supplied to increase to 1,500 pounds per week.
    - (i) Would the price floor result in a shortage, a surplus, or neither? Explain.
    - (ii) Calculate the price elasticity of supply if the price increases from \$1 to \$1.20. Show your work.
    - (iii) Between \$1 and \$1.20, is the supply elastic, unit elastic, or inelastic? Explain.
  - (b) Bananas are an input for muffins.
    - (i) Draw a correctly labeled graph of the market for muffins indicating the equilibrium price and quantity, labeled  $P_0$  and  $Q_0$ , respectively.
    - (ii) On the graph drawn in part (b)(i), show the impact of an increase in the price of bananas on the muffin market, labeling the new equilibrium price and quantity  $P_1$  and  $Q_1$ , respectively.
    - (iii) On the same graph, completely shade the area that represents the change in the consumer surplus caused by the increase in the price of bananas.
  - (c) In the market for coffee, the equilibrium price is \$3.00 per cup and the equilibrium quantity is 100 cups per week. The cross-price elasticity of coffee with respect to muffins is -2.
    - (i) Are coffee and muffins normal goods, inferior goods, complementary goods, or substitute goods?
    - (ii) Assume the supply of coffee is perfectly elastic. Using the equilibrium price and quantity given above, draw a correctly labeled graph for the coffee market, and show the impact of an increase in the price of muffins on the coffee market.
    - (iii) Given the original quantity of 100 cups of coffee per week, if the increase in the price of muffins is 10%, calculate the new equilibrium quantity in the coffee market. Show your work.

## **2016 AP® MICROECONOMICS FREE-RESPONSE QUESTIONS**

2. Martha has a fixed budget of \$20, and she spends it all on two goods, X and Y. The price of X is \$4 per unit, and the price of Y is \$2 per unit. The table below shows the total benefit, measured in dollars, Martha receives from the consumption of each good.

Quantity of X	Total Benefit from X	Quantity of Y	Total Benefit from Y
0	\$0	0	\$0
1	\$16	1	\$10
2	\$28	2	\$18
3	\$36	3	\$24
4	\$40	4	\$28
5	\$41	5	\$30

- (a) What is Martha’s marginal benefit of the fifth unit of good X?
- (b) Calculate the total consumer surplus if Martha consumes 5 units of X. Show your work.
- (c) Martha is currently consuming 4 units of X and 2 units of Y. Use marginal analysis to explain why this combination is not optimal for Martha.
- (d) What is Martha’s optimal combination of goods X and Y?
- (e) Indicate whether each of the following will cause the optimal quantity of good Y to increase, decrease, or stay the same.
- (i) The price of good Y doubles.
  - (ii) Martha’s income falls to \$10 with no changes in prices.
  - (iii) Martha’s income doubles, and the price of both goods double.

**AP® MICROECONOMICS  
2016 SCORING GUIDELINES**

**Question 1**

**10 points (3+3+4)**

(a) 3 points:

- One point is earned for stating that the quantity supplied exceeds the quantity demanded at the price floor or the price floor would result in a surplus because the price floor is binding or effective.
- One point is earned for correctly calculating the price elasticity of supply. Students can use either the midpoint formula or the point elasticity formula.

$$E = (500/1250) / (0.2/1.1) = 2.2$$

$$E = (50\% / 20\%) = 2.5$$

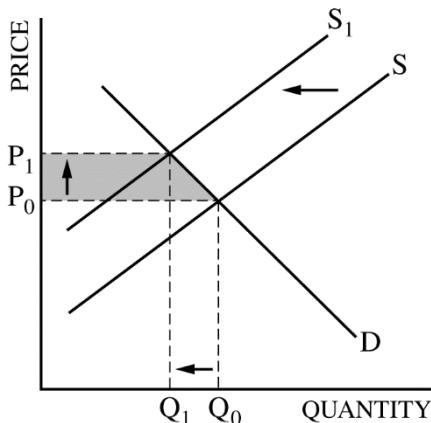
$$E = (500/0.2) \times (1/1000) = 2.5$$

$$E = [(1500 - 1000)/1000] / [(1.2 - 1)/1] = 0.5/0.2 = 2.5$$

$$E = (500/0.2) \times (1.2/1500) = 2$$

- One point is earned for stating that the supply is elastic and for explaining that the percentage change in quantity supplied exceeds the percentage change in price or because price elasticity of supply is greater than one. (Other equivalent explanations are accepted.)

(b) 3 points:



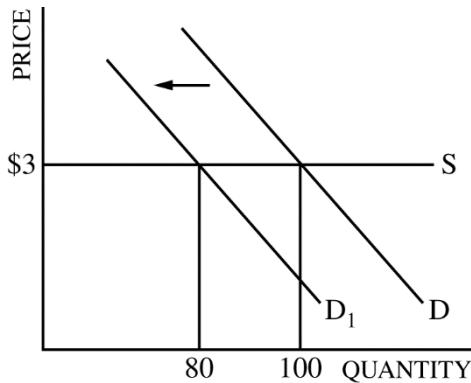
- One point is earned for drawing a correctly labeled graph and for showing the equilibrium price and quantity, labeled  $P_0$  and  $Q_0$ , respectively.
- One point is earned for shifting the supply curve to the left and for showing the new equilibrium price and quantity, labeled  $P_1$  and  $Q_1$ , respectively.
- One point is earned for completely shading on the graph the area representing the change in consumer surplus.

**AP® MICROECONOMICS  
2016 SCORING GUIDELINES**

**Question 1 (continued)**

(c) 4 points:

- One point is earned for stating that coffee and muffins are complementary goods.



- One point is earned for drawing a correctly labeled graph for the coffee market and showing a horizontal supply curve (S) and a downward sloping demand curve (D).
- One point is earned for shifting the demand curve to the left and for showing a decrease in the equilibrium quantity and no change in the equilibrium price of coffee.
- One point is earned for correctly calculating the new equilibrium quantity and showing the work.

$$\% \Delta Q = (10\% \times -2) = -20\%$$

$$\text{New Equilibrium Quantity} = 100 \times (-20\%) = 80$$

OR

$$\text{New Equilibrium Quantity} = 100 - (0.2 \times 100) = 80$$

(Using the midpoint formula is also acceptable.)