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# AP<sup>®</sup> Microeconomics

## Sample Student Responses and Scoring Commentary Set 2

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#### **Free Response Question 2**

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**AP<sup>®</sup> MICROECONOMICS  
2019 SCORING GUIDELINES**

**Question 2**

**5 points (2 + 2 + 1)**

(a) 2 points

- One point is earned for identifying the after-tax price paid by consumers as  $P_3$  and the after-tax quantity as  $Q_2$ .
- One point is earned for identifying the area representing the total tax revenue as:  
 $P_1P_3SZ$ , or  
 $(P_3 \times Q_2) - (P_1 \times Q_2)$ , or  
 $(P_3 - P_1) \times Q_2$

(b) 2 points

- One point is earned for stating that the price paid by consumers will be higher.
- One point is earned for stating that the tax revenue received by the government will be higher because the tax does not reduce the quantity purchased when the demand is perfectly inelastic, while the quantity does fall when demand is downward sloping (i.e.,  $Q_3 > Q_2$ ).

(c) 1 point

- One point is earned for stating that the producer surplus will stay the same, and for explaining that this is because both the price received by sellers ( $P_2$ ) and the quantity sold ( $Q_3$ ) do not change. It is also acceptable to explain that producer surplus stays the same because the consumer bears the full burden of the tax.

2. a) i) after tax price:  $P_3$   
after tax quantity:  $Q_3$

~~ii)~~ ii)  $P_3$  S Z  $P_1$

b) i) higher

ii) higher. although the per-unit tax amount has stayed the same, the equilibrium quantity of hats purchased has now increased, and since ~~the~~ tax revenue = tax  $\times$  quantity, government tax revenue increases.

c) the producer surplus will stay exactly the same, because the more inelastic the demand for a good is, the more the consumers bear the tax burden. Because the demand in this case is perfectly inelastic, the consumers bear all of the tax burden and the producers bear none, so it doesn't matter how much the tax is increased or decreased, ~~and~~ when demand is perfectly inelastic, producer surplus is unaffected by the change in government tax.

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2a:  $P_3 Q_2$

ii  $P_3 S Z P_1$

b: Higher

ii Remain the same, because while the consumer burden will be greater, the producer burden will be less. The area of the tax box remains the same, but ~~it~~ it will be divided differently relative to who is burdening what

c. It will be reduced, because consumers and producers both burden the tax, but the inelasticity of  $Q_d$  causes consumers to burden more than producers. The tax box will decrease in area because of the reduction of the tax, but who bears what proportion of the tax will remain relatively the same.

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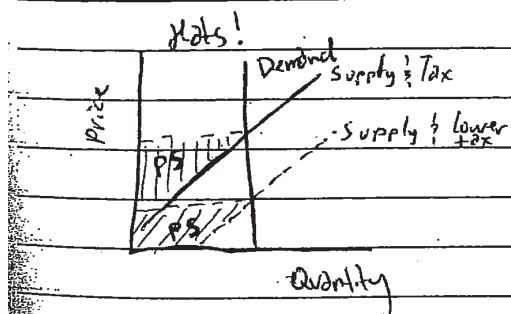
a) i. The after-tax price is  $P_3$   
The after-tax quantity is  $Q_2$

ii. The area representing the total tax revenue is  $STP_2P_3$

b) i. The after tax price will be higher (at  $P_4$ )

ii. The total tax revenue will be higher because both the price and demand increase due to the inelasticity of the demand curve

c) Producer surplus will be decreased because the quantity sold would remain the same but the price would decrease



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# AP<sup>®</sup> MICROECONOMICS

## 2019 SCORING COMMENTARY

### Question 2

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

#### Overview

This question assessed students' understanding of tax incidence, as portrayed using a graph when a per-unit sales tax is imposed. The concepts in the question included recognizing the price paid by consumers, the burden of a tax, and identifying the total tax revenue received by the government. Students needed to understand the impact on price for the case of an inelastic demand curve and also determine how the tax revenue to the government and producer surplus change after the demand becomes inelastic.

The question provided a graph showing a per-unit tax on a product. In part (a)(i) students needed to use the graph to determine the after-tax price and quantity paid by the consumer as  $P_3$  and  $Q_2$ . In (a)(ii) they needed to indicate the area that represented the total tax revenue the government received,  $P_1P_3SZ$ .

Part (b) of the question asked the student to assume the demand is perfectly inelastic at quantity  $Q_3$ , with supply and the per unit tax remaining unchanged. Part (b)(i) required the student to state that the after-tax price paid by consumers is higher than the answer in part (a)(i). In part (b)(ii) the student needed to state that the total tax revenue received by the government is higher than in part (a)(ii). The student also needed to explain that this is because a per-unit tax does not change quantity given perfectly inelastic demand, while it does change quantity given relatively inelastic demand ( $Q_3$  is higher than  $Q_2$ ).

Part (c) continued to use the inelastic demand at quantity  $Q_3$ , and reduced the per-unit sales tax. Students needed to recognize that the producer surplus stayed the same and explain either that price and quantity do not change, or that the consumer bears all the burden of the tax.

#### Sample: 2A

**Score: 5**

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

#### Sample: 2B

**Score: 3**

The response did not earn 1 point for failing to indicate that the tax revenue increased because the quantity has increased in part (b)(ii). The response did not earn 1 point in part (c) for failing to indicate that producer surplus stayed the same because price and quantity stayed the same.

#### Sample: 2C

**Score: 2**

The response earned 1 point in part (a)(i) by stating the after tax price is  $P_3$  and the after-tax quantity is  $Q_2$ . The response earned 1 point in part (b)(i) for correctly indicating that the price paid by the consumer is higher than the price in part (a)(i).