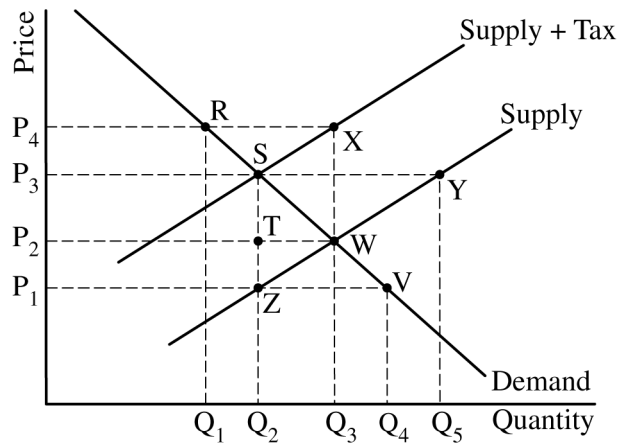


## 2019 AP<sup>®</sup> MICROECONOMICS FREE-RESPONSE QUESTIONS



2. Hats are produced in a perfectly competitive industry, and the government imposes a per-unit sales tax on hats.
- (a) Using the labeling from the graph, identify each of the following.
    - (i) The after-tax price paid by consumers and the after-tax quantity
    - (ii) The area representing the total tax revenue received by the government
  - (b) Now assume instead that the demand for hats is perfectly inelastic at  $Q_3$ , while the supply and the per-unit tax remain unchanged.
    - (i) Will the after-tax price paid by consumers be higher, lower, or the same compared to the price in your answer to part (a)(i) ?
    - (ii) Will the total tax revenue received by the government be higher, lower, or the same compared to the tax revenue in your answer to part (a)(ii) ? Explain.
  - (c) If the demand for hats remains perfectly inelastic at  $Q_3$  and the per-unit sales tax is reduced, will producer surplus increase, decrease, or stay the same? Explain.

## 2019 AP<sup>®</sup> MICROECONOMICS FREE-RESPONSE QUESTIONS

		Boulevard	
		Delivery	No Delivery
Jackpot	6:00 P.M.	\$35, \$30	\$55, \$20
	9:00 P.M.	\$25, \$50	\$45, \$40

3. Jackpot Florist and Boulevard Gardens share the market for floral bouquets in Tuliptown. Jackpot is deciding whether to close at 6:00 P.M. or to close at 9:00 P.M., and Boulevard is deciding whether to offer Delivery or No Delivery. The payoff matrix above shows the annual profits for each combination of actions that the firms can choose. The first entry shows Jackpot's profit, and the second entry shows Boulevard's profit.

Assume that both firms know all the information in the matrix and act simultaneously and independently.

- (a) Is Jackpot's dominant strategy to close at 6:00 P.M., to close at 9:00 P.M., or does it not have a dominant strategy?
- (b) Suppose Jackpot chooses to close at 6:00 P.M. and Boulevard chooses No Delivery. Is this the profit-maximizing action by Boulevard? Explain using values from the payoff matrix.
- (c) How much profit will Boulevard earn in the Nash equilibrium?
- (d) Suppose these two firms merge to form one company with two locations and still face the same actions and payoffs. Which strategies would the new company choose to maximize its combined profit?
- (e) Now assume that instead of merging, Jackpot proposes a plan to cooperate with Boulevard. Jackpot would agree to close at 9:00 P.M., and Boulevard would agree to No Delivery. If either firm breaks the agreement, it **MUST** subtract \$12 from its profit that is then added to the other firm's profit.
  - (i) Assuming the agreement was in effect and enforced, redraw the matrix, including the players, actions, and payoffs.
  - (ii) Assuming Boulevard is a profit-maximizing firm and there are no antitrust concerns, would Boulevard agree to Jackpot's proposal? Explain using specific values from the redrawn payoff matrix.

**STOP**

**END OF EXAM**

**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.