

2024



AP[®] Microeconomics

Sample Student Responses and Scoring Commentary Set 1

Inside:

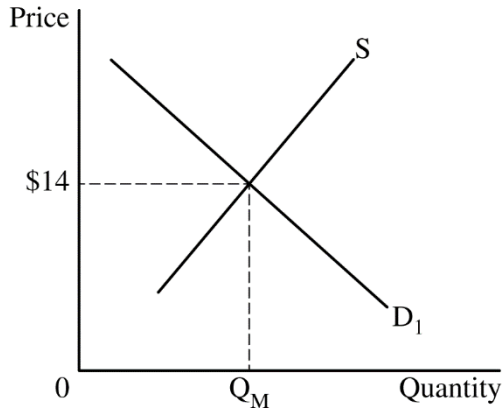
Free-Response Question 1

- Scoring Guidelines**
- Student Samples**
- Scoring Commentary**

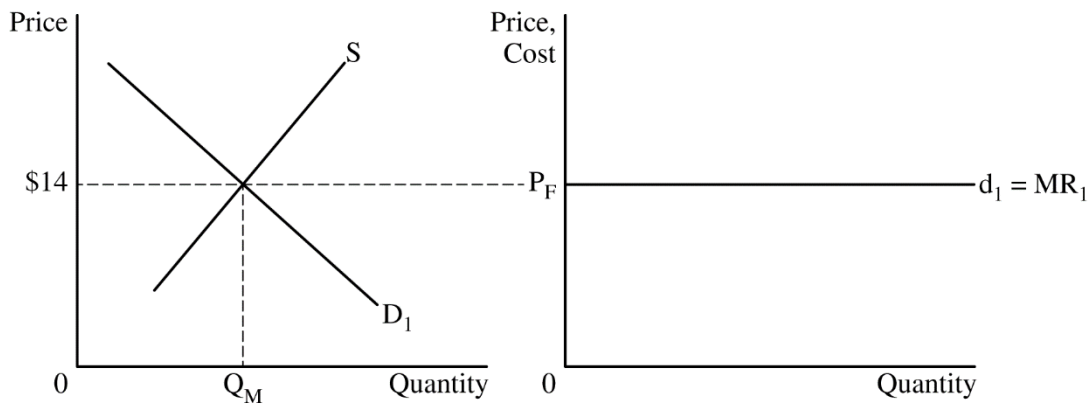
Question 1: Long

10 points

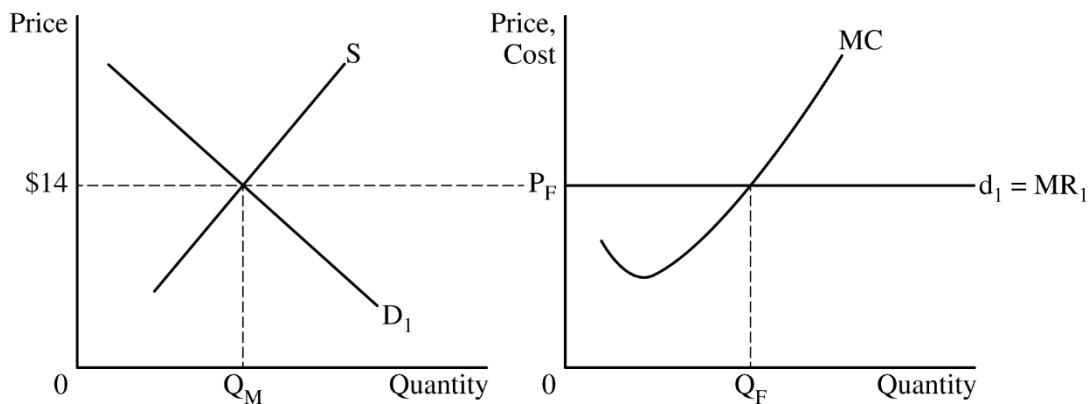
- (a) Draw a correctly labeled graph of the market for soybeans with a downward-sloping demand (D_1) curve and an upward-sloping supply (S) curve and label the market equilibrium price as \$14 and the market equilibrium quantity as Q_M . **1 point**



- For the second point, draw a correctly labeled graph of Soja Farm and show the firm's horizontal demand and marginal revenue ($d_1=MR_1$) curve extended from the market equilibrium price and label the firm's price as P_F . **1 point**

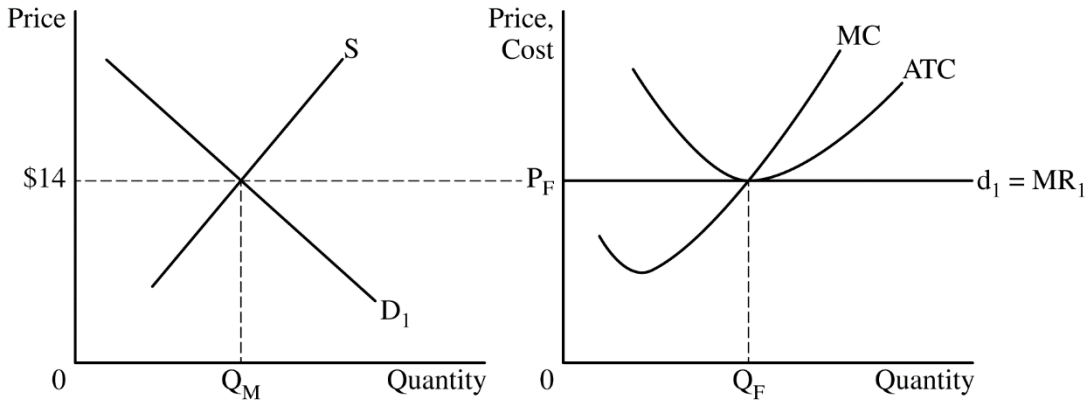


- For the third point, the firm's graph must show a rising marginal cost (MC) curve, and show the profit-maximizing quantity, labeled Q_F where $MR = MC$. **1 point**



For the fourth point, the firm’s graph must show the average total cost (ATC) curve tangent to the firm’s demand curve at Q_F and show the MC curve passing through the minimum point of the ATC curve.

1 point



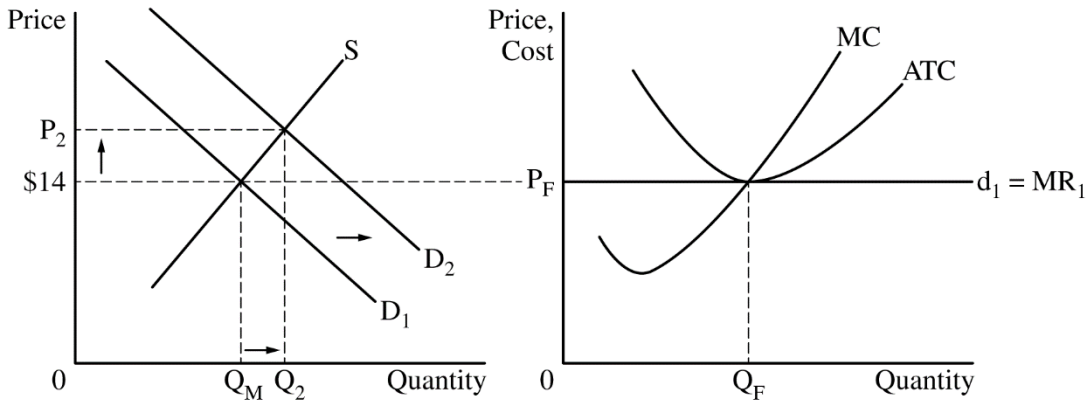
Total for part (a) 4 points

(b) State that Soja Farm’s total revenues would decrease to \$0 and explain that all consumers of soybeans would buy soybeans from other sellers who charge the market price of \$14.

1 point

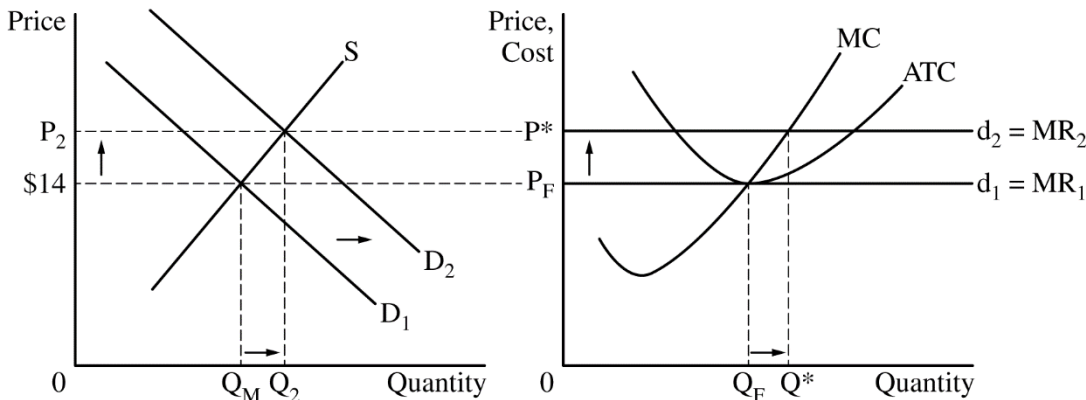
(c) (i) The market graph from part (a) must show a rightward shift of the market demand curve and the new equilibrium price labeled P_2 and the new equilibrium quantity labeled Q_2 .

1 point



(ii) The firm’s graph from part (a) must show an upward shift in the firm’s marginal revenue (demand) curve at P_2 and the new profit-maximizing quantity for Soja Farms, labeled Q^* .

1 point



	Total for part (c)	2 points
(d)	State that the number of firms will increase in the long run and explain that the positive economic profits earned by soybean producers will encourage new firms to enter the market.	1 point
(e) (i)	State that demand for quinoa is inelastic and explain with ONE of the following. <ul style="list-style-type: none">• The absolute value of the price elasticity of demand for quinoa is 0.2.• The 5% decrease in the quantity demanded of quinoa is less than the 25% increase in the price of quinoa.	1 point
(ii)	Calculate the cross-price elasticity of demand as 0.4 and show your work.	1 point
	$\text{Cross Price Elasticity of Demand} = \frac{\% \text{ Change in } Q_D \text{ of Tofu}}{\% \text{ Change in Price of Quinoa}} = \frac{10\%}{25\%} = 0.4$	
	Total for part (e)	2 points
	Total for question 1 10 points	

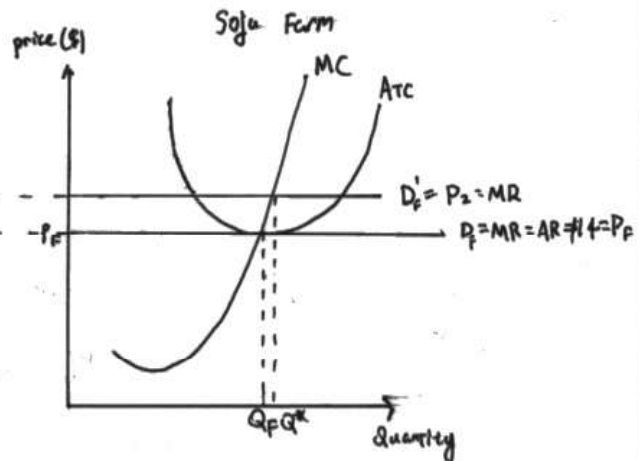
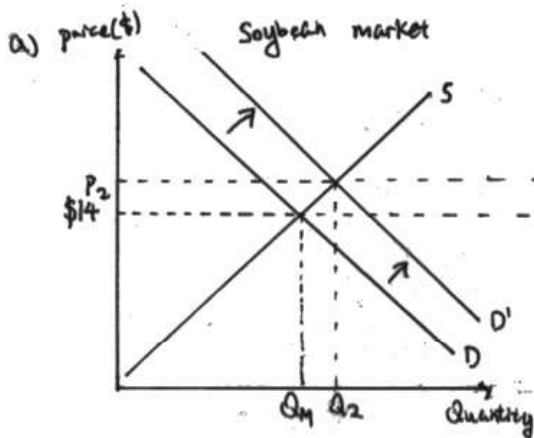
Question 1 Sample A Page 1 of 1

Important: Completely fill in the circle that corresponds to the question you are answering on this page.

Question 1 Question 2 Question 3



Begin your response to each question at the top of a new page.



b) ~~Decrease~~ Decrease to 0, because firms in a perfectly competitive market are price takers, an increase of price means consumers can turn to other firms selling the identical product at a lower price. Soja farm may sell as much as it wants to at the market price, since demand is perfectly elastic, or 0 units above the market equilibrium price.

d) Increase, firms will enter because individual firms in the market are incurring an economic profit since $P > ATC$

e) i) Elasticity of demand = $\frac{\% \Delta Qd}{\% \Delta P} = \left| \frac{-5\%}{25\%} \right| = \frac{1}{5}$

The elasticity is inelastic as the ^{absolute} value is less than 1, ~~the~~ a 1% change in price will cause ~~only~~ $\frac{1}{5}$ of that percentage change in Qd

ii) CPE = $\frac{\% \Delta Qd}{\% \Delta Pq} = \frac{10\%}{25\%} = \frac{2}{5}$

Use a pen with black or dark blue ink only. Do NOT write your name. Do NOT write outside the box.

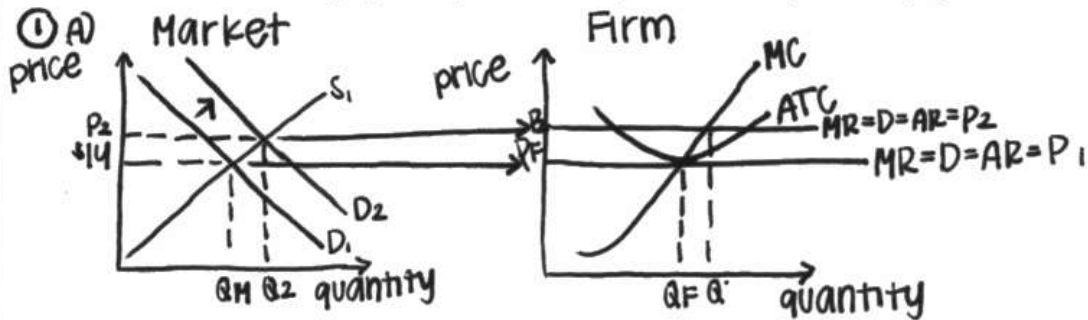
Question 1 Sample B Page 1 of 1

Important: Completely fill in the circle that corresponds to the question you are answering on this page.

Question 1 Question 2 Question 3



Begin your response to each question at the top of a new page.



B) Soja Farm's total revenue would stay the same because the firm is a price taker not a price maker. Thus, consumers will go to other firms that produce the same good for cheaper.

D) More firms will join the market in the short run but in the long run, they will exit when the market becomes oversaturated and firms lose profit trying to compete with each other. So, in the long run, there will be less firms in the soybean market.

F) i. The demand for quinoa is elastic because consumers are sensitive to changes in price and buy less of the product when ~~it~~ gets expensive.
 the good

ii. $-5/10 = -1/2$. They are substitute goods.

Use a pen with black or dark blue ink only. Do NOT write your name. Do NOT write outside the box.

Question 1 Sample C Page 1 of 1

Important: Completely fill in the circle that corresponds to the question you are answering on this page.

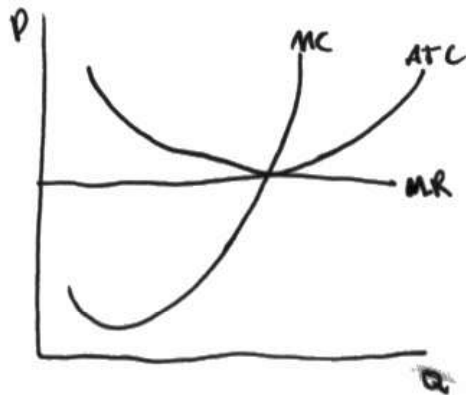
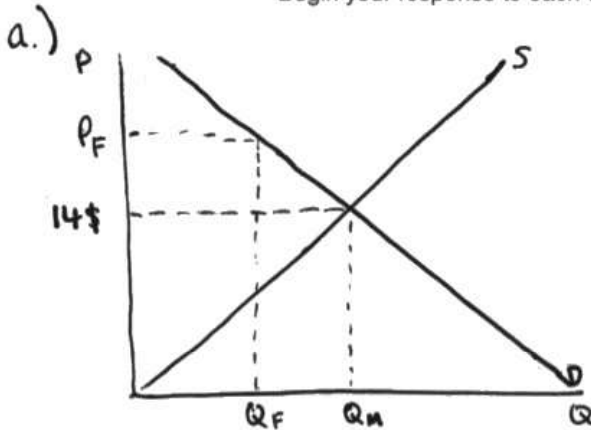
Question 1

Question 2

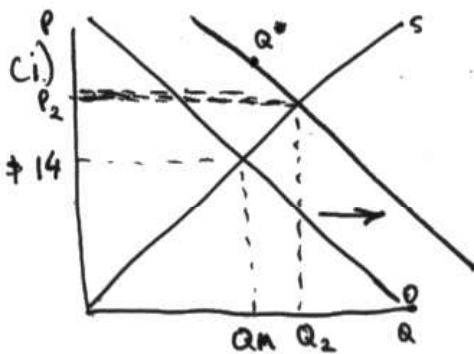
Question 3



Begin your response to each question at the top of a new page.



b.) Soja Farm's total revenue will decrease to 0, because if they are the only firm charging \$15 compared to \$14 in a perfectly competitive market then consumers will just shop somewhere else and receive the same product for \$1 less.



d.) There will be an increase in the number of firms in the soybean market because tofu is making soybeans have such high demand.

ei.) The demand for quinoa is elastic because in increase in its market price causes for the demand to shift to the left, because as it increases 25% the demand shifts negatively 5%

eii.)
$$\frac{5-10}{25} = \frac{-5}{25} = \boxed{-\frac{1}{5}}$$

Page 2

Use a pen with black or dark blue ink only. Do NOT write your name. Do NOT write outside the box.

Question 1

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

Overview

The question assessed students' understanding of how a firm in a perfectly competitive market would maximize profit in the long run, how the firm adjusts to the short-run equilibrium given an increase in demand, and the implication of this increase in demand on the number of firms in the market as it adjusts to a new long-run equilibrium. The question also assessed students' understanding of elasticity of demand given a percent change in market price and a percent change in quantity demanded as well as performing a calculation of cross-price elasticity given a percent change in quantity demanded and percent change in price of a related product.

The question stated that Soja Farm was a typical profit-maximizing firm that produces and sells soybeans in a constant-cost, perfectly competitive market that is in long-run equilibrium and that the market equilibrium price of soybeans was \$14.

In part (a) students were asked to draw correctly labeled side-by-side graphs for the soybean market and for Soja Farm. In part (a)(i) students were asked to show on the market graph the equilibrium price of \$14 and equilibrium quantity labeled Q_M . This task included showing a downward-sloping demand curve, an upward sloping supply curve and \$14 and Q_M indicated at the intersection of the two curves. Part (a)(ii) asked students to show the firm's profit-maximizing price and quantity labeled P_F and Q_F . These parts of the question assessed students' knowledge of market conditions for perfect competition and their ability to illustrate these concepts using a graph. This task included demonstrating knowledge of a horizontal demand (d) and marginal revenue (MR) curve for the firm where $d = MR$ at the market price, and the firm's profit-maximizing quantity where $MR = \text{Marginal Cost (MC)}$. Students were required to show that $d = MR$ is horizontal and extended from the market price of \$14 labeled P_F , and that Q_F is the quantity where $MR = MC$. Part (a)(iii) asked students to draw an average total cost curve consistent with long-run equilibrium labeled ATC. This task required students to draw P_F equal to ATC at Q_F and MC passing through the minimum of the ATC curve.

In part (b) students were asked to explain if Soja Farm is the only firm in the market that chose to increase its price of soybeans to \$15 per bushel, would Soja Farm's total revenue increase by \$1, remain the same, or decrease to zero. This part assessed the students' knowledge that in a perfectly competitive market, firms are price-takers and if one firm raises its price, all of the firm's consumers would buy from other firms that are selling at the lower market price of \$14 and therefore the total revenue for that firm would decrease to \$0.

In part (c) the question stated that soybeans are an input of production for tofu and that tofu has increased in popularity. Students were asked to show the effect of the increase in popularity for tofu on the market for soybeans and for Soja Farm. In part (c)(i) students were asked to show the impact in the market. This task included drawing a rightward shift of the market demand curve and labeling the new equilibrium price as P_2 and the new equilibrium quantity as Q_2 . In part (c)(ii) students were asked to show the impact of the increase in popularity of tofu on Soja Farm's graph. This task included drawing an upward shift in the firm's MR curve at P_2 and labeling the new profit-maximizing quantity for Soja Farms as Q^* where MR_2 intersects the MC curve.

Question 1 (continued)

In part (d), students were asked to explain that the number of firms in the soybean market will increase in the long run as a result of the increase in popularity of tofu.

In part (e) students were informed that a 25% increase in the market price of quinoa caused a 5% decrease in quantity demanded of quinoa and a 10% increase in the quantity demanded of tofu. In part (e)(i) students were asked to explain using numbers if the demand for quinoa is elastic, inelastic, or unit elastic. This task required students to either explain that the demand is inelastic because the 25% change in price is greater than the 5% change in quantity demanded or calculate the price elasticity of demand ($-5\%/25\% = -0.2$) and explain that because the absolute value of the price elasticity of demand is less than one, the demand is inelastic. In part (e)(ii) students were asked to calculate the cross-price elasticity between quinoa and tofu and to show their work. This task required students to calculate cross price elasticity of demand as 0.4 ($\% \text{ change in quantity demanded of tofu} / \% \text{ change in price of quinoa} = 10\%/25\% = 0.4$).

Sample: 1A**Score: 10**

Part (a): 4 points

The response earned the first point in part (a) because the response shows a correctly labeled graph of the market for soybeans with a market equilibrium price of \$14 and quantity, labeled as Q_M . The response earned the second point in part (a) because the response shows a correctly labeled graph of Soja Farm with the firm's horizontal marginal revenue (MR) curve extended from the market equilibrium price \$14, and the firm's price labeled as P_F . The response earned the third point in part (a) because the response shows a rising marginal cost (MC) curve, and the firm's profit-maximizing quantity, labeled as Q_F , where $MR = MC$. The response earned the fourth point in part (a) because the response shows the average total cost (ATC) curve tangent to the firm's demand curve at Q_F , and MC passing through the minimum point of the ATC curve.

Part (b): 1 point

The response earned the point because the response asserts total revenue would decrease to \$0 and correctly explains that Soja Farm would see "...0 units above the market equilibrium price."

Part (c): 2 points

The response earned the first point in part (c) because the response shows a rightward shift of the market demand curve and the new market equilibrium price, labeled as P_2 , and the new market equilibrium quantity, labeled as Q_2 . The response earned the second point in part (c) because the response shows an upward shift in the marginal revenue (demand) curve at P_2 , and the new profit-maximizing quantity for Soja Farm, labeled as Q^* .

Question 1 (continued)

Part (d): 1 point

The response earned the point because the response asserts the number of firms will increase and explains that the presence of economic profits will cause more firms to enter.

Part (e): 2 points

The response earned the first point in part (e) because the response asserts the demand for quinoa is inelastic and correctly explains using a calculation that generates the elasticity coefficient of $1/5$. The response earned the second point in part (e) because the response calculates the value of cross-price elasticity of demand between tofu and quinoa as $2/5$ and shows the work.

Sample: 1B**Score: 6**

Part (a): 4 points

The response earned the first point in part (a) because the response shows a correctly labeled graph of the market for soybeans with a market equilibrium price of \$14 and quantity, labeled as Q_M . The response earned the second point in part (a) because the response shows a correctly labeled graph of Soja Farm with the firm's horizontal marginal revenue (MR) curve extended from the market equilibrium price (\$14), and the firm's price labeled as P_F . The response earned the third point in part (a) because the response shows a rising marginal cost (MC) curve, and the firm's profit-maximizing quantity, labeled as Q_F , where $MR = MC$. The response earned the fourth point in part (a) because the response shows the average total cost (ATC) curve tangent to the firm's demand curve at Q_F , and MC passing through the minimum point of the ATC curve.

Part (b): 1 point

The response did not earn the point because the response incorrectly asserts total revenue would stay the same.

Part (c): 2 points

The response earned the first point in part (c) because the response shows a rightward shift of the market demand curve and the new market equilibrium price, labeled as P_2 , and the new market equilibrium quantity, labeled as Q_2 . The response earned the second point in part (c) because the response shows an upward shift in the marginal revenue (demand) curve at P_2 and the new profit-maximizing quantity for Soja Farm, labeled as Q^* .

Part (d): 1 point

The response did not earn the point because the response incorrectly asserts there will be less firms in the long run.

Question 1 (continued)

Part (e): 2 points

The response did not earn the first point in part (e) because the response incorrectly asserts the demand for quinoa is elastic. The response did not earn second point in part (e) because the response incorrectly calculates the value of cross-price elasticity of demand between tofu and quinoa as $-1/2$.

Sample: 1C**Score: 3**

Part (a): 4 points

The response earned the first point in part (a) because the response shows a correctly labeled graph of the market for soybeans with a market equilibrium price of \$14 and quantity, labeled as Q_M . The response did not earn the second point in part (a) because the response does not show the extension from the market equilibrium price (\$14) to the Soja Farm's horizontal marginal revenue curve in the firm's graph. The response did not earn the third point in part (a) because the response does not show the firm's profit-maximizing quantity, labeled as Q_F , where $MR = MC$. The response did not earn the fourth point in part (a) because the response does not show the average total cost (ATC) curve tangent to the firm's demand curve at Q_F .

Part (b): 1 point

The response earned the point because the response asserts total revenue would decrease to \$0 and correctly explains that consumers would go to other firms offering soybeans at the market price of \$14.

Part (c): 2 points

The response earned the first point in part (c) because the response shows a rightward shift of the market demand curve, and the new market equilibrium price, labeled as P_2 and the new market equilibrium quantity, labeled as Q_2 . The response did not earn the second point in part (c) because the response does not show on the firm's graph an upward shift in the marginal revenue (demand) curve at P_2 and the new profit-maximizing quantity for Soja Farm, labeled as Q^* .

Part (d): 1 point

The response did not earn the point because the response does not explain that the number of firms will increase due to the presence of positive economic profits being earned.

Part (e): 2 points

The response did not earn the first point in part (e) because the response asserts the demand for quinoa is elastic. The response did not earn the second point in part (e) because the response does not calculate the cross-price elasticity of demand between tofu and quinoa as 0.4.