

Past-paper walk-through

Supply ■ 2.2

eXercise

Questions in this set

- 2017 Q1
- 2016 Q1

Reading the mark scheme

- **B1** a mark that stands on its own – the point is either made or not.
- **M1** a *method* mark: the right approach, even if the number is wrong.
- **A1** an *answer* mark, and it usually needs its M mark first.
- **C1** a working mark on the way to the answer.
- **//** separates answers the examiner accepts equally.
- **ecf** = error carried forward: a later part is marked on your own earlier answer.
- **owtte** = “or words to that effect” – the wording need not match.

Question 1

2017 ■ Q1

Corn is used as food and as an input in the production of ethanol, an alternative fuel. Assume corn is produced in a perfectly competitive market.

(a) Draw correctly labeled side-by-side graphs for the corn market and a representative corn farmer. On your graphs show each of the following.

(i) The equilibrium price and quantity in the corn market, labeled P_M and Q_M , respectively

(ii) The profit-maximizing quantity of corn produced by the representative farmer earning zero economic profit, labeled Q_F

Question 1

2017 ■ Q1

Corn is used as food and as an input in the production of ethanol, an alternative fuel. Assume corn is produced in a perfectly competitive market.

(b)(i) Assume the demand for ethanol increases. On your graphs in part (a) show what will happen to each of the following in the short run.

The market price and quantity of corn, labeled P^* and Q^*

(b)(ii) The area of the profit or loss earned by the representative corn farmer, shaded completely

Question 1

2017 ■ Q1

Corn is used as food and as an input in the production of ethanol, an alternative fuel. Assume corn is produced in a perfectly competitive market.

(c) Relative to your answer in part (b), state what will happen to the market equilibrium price and quantity of corn in the long run. Explain.

Question 1

2017 ■ Q1

Corn is used as food and as an input in the production of ethanol, an alternative fuel. Assume corn is produced in a perfectly competitive market.

(d) Soybeans are produced in a perfectly competitive market. Assume farmers can grow either corn or soybeans on the same land. What happens to the price of soybeans in the next planting season if the price of corn increases? Explain.

Question 1

2017 ■ Q1

Corn is used as food and as an input in the production of ethanol, an alternative fuel. Assume corn is produced in a perfectly competitive market.

(e)(i) Assume instead that the government sets a binding price ceiling in the corn market. Draw a new correctly labeled graph for the corn market and show each of the following.

The binding price ceiling, labeled P_c

(e)(ii) The quantity purchased by consumers in the corn market, labeled Q_p

Solution 1

(a) Mark scheme

- Draw side-by-side graphs. Corn MARKET graph: downward-sloping demand D_1 and upward-sloping supply S intersecting at equilibrium price P_M and quantity Q_M (both labeled on the axes with dashed lines to the intersection). FIRM graph: a horizontal demand/marginal-revenue curve $d_1 = MR_1$ drawn at the market price P_M ; the firm's profit-maximizing quantity Q_F is where $MC = MR_1$; the firm's ATC and MC curves are drawn with MC passing through the minimum point of ATC , and $P_M = ATC = MC$ at Q_F (the representative farmer earns zero economic profit). Points earned for: (1) correctly labeled corn-market graph with P_M, Q_M (downward demand, upward supply); (2) horizontal demand curve on the

Solution 1

firm graph extended from P_M ; (3) Q_F identified at $MC = MR_1$; (4) ATC/MC shown with MC passing through minimum ATC and $P = ATC = MC$ at Q_F .

Solution 1

(b)(i)

Mark scheme

- An increase in ethanol demand raises the demand for corn, shifting the market demand curve rightward from D_1 to D_2 . This raises the market equilibrium price and quantity of corn in the short run, labeled P^* and Q^* (both greater than P_M and Q_M).

Solution 1

(b)(ii)

Mark scheme

- On the firm's graph, with price now at P^* (above ATC) and the firm producing where $MC = MR_2 = d_2$ at quantity Q_{F2} , the profit earned is the rectangle bounded above by P^* and below by ATC , over the output range from 0 to Q_{F2} . This rectangle must be shown completely shaded to earn the point.

Solution 1

(c)

Mark scheme

- In the long run the market quantity of corn will increase and the market price will decrease (moving back down). Because the representative farmer is earning positive economic profit in the short run (part b), new farmers are attracted into the corn market; their entry shifts the market supply curve rightward, which increases quantity and decreases price until economic profit returns to zero.

Solution 1

(d)

Mark scheme

- The price of soybeans will increase in the next planting season. Since farmers can grow either corn or soybeans on the same land, a higher price of corn makes growing corn relatively more profitable, so farmers substitute land away from soybeans and into corn. This decreases the supply of soybeans, raising the equilibrium price of soybeans.

Solution 1

(e)(i)

Mark scheme

- Draw a new, correctly labeled graph of the corn market (same upward-sloping supply and downward-sloping demand) showing a binding price ceiling P_C set below the market equilibrium price.

Solution 1

(e)(ii)

Mark scheme

- The quantity purchased by consumers, Q_P , is the quantity at which the price ceiling P_C intersects the supply curve – i.e. the quantity that sellers are willing to supply at the ceiling price, which is the actual (constrained) quantity transacted in the market.

Question 1

2016 ■ Q1

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.

Question 1

- (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.

Question 1

- (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.

Solution 1

(a)(i)

Mark scheme

- Surplus. At the price floor of 1.20 (*above the* 1.00 equilibrium), the price floor is binding/effective, so quantity supplied (1,500 lb/week) exceeds quantity demanded — this excess of Q_s over Q_d is a surplus, not a shortage.

Solution 1

(a)(ii)

Mark scheme

- Price elasticity of supply 2.2–2.5 (either the midpoint or point method earns the point). Midpoint formula: $\% \Delta Q = (1500 - 1000) / 1250 = 0.4 = 40\%$; $\% \Delta P = (1.20 - 1.00) / 1.10 = 0.182 = 18.2\%$; $E = 40\% / 18.2\% = 2.2$. (Equivalently with the point method using the original base: $\% \Delta Q = 500 / 1000 = 50\%$, $\% \Delta P = 0.20 / 1.00 = 20\%$, $E = 50\% / 20\% = 2.5$.) Any correctly-worked elasticity value from a valid formula (2, 2.2, or 2.5) earns the point.

Solution 1

(a)(iii)

Mark scheme

- Elastic. Since the price elasticity of supply calculated above is greater than 1 (the percentage change in quantity supplied exceeds the percentage change in price), supply over this range is elastic.

Solution 1

(b)(i)

Mark scheme

- A correctly labeled graph of the muffin market: Price on the vertical axis, Quantity on the horizontal axis, an upward-sloping supply curve S and a downward-sloping demand curve D intersecting at the initial equilibrium, with the equilibrium price and quantity labeled P_0 and Q_0 respectively (dashed lines dropping to the axes).

Solution 1

(b)(ii)

Mark scheme

- Because bananas are an input to muffins, the rise in the price of bananas raises muffin producers' costs, shifting the muffin supply curve LEFT from S to S_1 . The new intersection with demand D occurs at a higher price and lower quantity, labeled $P_1 (> P_0)$ and $Q_1 (< Q_0)$.

Solution 1

(b)(iii)

Mark scheme

- The area representing the decrease in consumer surplus is the trapezoid bounded above by the new price line P_1 , below by the original price line P_0 , on the left by the price (vertical) axis, and on the right by the (unchanged) demand curve D between the points (Q_1, P_1) and (Q_0, P_0) — i.e., the whole shaded band between P_0 and P_1 under the demand curve, out to Q_0/Q_1 , must be completely shaded.

Solution 1

(c)(i)

Mark scheme

- Complementary goods. The cross-price elasticity of coffee with respect to muffins is negative ($-2 < 0$): a rise in the price of muffins decreases the quantity demanded of coffee, which is the defining property of complements.

Solution 1

(c)(ii)

Mark scheme

- Correctly labeled coffee-market graph: Price on the vertical axis, Quantity on the horizontal axis,
a perfectly elastic (horizontal) supply curve S drawn at $P = 3$, *and a downward-sloping demand curve D with initial equilibrium quantity 100 cups/week. Because coffee and mu*
while the equilibrium quantity falls (to 80 cups/week, from part (c)(iii)).

Solution 1

(c)(iii)

Mark scheme

- $\% \Delta Q = \% \Delta P(\text{muffins}) \times \text{cross-price elasticity} = 10\% \times (-2) = -20\%$.
New equilibrium quantity $= 100 - (0.20 \times 100) = 100 \times (1 - 0.20) = 80$
cups per week. (Using the midpoint formula to back out the same $-20\%/80$
result is also acceptable.)