Understanding Supply and Demand

Solutions manual and marking guidance (for learners checking their work, and for instructors).

O1: Explain what a market is, and who the buyers and sellers are.

Q01 [Foundational · short answer] In your own words, what is a market? Give two examples that are not physical places.

Answer: Any place or system where buyers and sellers meet to exchange something.

1. Examples: an online shop, a phone or video call between two firms, a ticket resale app.

Q02 [Foundational · multiple choice] In a market for bicycles, who are the producers? (a) people buying bicycles (b) firms making and selling bicycles (c) the government (d) banks

Answer: (b)

1. Producers (suppliers) are the sellers; consumers are the buyers.

Q03 [Core · conceptual] Why do economists say that most prices are not 'set' by anyone?

Answer: Prices emerge from the combined decisions of many buyers and sellers.

1. If buyers want more than sellers offer, competition among buyers pushes the price up; the reverse pushes it down.

O2: Describe demand and supply using tables and graphs.

Q04 [Foundational · numerical] Using Qd = 1100 - 200P, find the quantity demanded at $4 per kg.

Answer: 300 kg

1. Qd = 1100 - 200 x 4 = 300.

Q05 [Foundational · numerical] Using Qs = -100 + 200P, find the quantity supplied at $5 per kg.

Answer: 900 kg

1. Qs = -100 + 200 x 5 = 900.

Q06 [Core · applied] Complete a demand schedule for P = $1, $2, $3, $4 and $5 using Qd = 1100 - 200P, and describe the shape of the demand curve.

Answer: $1: 900 kg, $2: 700 kg, $3: 500 kg, $4: 300 kg, $5: 100 kg; the curve slopes downwards.

1. Each $1 rise in price lowers the quantity demanded by 200 kg: the law of demand.

Q07 [Core · multiple choice] Which axis shows price on a standard supply and demand graph? (a) horizontal (b) vertical (c) either (d) neither

Answer: (b)

1. By convention economists plot price vertically and quantity horizontally.

Q08 [Applied · conceptual] Give two different reasons why the quantity demanded of a good falls when its price rises.

Answer: People can afford or choose to buy less of it, and they switch to substitutes.

1. Example: when mangoes become expensive, some buyers switch to bananas.

O3: Find the equilibrium price, and explain shortages and surpluses.

Q09 [Foundational · numerical] Find the equilibrium price and quantity for Qd = 1100 - 200P and Qs = -100 + 200P.

Answer: $3.00; 500 kg

1. Set 1100 - 200P = -100 + 200P.
2. 1200 = 400P, so P = 3.
3. Q = 1100 - 600 = 500.

Q10 [Core · numerical] At a price of $1 per kg, is there a shortage or a surplus, and how large?

Answer: Shortage of 800 kg

1. Qd(1) = 900; Qs(1) = 100; difference 800.

Q11 [Core · numerical] At a price of $4.50 per kg, is there a shortage or a surplus, and how large?

Answer: Surplus of 600 kg

1. Qd(4.5) = 200; Qs(4.5) = 800; supply exceeds demand by 600.

Q12 [Core · true/false] True or false: equilibrium is the fairest possible price.

Answer: False

1. Equilibrium only means buyers' and sellers' plans match; fairness is a separate question.

Q13 [Applied · scenario] Concert tickets have a printed price far below what many fans will pay, and they sell out in minutes. Use supply and demand to explain the resale market.

Answer: The printed price is below equilibrium, causing a shortage; resale prices rise towards what buyers will pay.

1. Supply is fixed (seats); demand at the printed price exceeds it.
2. Unmet demand lets resellers charge more.

Q14 [Applied · applied] A city sets a legal maximum price of $2 per kg for mangoes. Using the lesson's equations, how big is the shortage, and name two likely side effects.

Answer: Shortage of 400 kg; e.g. queues and illegal trading above the ceiling.

1. The ceiling is below equilibrium ($3), so the shortage cannot be removed by a price rise.

G01a [Core · numerical] Market for coffee (cups per day): Qd = 900 - 100P and Qs = -100 + 100P. Find the equilibrium price and quantity.

Answer: P* = 5, Q* = 400

1. Set 900 - 100P = -100 + 100P, so 1000 = 200P.
2. P* = 1000/200 = 5; Q* = 900 - 100 x 5 = 400.

G01b [Core · numerical] In the same market, the price is held at 4. Is there a shortage or a surplus, and how large?

Answer: shortage of 200

1. Qd = 900 - 100 x 4 = 500; Qs = -100 + 100 x 4 = 300.

2. Difference 200: a shortage.

G02a [Core · numerical] Market for bicycles (per week): Qd = 220 - 10P and Qs = -20 + 6P. Find the equilibrium price and quantity.

Answer: P* = 15, Q* = 70

1. Set 220 - 10P = -20 + 6P, so 240 = 16P.
2. P* = 240/16 = 15; Q* = 220 - 10 x 15 = 70.

G02b [Core · numerical] In the same market, the price is held at 12. Is there a shortage or a surplus, and how large?

Answer: shortage of 48

1. Qd = 220 - 10 x 12 = 100; Qs = -20 + 6 x 12 = 52.
2. Difference 48: a shortage.

G03a [Core · numerical] Market for bread loaves (per day): Qd = 1200 - 300P and Qs = 200 + 200P. Find the equilibrium price and quantity.

Answer: P* = 2, Q* = 600

1. Set 1200 - 300P = 200 + 200P, so 1000 = 500P.
2. P* = 1000/500 = 2; Q* = 1200 - 300 x 2 = 600.

G03b [Core · numerical] In the same market, the price is held at 1.5. Is there a shortage or a surplus, and how large?

Answer: shortage of 250

1. Qd = 1200 - 300 x 1.5 = 750; Qs = 200 + 200 x 1.5 = 500.
2. Difference 250: a shortage.

G04a [Core · numerical] Market for concert seats (per night): Qd = 5000 - 50P and Qs = -1000 + 100P. Find the equilibrium price and quantity.

Answer: P* = 40, Q* = 3000

1. Set 5000 - 50P = -1000 + 100P, so 6000 = 150P.
2. P* = 6000/150 = 40; Q* = 5000 - 50 x 40 = 3000.

G04b [Core · numerical] In the same market, the price is held at 30. Is there a shortage or a surplus, and how large?

Answer: shortage of 1500

1. Qd = 5000 - 50 x 30 = 3500; Qs = -1000 + 100 x 30 = 2000.
2. Difference 1500: a shortage.

O4: Predict how prices and quantities change when demand or supply shifts.

Q15 [Foundational · multiple choice] Which of these shifts the demand curve for coffee? (a) the price of coffee rises (b) a study says coffee is healthy (c) a new coffee machine lowers costs (d) coffee farmers have a good harvest

Answer: (b)

1. (a) is a movement along the curve; (c) and (d) shift supply.

Q16 [Core · true/false] True or false: 'The price of coffee rose, so the demand for coffee fell.'

Answer: False as stated

1. The quantity demanded fell: a movement along the demand curve. Demand itself shifts only when something other than price changes.

Q17 [Core · numerical] Supply falls by 200 kg at every price (Qs' = -300 + 200P). Find the new equilibrium.

Answer: $3.50; 400 kg

1. Set 1100 - 200P = -300 + 200P, so 1400 = 400P.
2. P = 3.50; Q = 400.

Q18 [Applied · applied] A new machine makes bicycles much cheaper to produce. What happens to supply, the equilibrium price and the quantity sold?

Answer: Supply shifts right; the equilibrium price falls; the quantity sold rises.

1. Lower costs make sellers willing to offer more at every price.

Q19 [Applied · scenario] Incomes rise and, at the same time, a storm damages farms. Can you say for certain what happens to the price of mangoes? To the quantity?

Answer: The price rises for certain; the change in quantity is uncertain.

1. Higher incomes shift demand right (price up, quantity up).
2. The storm shifts supply left (price up, quantity down).
3. Both raise the price; the quantity effects pull in opposite directions.

Q20 [Advanced · critical thinking] Both a demand increase and a supply decrease raised the mango price to $3.50 in the lesson. How could an observer who sees only the new price and quantity tell which one happened?

Answer: Look at the quantity: it rose to 600 kg with the demand increase and fell to 400 kg with the supply decrease.

1. Demand shift: $3.50, 600 kg.
2. Supply shift: $3.50, 400 kg.

Q21 [Advanced · long answer] Write a short paragraph (about 120 words) explaining, with a diagram, why winter strawberries cost more than summer strawberries in a country with cold winters.

Answer: Marking points: supply from local farms falls in winter (shift left); remaining supply needs heated greenhouses or long transport (higher costs); demand roughly unchanged; new equilibrium has a higher price and lower quantity; diagram correctly labelled.

1. Award 1 mark each for: supply shift identified; reason (costs or availability); correct diagram; higher price; lower quantity; clear wording (max 6).

G01c [Applied · numerical] Demand in the coffee (cups per day) market rises by 100 at every price (Qd' = 1000 - 100P). Find the new equilibrium and say which way price and quantity moved.

Answer: P = 5.5, Q = 450: both rise

1. Set 1000 - 100P = -100 + 100P, so P = (1000 - (-100)) / 200 = 5.5.
2. Q = 1000 - 100 x 5.5 = 450; both are higher than 5 and 400.

G02c [Applied · numerical] Demand in the bicycles (per week) market rises by 8 at every price (Qd' = 228 - 10P). Find the new equilibrium and say which way price and quantity moved.

Answer: P = 15.5, Q = 73: both rise

1. Set 228 - 10P = -20 + 6P, so P = (228 - (-20)) / 16 = 15.5.
2. Q = 228 - 10 x 15.5 = 73; both are higher than 15 and 70.

G03c [Applied · numerical] Demand in the bread loaves (per day) market rises by 250 at every price (Qd' = 1450 - 300P). Find the new equilibrium and say which way price and quantity moved.

Answer: P = 2.5, Q = 700: both rise

1. Set 1450 - 300P = 200 + 200P, so P = (1450 - 200) / 500 = 2.5.
2. Q = 1450 - 300 x 2.5 = 700; both are higher than 2 and 600.

G04c [Applied · numerical] Demand in the concert seats (per night) market rises by 75 at every price (Qd' = 5075 - 50P). Find the new equilibrium and say which way price and quantity moved.

Answer: P = 40.5, Q = 3050: both rise

1. Set 5075 - 50P = -1000 + 100P, so P = (5075 - (-1000)) / 150 = 40.5.
2. Q = 5075 - 50 x 40.5 = 3050; both are higher than 40 and 3000.

Marking scheme: Assignment 1: observe a real market (individual, about 600 words)

- Market correctly described, buyers and sellers identified: 2 marks
- Data table and graph clear and correctly labelled: 3 marks
- Correct curve chosen and direction of shift justified: 3 marks
- Predicted change in price and quantity consistent with the shift: 2 marks
- Limitation identified and explained: 2 marks
- Clear, organised writing: 2 marks (total 14)

Marking scheme: Assignment 2: data analysis (individual)

- Graph: axes, labels, both curves, equilibrium at $4 and 600 kg: 4 marks
- Equations Qd = 1400 - 200P and Qs = -200 + 200P, checked: 4 marks
- Shortage at $3 = 800 - 400 = 400 kg, with two consequences: 3 marks
- Halved supply Qs = -100 + 100P: new equilibrium P = 1500/300 = $5, Q = 400 kg: 4 marks (total 15)