Price Elasticity of Demand

Student workbook: attempt every question before looking at the solutions manual.

O1	Explain what price elasticity of demand measures, and why it uses percentages.
O2	Calculate price elasticity of demand with the midpoint method.
O3	Classify demand as elastic, inelastic or unit elastic, and explain why elasticity differs from slope.
O4	Use the total revenue test to predict how a price change affects sellers' revenue.
O5	Explain the determinants of price elasticity of demand, and apply them to real goods.

O1: Explain what price elasticity of demand measures, and why it uses percentages.

Q01 [Foundational · short answer]

In one sentence, what does price elasticity of demand measure?

Q02 [Foundational · multiple choice]

Which formula defines price elasticity of demand? (a) change in P / change in Q (b) % change in P / % change in Q (c) % change in Qd / % change in P (d) Qd / P

Q03 [Core · conceptual]

Why do economists measure elasticity with percentage changes rather than changes in kilograms and dollars?

Q04 [Core · true/false]

True or false: the price elasticity of demand calculated with signed changes is normally negative.

Q05 [Applied · conceptual]

The rubber-band analogy says elastic demand 'stretches a lot'. State one way in which the analogy breaks down.

Q06 [Core · numerical]

A price rises by 5% and the quantity demanded falls by 15%. Calculate the price elasticity of demand.

O2: Calculate price elasticity of demand with the midpoint method.

Q07 [Foundational · numerical]

Using the midpoint method, what is the percentage change in quantity when it falls from 700 kg to 500 kg?

Q08 [Core · numerical]

Using Qd = 1100 - 200P and the midpoint method, find the price elasticity of demand between $1 and $2.

Q09 [Core · numerical]

Without the midpoint method, compute the elasticity for a rise from $2 to $3 and for a fall from $3 to $2 on the mango curve. What do you notice?

Q10 [Applied · applied]

A café sells 400 coffees a day at $3.00 and 300 a day at $3.50. Use the midpoint method to find the price elasticity of demand and classify it.

Q11 [Advanced · critical thinking]

Show algebraically that the midpoint method gives the same elasticity whether the price rises from P1 to P2 or falls from P2 to P1.

G01a [Core · numerical]

Demand for bread loaves per day is Qd = 1200 - 200P. Use the midpoint method to find the price elasticity of demand between 2 and 3, and classify it.

G02a [Core · numerical]

Demand for cinema tickets per night is Qd = 900 - 60P. Use the midpoint method to find the price elasticity of demand between 5 and 6, and classify it.

G03a [Core · numerical]

Demand for bus rides per day is Qd = 5000 - 1000P. Use the midpoint method to find the price elasticity of demand between 1 and 2, and classify it.

G04a [Core · numerical]

Demand for phone cases per week is Qd = 300 - 20P. Use the midpoint method to find the price elasticity of demand between 8 and 10, and classify it.

O3: Classify demand as elastic, inelastic or unit elastic, and explain why elasticity differs from slope.

Q12 [Foundational · multiple choice]

An elasticity of 0.4 means demand is: (a) elastic (b) inelastic (c) unit elastic (d) perfectly elastic

Q13 [Foundational · short answer]

Describe the shape of a perfectly inelastic demand curve, and say what it means for buyers.

Q14 [Core · true/false]

True or false: inelastic demand means buyers do not change their purchases when the price changes.

Q15 [Core · numerical]

Find the midpoint elasticity of the mango demand curve between $4 and $5, and classify demand there.

Q16 [Applied · conceptual]

The mango demand curve is a straight line with the same slope everywhere. Explain why its elasticity is not the same everywhere.

Q17 [Applied · numerical]

At what price is the mango demand curve unit elastic, and what is the quantity demanded there?

G01c [Applied · numerical]

At what price is demand for bread loaves per day unit elastic, and what is the maximum total revenue?

G02c [Applied · numerical]

At what price is demand for cinema tickets per night unit elastic, and what is the maximum total revenue?

G03c [Applied · numerical]

At what price is demand for bus rides per day unit elastic, and what is the maximum total revenue?

G04c [Applied · numerical]

At what price is demand for phone cases per week unit elastic, and what is the maximum total revenue?

O4: Use the total revenue test to predict how a price change affects sellers' revenue.

Q18 [Foundational · short answer]

Define total revenue and state how it appears on a demand diagram.

Q19 [Core · numerical]

Compute total revenue at $2 and at $3 on the mango demand curve. Did revenue rise or fall, and what does this tell you about elasticity?

Q20 [Core · multiple choice]

A firm faces elastic demand and cuts its price. Its total revenue will: (a) rise (b) fall (c) stay the same (d) cannot be known

Q21 [Applied · scenario]

A bus company raises fares by 10% and finds that its fare revenue falls. A manager says 'passengers must not care much about price'. Evaluate the claim.

Q22 [Applied · numerical]

Between $4 and $5 on the mango curve, calculate the revenue gain and loss areas, and the net change in revenue.

Q23 [Advanced · critical thinking]

Explain why a seller facing a straight-line demand curve would never choose a price in the inelastic range if its only goal were to maximise revenue.

G01b [Core · numerical]

In the same market, compute total revenue at 2 and at 3. Is the change consistent with the total revenue test?

G02b [Core · numerical]

In the same market, compute total revenue at 5 and at 6. Is the change consistent with the total revenue test?

G03b [Core · numerical]

In the same market, compute total revenue at 1 and at 2. Is the change consistent with the total revenue test?

G04b [Core · numerical]

In the same market, compute total revenue at 8 and at 10. Is the change consistent with the total revenue test?

O5: Explain the determinants of price elasticity of demand, and apply them to real goods.

Q24 [Foundational · multiple choice]

Which is likely to have the most elastic demand? (a) table salt (b) insulin for a diabetic patient (c) one particular brand of orange juice (d) household electricity

Q25 [Core · short answer]

List four determinants of the price elasticity of demand.

Q26 [Core · conceptual]

Why is demand for petrol usually more elastic over five years than over one week?

Q27 [Applied · scenario]

Rank, from least to most elastic, the demand for: fruit in general; mangoes; mangoes from Kofi's stall. Justify your ranking.

Q28 [Applied · applied]

A government wants to raise as much tax revenue as possible from a tax on one good, with little change in how much is bought. Should it choose a good with elastic or inelastic demand? Explain, and state one concern.

Q29 [Advanced · long answer]

In about 150 words, explain why a bumper harvest can reduce farmers' total revenue. Use the terms elasticity, inelastic and total revenue, and include a labelled diagram.

Q30 [Core · true/false]

True or false: goods that take a large share of a household's budget tend to have more elastic demand.

Assignment 1: pricing advice for a market stall (individual, about 600 words)

Kofi records his daily mango sales at different prices over several weeks: $1.50: 800 kg; $2.00: 700 kg; $2.50: 600 kg; $3.00: 500 kg; $3.50: 400 kg; $4.00: 300 kg. He asks whether he should charge $2.00 or $3.50.

1. Plot the demand schedule and calculate total revenue at each price (O4).
2. Calculate midpoint elasticities between each pair of neighbouring prices and classify each (O2, O3).
3. Identify the revenue-maximising price in the table and explain it using elasticity (O3, O4).
4. Give Kofi a recommendation, and name two factors beyond revenue he should consider (for example costs, competing stalls, waste) (O5).
5. State one limitation of using past sales data to estimate elasticity (other things may not have been equal).

Assignment 2: elasticity in the news (individual)

Find a recent news report about a price change (for example fuel, public transport fares, streaming subscriptions or a tax on sugary drinks).

1. Summarise the price change and any reported change in quantity or revenue.
2. Say whether demand appears elastic or inelastic, using the total revenue test or the reported figures.
3. Use at least two determinants of elasticity to explain why.
4. Identify what other changes (incomes, competitors, seasons) could make the comparison misleading.