# Elasticity, Total Revenue & Linear Demand — 30 Practice Questions (Full Answers)

Format per question: 1) Question, 2) Concept (beginner-friendly), 3) Example, 4) Mathematical derivation (if applicable), 5) ASCII graph you can copy-paste.

## Q1. Define price elasticity of demand.

Concept: Elasticity measures how sensitive quantity demanded is to a price change.

Example: Price rises 10%, quantity falls 15% ⇒ elasticity E = −15%/10% = −1.5 (elastic).

Math: E = (dQ/dP) × (P/Q) for a demand curve Q(P). The sign is usually negative (law of demand).

Price (P)  
 ↑ |\ Elastic (|E|>1)  
 | \  
 | \ Unit elastic (midpoint)  
 | \  
 | \ Inelastic (|E|<1)  
 +-----\------------------> Quantity (Q)

## Q2. What does it mean when demand is (a) Elastic (b) Inelastic (c) Unit elastic?

Concept: Classification of buyer responsiveness.

Example: Elastic—movie tickets on Tuesday deals; Inelastic—insulin; Unit elastic—price where TR peaks.

Math: |E|>1 elastic; |E|<1 inelastic; |E|=1 unit elastic.

Price (P)  
 ↑ |\ Elastic (|E|>1)  
 | \  
 | \ Unit elastic (midpoint)  
 | \  
 | \ Inelastic (|E|<1)  
 +-----\------------------> Quantity (Q)

## Q3. What happens to Total Revenue (TR) when (a) price falls in the elastic region? (b) price falls in the inelastic region? (c) price is at unit elasticity?

Concept: TR = P × Q. How TR moves depends on elasticity at that price.

Example: In elastic region, a small price cut yields a big Q jump so P×Q rises; opposite in inelastic.

Math: dTR/dP = Q + P·(dQ/dP) = Q[1 + (1/E)]. Sign depends on (1 + 1/E).

TR  
↑ /\  
 / \  
 / \  
\_\_\_\_\_\_\_\_/\_\_\_\_\_\_\\_\_\_\_\_\_\_\_→ Q  
 Elastic Unit Inelastic

## Q4. If |E| > 1, should a firm raise or lower price to increase TR? Why?

Concept: With elastic demand, lower price to increase revenue.

Example: E = −2: price −5% ⇒ Q +10% ⇒ TR rises roughly +4.5%.

Math: Since |E|>1 ⇒ 1 + 1/E < 0 ⇒ dTR/dP < 0. So decreasing P increases TR.

TR  
↑ /\  
 / \  
 / \  
\_\_\_\_\_\_\_\_/\_\_\_\_\_\_\\_\_\_\_\_\_\_\_→ Q  
 Elastic Unit Inelastic

## Q5. Why does elasticity vary along a linear demand curve even though slope is constant?

Concept: On a straight-line demand, slope is constant but elasticity depends on P/Q at the point.

Example: At high P, Q is small → a 1-unit Q change is a big % change ⇒ |E| large (elastic).

Math: E = (dQ/dP)×(P/Q); dQ/dP constant, but P/Q changes along the line.

Price (P)  
 ↑ |\ Elastic (|E|>1)  
 | \  
 | \ Unit elastic (midpoint)  
 | \  
 | \ Inelastic (|E|<1)  
 +-----\------------------> Quantity (Q)

## Q6. On a linear demand curve, which portion is elastic and why?

Concept: Top (high P, low Q) is elastic because P/Q is large; small price cuts cause big %ΔQ.

Example: Using Q = 100 − 2P → midpoint at (Q=50, P=25) gives TR=1250 (peak).

Price (P)  
 ↑ |\ Elastic (|E|>1)  
 | \  
 | \ Unit elastic (midpoint)  
 | \  
 | \ Inelastic (|E|<1)  
 +-----\------------------> Quantity (Q)

## Q7. When total revenue is at its maximum, what is the elasticity?

Concept: At TR maximum, elasticity equals −1 (unit elastic).

Example: Using Q = 100 − 2P → midpoint at (Q=50, P=25) gives TR=1250 (peak).

TR  
↑ /\  
 / \  
 / \  
\_\_\_\_\_\_\_\_/\_\_\_\_\_\_\\_\_\_\_\_\_\_\_→ Q  
 Elastic Unit Inelastic

## Q8. If TR decreases when price decreases, which region are we in?

Concept: If price↓ and TR↓, you are in the inelastic region (|E|<1).

Example: Using Q = 100 − 2P → midpoint at (Q=50, P=25) gives TR=1250 (peak).

TR  
↑ /\  
 / \  
 / \  
\_\_\_\_\_\_\_\_/\_\_\_\_\_\_\\_\_\_\_\_\_\_\_→ Q  
 Elastic Unit Inelastic

## Q9. At high prices and low quantities, demand tends to be \_\_\_\_\_\_\_.

Concept: High price + low quantity ⇒ Elastic region.

Example: Using Q = 100 − 2P → midpoint at (Q=50, P=25) gives TR=1250 (peak).

TR  
↑ /\  
 / \  
 / \  
\_\_\_\_\_\_\_\_/\_\_\_\_\_\_\\_\_\_\_\_\_\_\_→ Q  
 Elastic Unit Inelastic

## Q10. At low prices and high quantities, demand tends to be \_\_\_\_\_\_\_.

Concept: Low price + high quantity ⇒ Inelastic region.

Example: Using Q = 100 − 2P → midpoint at (Q=50, P=25) gives TR=1250 (peak).

TR  
↑ /\  
 / \  
 / \  
\_\_\_\_\_\_\_\_/\_\_\_\_\_\_\\_\_\_\_\_\_\_\_→ Q  
 Elastic Unit Inelastic

## Q11. On the demand graph, label elastic, unit elastic, and inelastic parts (explain).

Concept: Demand parts: top elastic; midpoint unit elastic; bottom inelastic.

Example: Using Q = 100 − 2P → midpoint at (Q=50, P=25) gives TR=1250 (peak).

Price (P)  
 ↑ |\ Elastic (|E|>1)  
 | \  
 | \ Unit elastic (midpoint)  
 | \  
 | \ Inelastic (|E|<1)  
 +-----\------------------> Quantity (Q)

## Q12. On the TR graph, identify where TR is increasing, constant, or decreasing (explain).

Concept: TR increases on left (elastic), is flat at the peak (unit), and decreases on right (inelastic).

Example: Using Q = 100 − 2P → midpoint at (Q=50, P=25) gives TR=1250 (peak).

TR  
↑ /\  
 / \  
 / \  
\_\_\_\_\_\_\_\_/\_\_\_\_\_\_\\_\_\_\_\_\_\_\_→ Q  
 Elastic Unit Inelastic

## Q13. Why is the TR curve shaped like a hill?

Concept: TR looks like a hill because P falls as Q rises; initially P is still high so P×Q grows, then P becomes too low so P×Q falls.

Example: Using Q = 100 − 2P → midpoint at (Q=50, P=25) gives TR=1250 (peak).

TR  
↑ /\  
 / \  
 / \  
\_\_\_\_\_\_\_\_/\_\_\_\_\_\_\\_\_\_\_\_\_\_\_→ Q  
 Elastic Unit Inelastic

## Q14. If price falls from $100 to $80 and quantity rises from 0 to 10, what happens to TR?

Concept: Compute TR before and after the price change.

Example: TR₀ = 100×0 = 0; TR₁ = 80×10 = 800 ⇒ TR increases ⇒ elastic region.

Math: ΔTR = P₁Q₁ − P₀Q₀ = 800 − 0 = +800.

TR  
↑ /\  
 / \  
 / \  
\_\_\_\_\_\_\_\_/\_\_\_\_\_\_\\_\_\_\_\_\_\_\_→ Q  
 Elastic Unit Inelastic

## Q15. Explain why the top of the TR curve corresponds to the midpoint of the demand curve.

Concept: Midpoint corresponds to |E|=1 because for linear demand that’s where P and Q are exactly half of intercepts; calculus: TR(P)=100P−2P² ⇒ max at P=25.

Example: Using Q = 100 − 2P → midpoint at (Q=50, P=25) gives TR=1250 (peak).

TR  
↑ /\  
 / \  
 / \  
\_\_\_\_\_\_\_\_/\_\_\_\_\_\_\\_\_\_\_\_\_\_\_→ Q  
 Elastic Unit Inelastic

## Q16. Using Q = 100 - 2P, when P = 40, find Q, TR, and elasticity.

Concept: Plug price into demand to get Q and TR; compute elasticity at the point.

Example: P=40 ⇒ Q=20, TR=800. Big |E| implies elastic.

Math: E = (dQ/dP)×(P/Q) = (−2)×(40/20) = -4.00 ⇒ elastic.

Price (P)  
 ↑ |\ Elastic (|E|>1)  
 | \  
 | \ Unit elastic (midpoint)  
 | \  
 | \ Inelastic (|E|<1)  
 +-----\------------------> Quantity (Q)

## Q17. Using Q = 100 - 2P, when P = 20, find Q, TR, and elasticity.

Concept: Same steps at a lower price.

Example: P=20 ⇒ Q=60, TR=1200. |E|<1 ⇒ inelastic.

Math: E = (−2)×(20/60) = -0.67 ⇒ inelastic.

Price (P)  
 ↑ |\ Elastic (|E|>1)  
 | \  
 | \ Unit elastic (midpoint)  
 | \  
 | \ Inelastic (|E|<1)  
 +-----\------------------> Quantity (Q)

## Q18. For Q = 100 - 2P, at which P and Q is TR maximized?

Concept: TR is maximized at unit elasticity (midpoint).

Example: Midpoint of intercepts → P=25, Q=50, TR=1250.

Math: TR(P)=100P−2P² ⇒ dTR/dP=100−4P=0 ⇒ P=25 ⇒ Q=50.

TR  
↑ /\  
 / \  
 / \  
\_\_\_\_\_\_\_\_/\_\_\_\_\_\_\\_\_\_\_\_\_\_\_→ Q  
 Elastic Unit Inelastic

## Q19. Using results from Q16–Q18, identify the elastic and inelastic regions.

Concept: Compare elasticity signs around the midpoint.

Example: P>25 (like P=40) ⇒ elastic; P<25 (like P=20) ⇒ inelastic.

Math: E = −2·P/Q; if P/Q>0.5 ⇒ |E|>1 (elastic); if <0.5 ⇒ |E|<1 (inelastic).

Price (P)  
 ↑ |\ Elastic (|E|>1)  
 | \  
 | \ Unit elastic (midpoint)  
 | \  
 | \ Inelastic (|E|<1)  
 +-----\------------------> Quantity (Q)

## Q20. Verify that TR increases in the elastic zone and decreases in the inelastic zone for this demand.

Concept: Track TR across elastic and inelastic examples.

Example: TR at P=40 is 800, at P=25 is 1250 (↑), at P=20 is 1200 (↓ from peak).

Math: Since E<−1 above the midpoint → reducing P raises TR; below midpoint E>−1 → reducing P lowers TR.

TR  
↑ /\  
 / \  
 / \  
\_\_\_\_\_\_\_\_/\_\_\_\_\_\_\\_\_\_\_\_\_\_\_→ Q  
 Elastic Unit Inelastic

## Q21. Why are airline tickets often elastic but salt purchases inelastic?

Concept: Air tickets: many substitutes and can delay travel ⇒ elastic. Salt: tiny budget share, essential ⇒ inelastic.

Example: Airlines vs. buses; luxury handbags vs. generic; cold medicine vs. clothing.

TR  
↑ /\  
 / \  
 / \  
\_\_\_\_\_\_\_\_/\_\_\_\_\_\_\\_\_\_\_\_\_\_\_→ Q  
 Elastic Unit Inelastic

## Q22. How can a business use elasticity to decide pricing strategy?

Concept: If demand is elastic at current price, cut price to grow TR/volume; if inelastic, raise price to raise TR.

Example: Retailer checks whether past discounts lifted revenue; if TR fell, it was inelastic at that price.

TR  
↑ /\  
 / \  
 / \  
\_\_\_\_\_\_\_\_/\_\_\_\_\_\_\\_\_\_\_\_\_\_\_→ Q  
 Elastic Unit Inelastic

## Q23. Why might a luxury brand raise prices and still earn more revenue?

Concept: Luxury buyers value exclusivity; demand is inelastic in target segment, so higher prices can raise TR.

Example: Airlines vs. buses; luxury handbags vs. generic; cold medicine vs. clothing.

TR  
↑ /\  
 / \  
 / \  
\_\_\_\_\_\_\_\_/\_\_\_\_\_\_\\_\_\_\_\_\_\_\_→ Q  
 Elastic Unit Inelastic

## Q24. During a sale, why do some products bring in higher revenue while others don’t?

Concept: Sale boosts TR for elastic items (fashion). For inelastic items (medication), price cuts barely move Q, TR may fall.

Example: Airlines vs. buses; luxury handbags vs. generic; cold medicine vs. clothing.

TR  
↑ /\  
 / \  
 / \  
\_\_\_\_\_\_\_\_/\_\_\_\_\_\_\\_\_\_\_\_\_\_\_→ Q  
 Elastic Unit Inelastic

## Q25. What does “unit elasticity” tell a manager about the firm’s current pricing point?

Concept: You’re at revenue-maximizing price. Small price changes won’t change TR.

Example: Retailer checks whether past discounts lifted revenue; if TR fell, it was inelastic at that price.

TR  
↑ /\  
 / \  
 / \  
\_\_\_\_\_\_\_\_/\_\_\_\_\_\_\\_\_\_\_\_\_\_\_→ Q  
 Elastic Unit Inelastic

## Q26. A company’s TR doesn’t change when price changes — what does that imply?

Concept: TR unchanged with price ⇒ unit elasticity (|E|=1) around that point.

Example: Retailer checks whether past discounts lifted revenue; if TR fell, it was inelastic at that price.

TR  
↑ /\  
 / \  
 / \  
\_\_\_\_\_\_\_\_/\_\_\_\_\_\_\\_\_\_\_\_\_\_\_→ Q  
 Elastic Unit Inelastic

## Q27. If elasticity = –0.8, what happens to TR when price increases by 10%? Explain.

Concept: E=−0.8 (inelastic): P ↑10% ⇒ Q ↓8% ⇒ TR rises roughly (1.10×0.92 ≈ +1.2%).

Math: %ΔQ = E × %ΔP = (−0.8)×(+10%) = −8%; TR≈P×Q → 1.10×0.92 ≈ 1.012 ⇒ +1.2%.

TR  
↑ /\  
 / \  
 / \  
\_\_\_\_\_\_\_\_/\_\_\_\_\_\_\\_\_\_\_\_\_\_\_→ Q  
 Elastic Unit Inelastic

## Q28. If elasticity = –2, what happens to TR when price increases by 10%? Explain.

Concept: E=−2 (elastic): P ↑10% ⇒ Q ↓20% ⇒ TR falls (1.10×0.80 = 0.88 ⇒ −12%).

Math: %ΔQ = (−2)×(+10%) = −20%; TR factor = 1.10×0.80 = 0.88 ⇒ −12%.

TR  
↑ /\  
 / \  
 / \  
\_\_\_\_\_\_\_\_/\_\_\_\_\_\_\\_\_\_\_\_\_\_\_→ Q  
 Elastic Unit Inelastic

## Q29. Why can the same product have different elasticities in different markets?

Concept: Different customer segments, incomes, and substitutes make the same product more/less responsive across markets.

Example: Airlines vs. buses; luxury handbags vs. generic; cold medicine vs. clothing.

TR  
↑ /\  
 / \  
 / \  
\_\_\_\_\_\_\_\_/\_\_\_\_\_\_\\_\_\_\_\_\_\_\_→ Q  
 Elastic Unit Inelastic

## Q30. What role does time play in determining elasticity?

Concept: Elasticity usually increases over time as people find substitutes, adjust habits, or adopt technology.

Example: Airlines vs. buses; luxury handbags vs. generic; cold medicine vs. clothing.

TR  
↑ /\  
 / \  
 / \  
\_\_\_\_\_\_\_\_/\_\_\_\_\_\_\\_\_\_\_\_\_\_\_→ Q  
 Elastic Unit Inelastic