Practice 5b — Solution

Exercise 1

The following table shows data on the demand for Product X:

Point	Price	Quantity
A	25	0
B	20	20
C	15	40
D	10	60
E	5	80
F	0	100

A) Draw the demand curve.

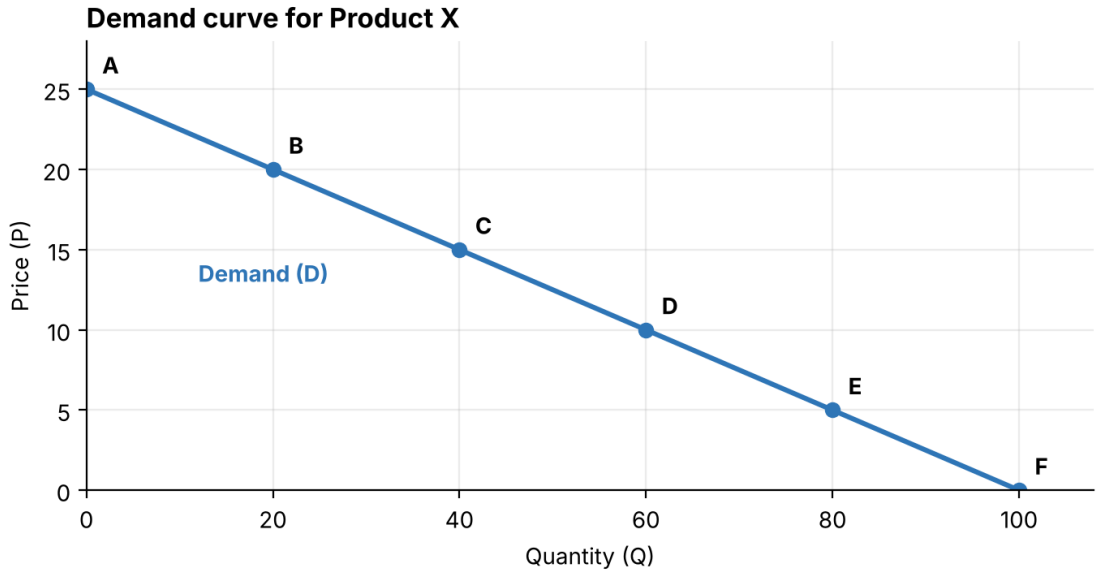
B) What is elasticity?

C) What is the sign of the elasticity coefficient?

D) Calculate the price elasticity at the midpoint of each interval.

Solution: Ex. 1

A) Draw the demand curve



B) What is elasticity?

Elasticity is the sensitivity of the quantity demanded to a change in the price of the good, with both changes expressed in relative terms (%).

$$E_d = \text{Price elasticity} = \frac{\%\ \text{change in quantity demanded}}{\%\ \text{change in price}}$$

$$\eta = \frac{\Delta q_n^d / q_n^d}{\Delta p_n / p_n} = \frac{\Delta q_n^d / \Delta p_n}{q_n^d / p_n}$$

C) What is the sign of the elasticity coefficient?

Negative. This is a result of the law of demand: when the price falls, the quantity demanded rises, and vice versa. The absolute value is used.

D) Calculate the price elasticity at the midpoint of each interval

Interval	Change in Q	Change in P	Midpoint Q	Midpoint P	Elasticity
A–B	20	–5	10	22.5	–9 (elastic)
B–C	20	–5	30	17.5	–2.33 (elastic)
C–D	20	–5	50	12.5	–1 (unit elastic)
D–E	20	–5	70	7.5	–0.43 (inelastic)
E–F	20	–5	90	2.5	–0.11 (inelastic)

Exercise 2

The price elasticity of demand for a certain good is 2, and we are currently selling 100 units at a price of €20. How many units will be sold at a price of €21? Show your answer with the corresponding calculations.

Solution: Ex. 2

In rough numbers, the price increase is 5% and the elasticity is 2, so the percentage decrease in quantity would be 10%. The new quantity would therefore be approximately 90.

To be more precise, we assume that the elasticity is 2 at the midpoint of the change from p = 20 to p = 21 (Q = 100 to Q = x). Substituting the values into the price-elasticity formula:

$$E = \frac{\Delta q / q}{\Delta p / p}$$

$$\frac{(x - 100) \ / \ \dfrac{x + 100}{2}}{(21 - 20) \ / \ \dfrac{21 + 20}{2}} = -2$$

$$\frac{41\,(x - 100)}{x + 100} = -2$$

$$41x - 4100 = -2x - 200$$

$$41x + 2x = 4100 - 200$$

$$43x = 3900$$

$$x = 3900/43 = 90.697$$

At a price of €21, we would sell **90.697 units** of the product.

Exercise 3

A company that sells mini laptops is marketing a particular laptop in a market where demand is given by the expression:

$$Q_d = 25000 - 40p$$

The company is considering raising the selling price of the mini laptop and would like to know what impact the price increase will have on total revenue.

a. Calculate the value of the elasticity, considering that the price of these mini laptops is €500.

b. Given the previous result, state with appropriate reasons whether the company should raise its price, and the effect that this price increase will have on total revenue.

Solution: Ex. 3

a. From Qd = 25000 – 40p, for p = €500 the quantity is q = 5,000 units. The point price elasticity of demand is given by:

$$\eta = -\frac{dq}{dp} \cdot \frac{p}{q} \quad \Rightarrow \quad \eta = -40 \cdot \frac{500}{5000} = -4$$

b. Since the elasticity in absolute value is greater than 1, demand is elastic. Therefore, a price increase would cause an even larger fall in sales volume, and total revenue would decrease.

Question 4

If a producer cuts the price of a given good by 20%, knowing that the price elasticity of demand is 1.5, by how much do you estimate the quantity demanded will change (as a percentage)?

a) 15%

b) 30%

c) 45%

d) 5%

Answer: b (20% × 1.5 = 30%)

Question 5

When the price elasticity of demand for a normal good is relatively elastic:

a) A reduction in the price of the good means higher revenue for the seller.

b) A reduction in the price of the good means lower revenue for the seller.

c) A price reduction does not change the seller's revenue.

d) None of the other answers is correct.

Answer: a

Question 6

If, when the price of a good "X" falls, the quantity demanded of good "X" rises and the quantity demanded of another good "Y" falls, we say that "X" and "Y" are:

a) Complements

b) Substitutes

c) Normal goods

d) None of the above

Answer: b