PRICE, INCOME AND CROSS ELASTICITY

SDP

Elasticity – Learning objectives

- Understand the definition of elasticity.
- Be able to compute the elasticity coefficients.
- Analyze the elasticity characteristics.
- Illustrate the determinants of the elasticity.
- Explain the total revenue test and understand the relationship between total revenue and price elasticity of demand.

Elasticity

- 4 basic types used:
- **Price elasticity of demand**
- **Price elasticity of supply**
- **Income elasticity of demand**

Price Elasticity of Demand – the concept

- The responsiveness of one variable to changes in another
- When price rises, what happens to demand?
- Demand falls
- BUT!
- How much does demand fall?

Price Elasticity of Demand – the concept

- If price rises by 10% - what happens to demand?
- We know demand will fall
- By more than 10%?
- By less than 10%?
- **Elasticity measures the <u>extent</u> to which demand will change**

Price Elasticity of Demand

- **Definition**
  - The responsiveness of demand to changes in price
  - Where % change in demand is greater than % change in price – **elastic**
  - Where % change in demand is less than % change in price - **inelastic**

Price Elasticity of Demand

The Formula:

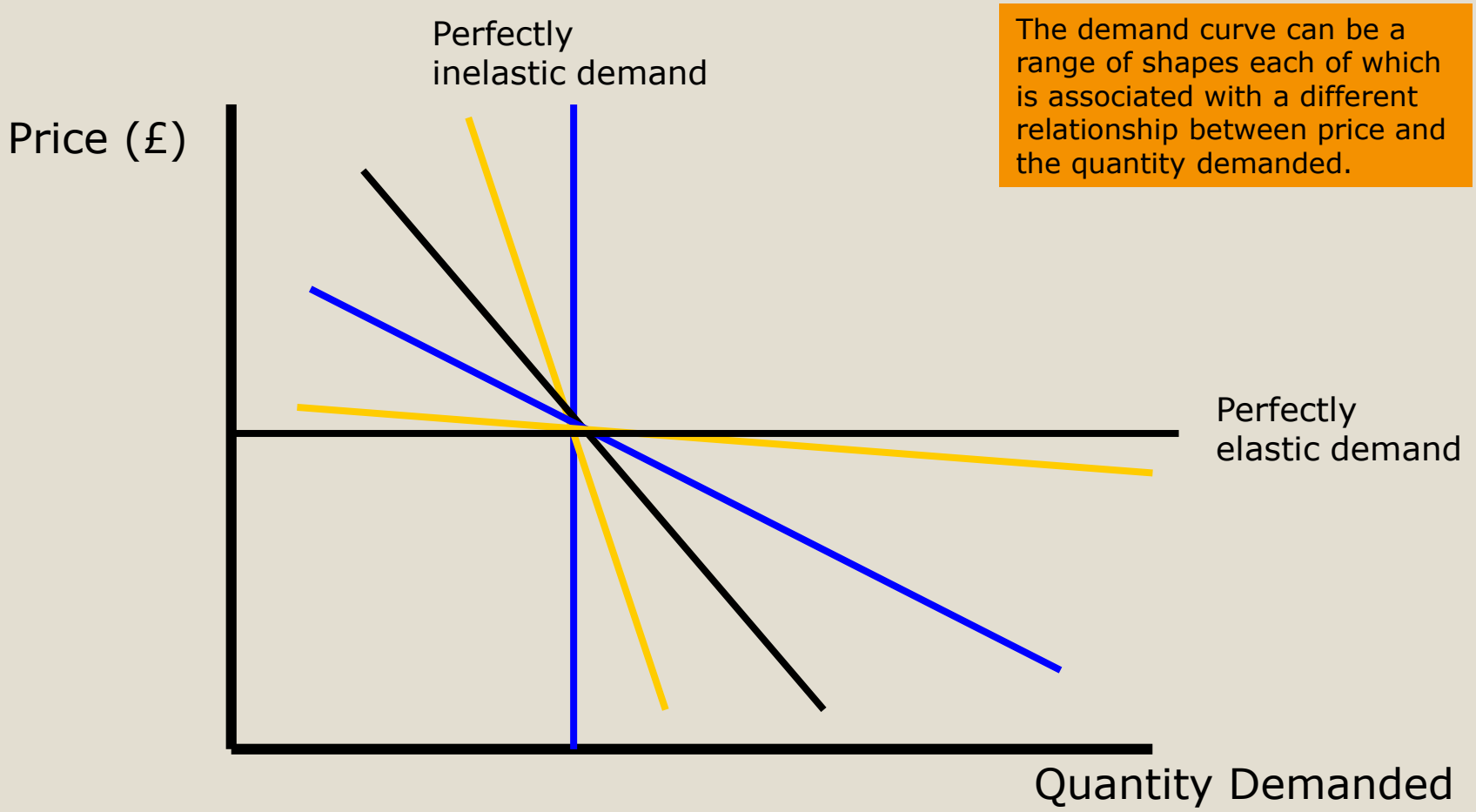
$$\text{Ped} = \frac{\%\ \text{Change in Quantity Demanded}}{\%\ \text{Change in Price}}$$

If answer is between 0 and -1: the relationship is inelastic

If the answer is between -1 and infinity: the relationship is elastic

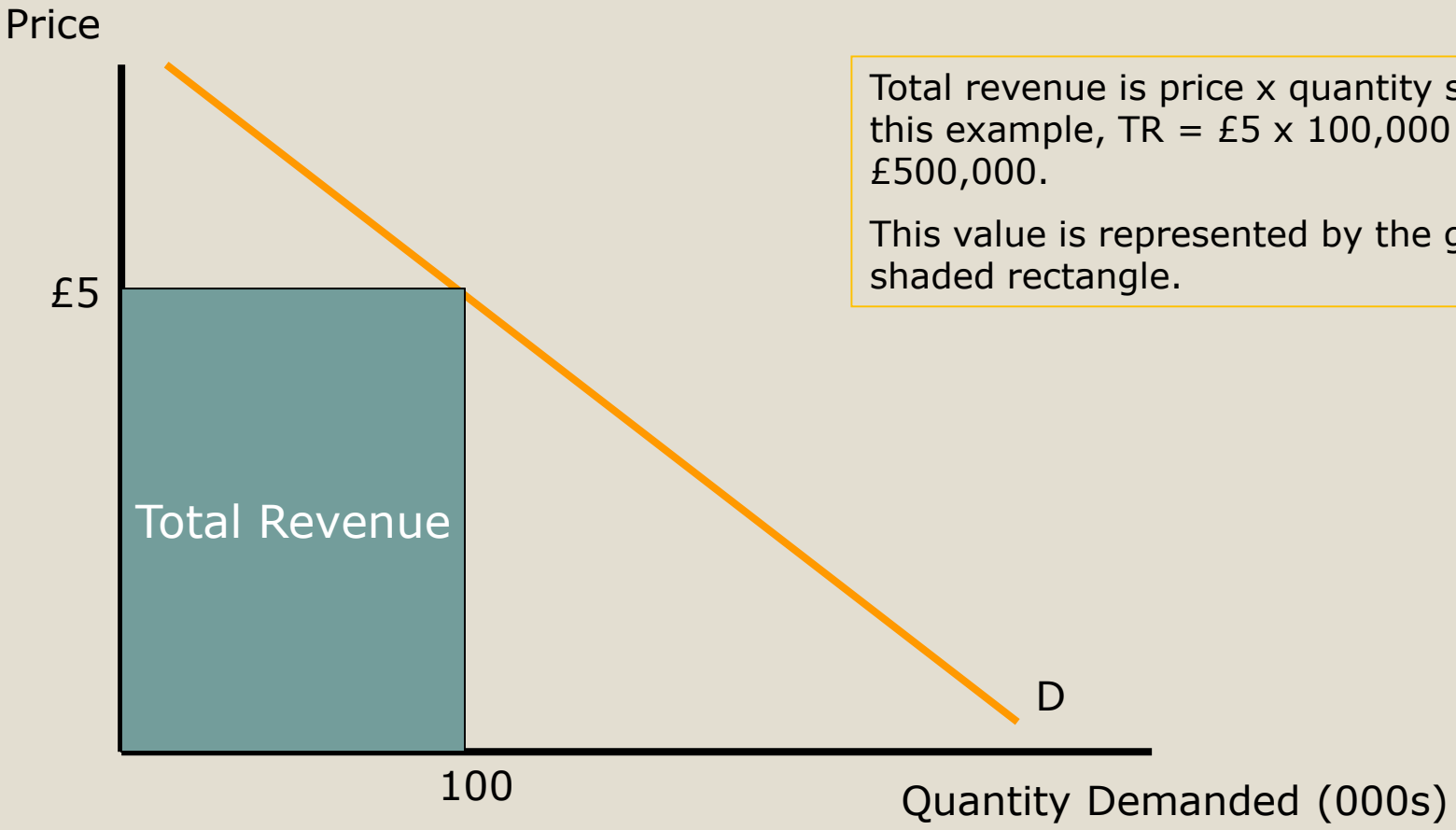
Note: PED has – sign in front of it; because as price rises demand falls and vice-versa (inverse relationship between price and demand)

Price Elasticity of Demand



The demand curve can be a range of shapes each of which is associated with a different relationship between price and the quantity demanded.

Price Elasticity of Demand



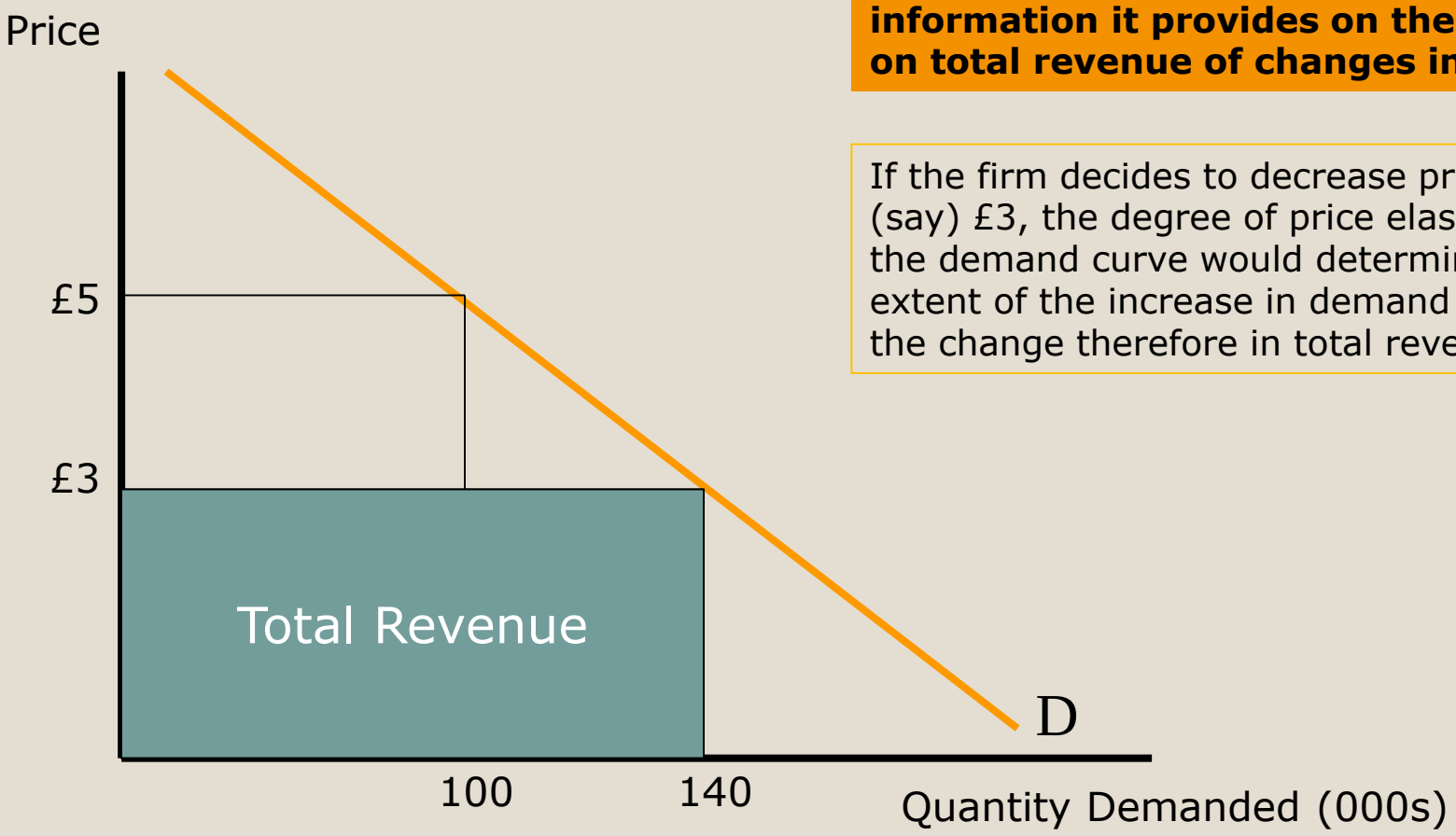
Total revenue is price x quantity sold. In this example, TR = £5 x 100,000 = £500,000.

This value is represented by the grey shaded rectangle.

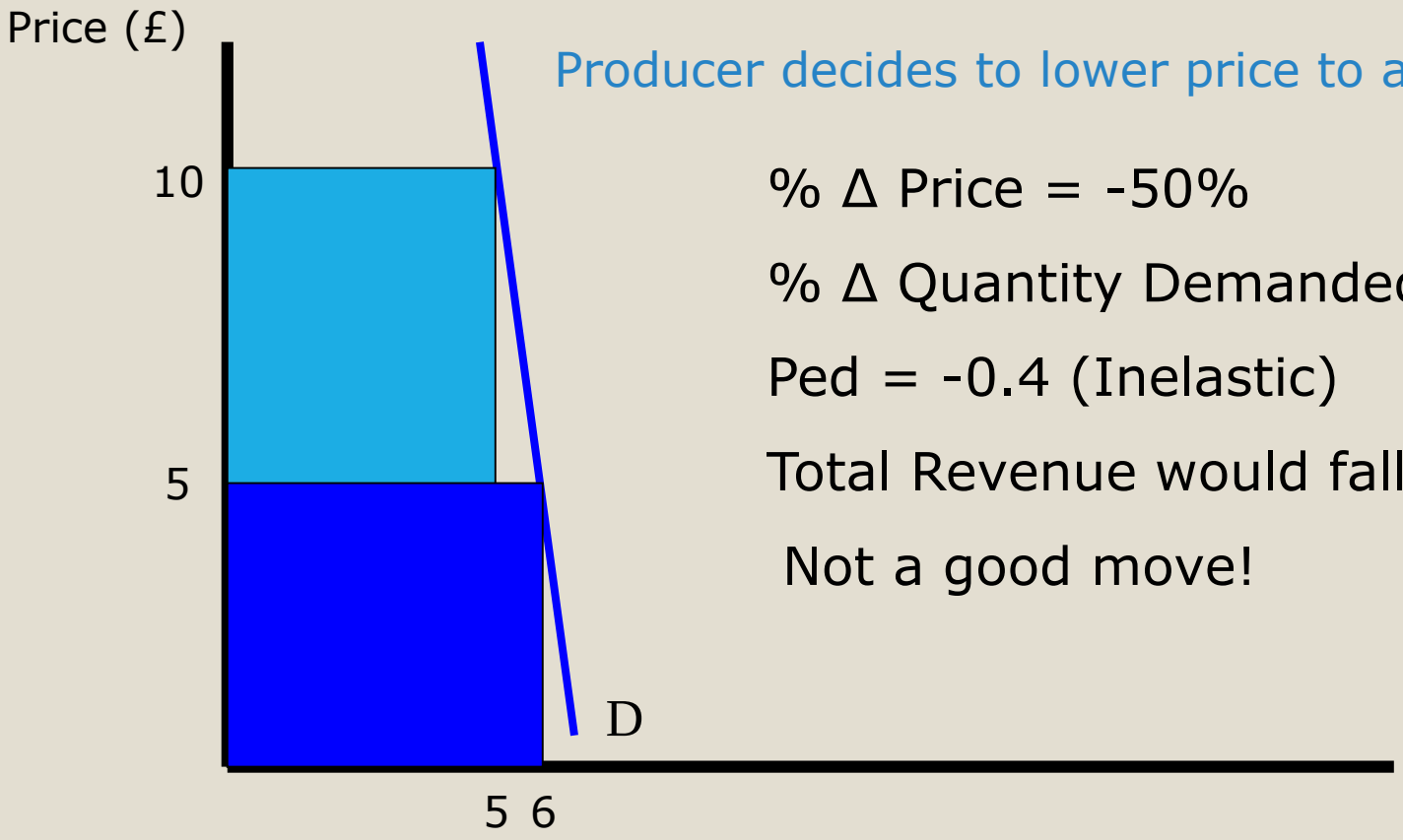
Price Elasticity of Demand

The importance of elasticity is the information it provides on the effect on total revenue of changes in price.

If the firm decides to decrease price to (say) £3, the degree of price elasticity of the demand curve would determine the extent of the increase in demand and the change therefore in total revenue.



Price Elasticity of Demand



Producer decides to lower price to attract sales

% Δ Price = -50%

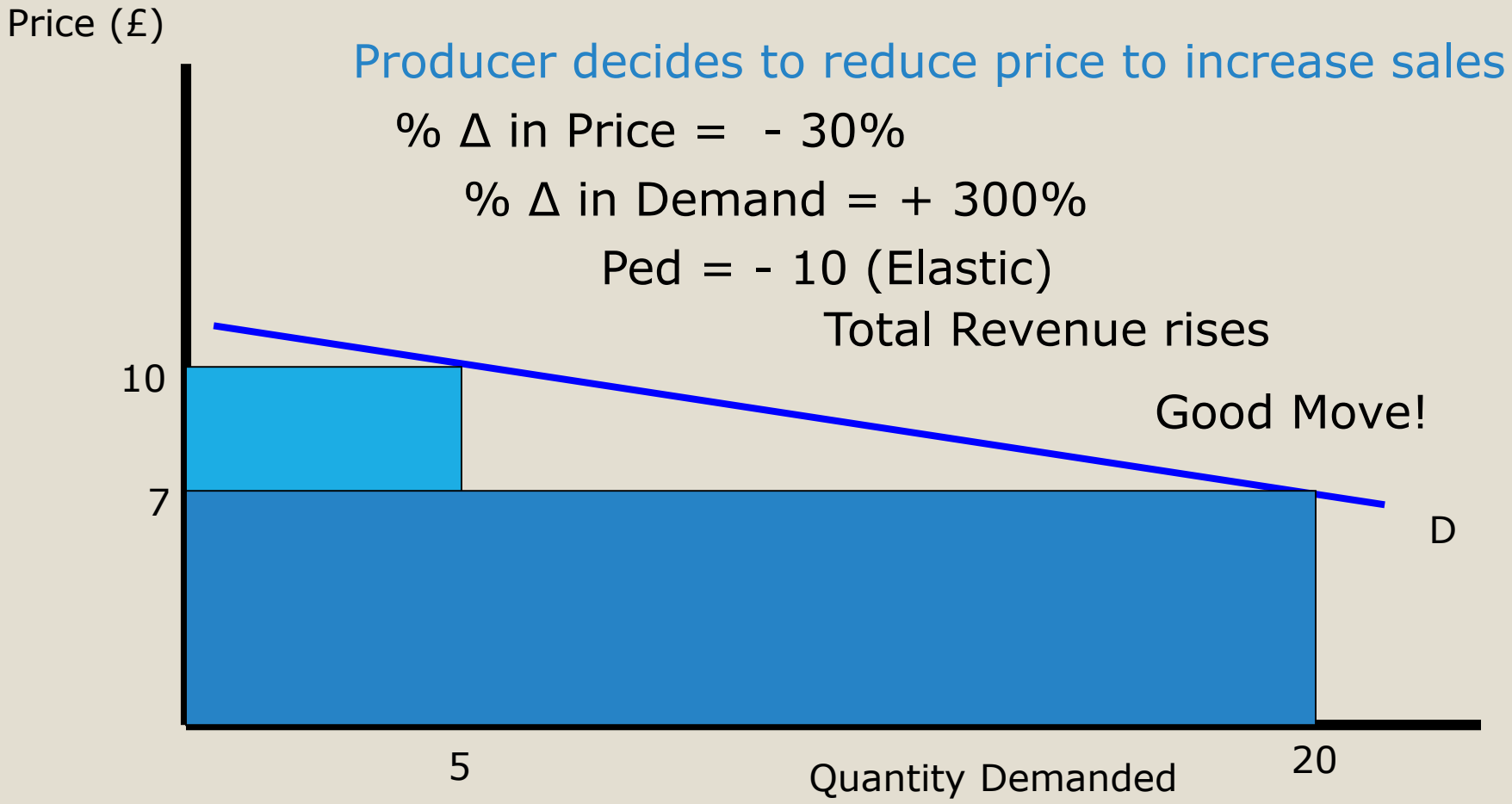
% Δ Quantity Demanded = +20%

Ped = -0.4 (Inelastic)

Total Revenue would fall

Not a good move!

Price Elasticity of Demand



Price Elasticity of Demand

- **If demand is price elastic:**
- Increasing price would **reduce** TR (%Δ Qd > % Δ P)
- Reducing price would **increase** TR (%Δ Qd > % Δ P)

- **If demand is price inelastic:**
- Increasing price would **increase** TR (%Δ Qd < % Δ P)
- Reducing price would **reduce** TR (%Δ Qd < % Δ P)

Price Elasticity of Demand - Pause for an exercise

- Economics in practise: Price elasticity of demand for oil, page 28, Text book

- Good Work!

Income Elasticity of Demand

- **Definition:**
  - The responsiveness of demand to changes in incomes
- **Normal Good** – demand rises as income rises and vice versa
- **Inferior Good** – demand falls as income rises and vice versa

Income Elasticity of Demand

- A positive sign denotes a normal good
- A negative sign denotes an inferior good

Income Elasticity of Demand

The Formula:

$$Yed = \frac{\%\ \text{Change in Quantity Demanded}}{\%\ \text{Change in Income}}$$

If answer is greater than 1 or less than -1:
- demand is said to be income elastic

If answer is between +1 and -1:
- demand is said to be income inelastic

Income Elasticity of Demand

- For example:
- Yed = - 0.6: Good is an **inferior good** but **inelastic** – a rise in income of 3% would lead to demand falling by 1.8%
- Yed = + 0.4: Good is a **normal good** but **inelastic** – a rise in incomes of 3% would lead to demand rising by 1.2%
- Yed = + 1.6: Good is a **normal good** and **elastic** – a rise in incomes of 3% would lead to demand rising by 4.8%
- Yed = - 2.1: Good is an **inferior good** and **elastic** – a rise in incomes of 3% would lead to a fall in demand of 6.3%

Income Elasticity of Demand - Pause for an exercise

- Economics in practise: Income elasticity in New Zealand, page 36, Text book.

- Good Work!

Price Elasticity of Supply

- **Definition:**
  - The responsiveness of supply to changes in price
  - If Pes is **inelastic** - it will be difficult for suppliers to react swiftly to changes in price
  - If Pes is **elastic** – supply can react quickly to changes in price

$$\text{Pes} = \frac{\%\ \Delta\ \text{Quantity Supplied}}{\%\ \Delta\ \text{Price}}$$

Price Elasticity of Supply

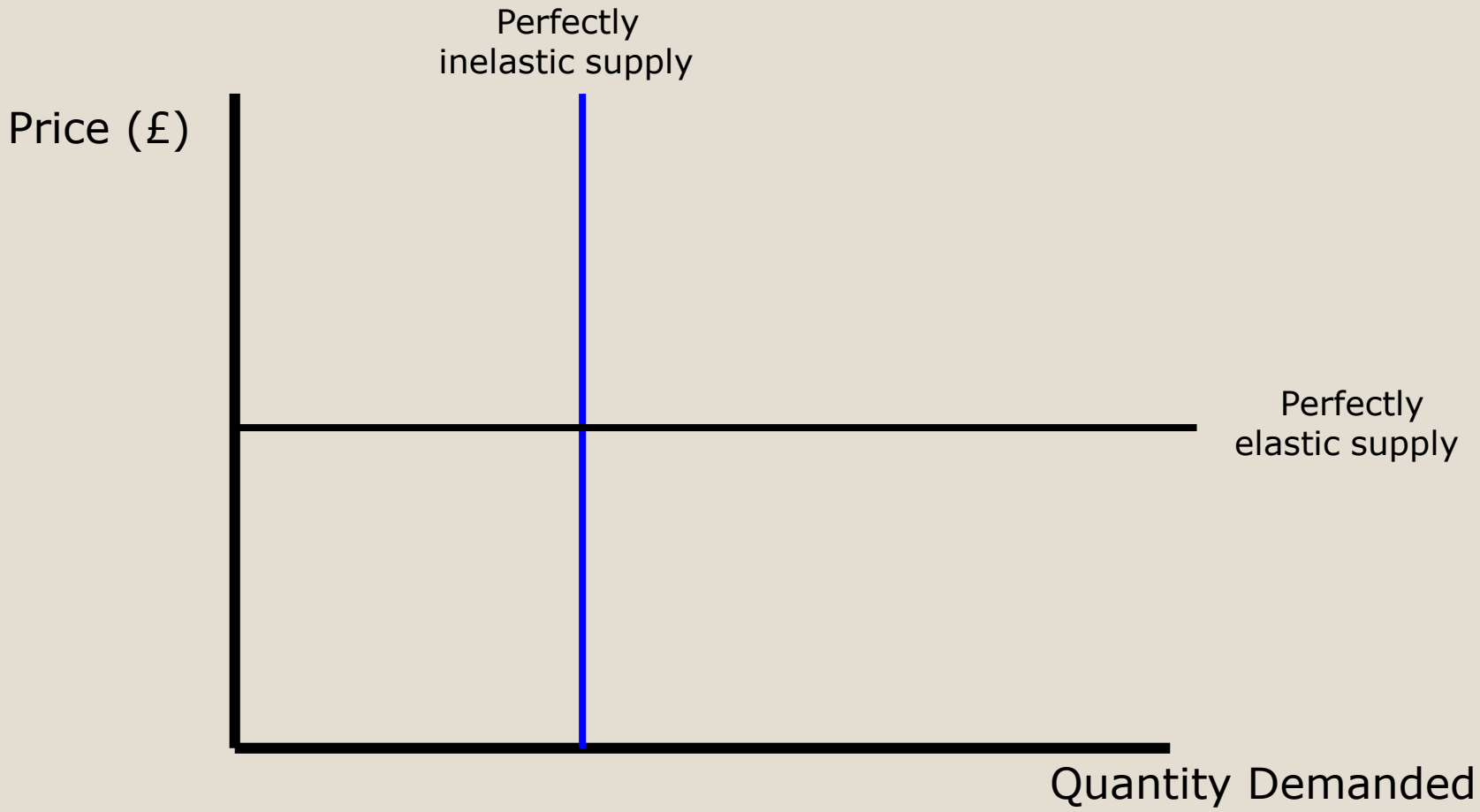
The Formula:

$$Pes = \frac{\%\ \text{Change in Quantity Supplied}}{\%\ \text{Change in Price}}$$

If answer is greater than 1:
- supply is said to be elastic

If answer is less than 1:
- supply is said to be inelastic

Price Elasticity of Supply



Price Elasticity of Demand

- **Factors affecting price elasticity of demand:**

- The availability of substitutes
- Degree of necessity
- Proportion of income spent on a product

Income Elasticity of Demand

- **Factors affecting income elasticity of demand:**

- Necessities or basic goods
- Luxuries

Price Elasticity of Supply

- **Factors affecting price elasticity of supply:**
- Time period (Stock levels, Production speed, Spare capacity, Easy entry into the market.)
- Producer substitutes and the mobility of production factors

Price Elasticity of Supply - Pause for an exercise

- Economics in practise: The supply of gold, page 33, Text book

- Good Work!

Summarize

- Elasticity measures the responsiveness of $\mathbf{Q^d}$ or $\mathbf{Q^s}$ to one of its determinants.
- Price elasticity of demand equals percentage change in $\mathbf{Q^d}$ divided by percentage change in ***P***.
  When it's less than one, demand is "inelastic."
  When greater than one, demand is "elastic."
- When demand is inelastic, total revenue rises when price rises. When demand is elastic, total revenue falls when price rises.

Summarize

- Demand is less elastic in the short run, for necessities, for broadly defined goods, or for goods with few close substitutes.
- Price elasticity of supply equals percentage change in $\boldsymbol{Q^s}$ divided by percentage change in ***P***.
  When it's less than one, supply is "inelastic."
  When greater than one, supply is "elastic."
- Price elasticity of supply is greater in the long run than in the short run.

Summarize

- The income elasticity of demand measures how much quantity demanded responds to changes in buyers' incomes.
- The cross-price elasticity of demand measures how much demand for one good responds to changes in the price of another good.

Elasticity – Did you learn?

- Understand the definition of elasticity. √
- Be able to compute the elasticity coefficients. √
- Analyze the elasticity characteristics. √
- Illustrate the determinants of the elasticity. √
- Explain the total revenue test and understand the relationship between total revenue and price elasticity of demand. √

APPLICATIONS OF ELASTICITY

Applications of Elasticity – Learning objectives

- Understand the importance information that elasticity can provide to:
    - Firms and the Government

Applications of Elasticity

Price elasticity and firms:

- **If demand is price elastic:**
- Increasing price would **reduce** TR (%Δ Qd > % Δ P)
- Reducing price would **increase** TR (%Δ Qd > % Δ P)

- **If demand is price inelastic:**
- Increasing price would **increase** TR (%Δ Qd < % Δ P)
- Reducing price would **reduce** TR (%Δ Qd < % Δ P)

Applications of Elasticity

Income elasticity and firms:

- Product switching: a predicted rise in incomes may encourage a firm to make some products if demand for them was income elastic.

- Production planning: if income are expected to rise in the future they can plan ahead, making sure they have enough capacity.

Applications of Elasticity

Price elasticity and the government:

Taxes: VAT and Excise Duties

Government target goods which are either necessities or have few substitutes.

Applications of Elasticity – Did you learn?

- Understand the importance information that elasticity can provide to:
  - Firms and the Government √

Pause for an exercise

Page 38

Question 1

Text Book

Answers for the exercise

Question 1:

(a) Demand for Crackles is elastic. The value of price elasticity for the product is –1.5, i.e. greater than 1.

(b) If demand for a product is elastic, a price reduction will result in an increase in total revenue.

(c) Total revenue before the price change is given by:

TR = 25p x 5,000,000 = £1.25m

Total revenue after the price change is given by:

TR = 20p x 6,500,000 = £1.3m

(d) The price reduction from 25p to 20p has resulted in an increase in total revenue of £50,000 (from £1,250,000 to £1,300,000). This was to be expected since demand for Crackles is elastic.

How does a price change affect TR if price elasticity is -1?

It means demand has unitary elasticity:

When there's is a price change the effect on TR is unique (will be exactly the same at every price).

Pause for an exercise

Page 40

Question 1

Text Book

Answers for the exercise

Question 2:

(a) (i) There are two taxes on petrol in the UK. Excise duty is 50.35p per litre and VAT is 17.13p per litre. Therefore the total tax is 67.48p. This represents 58.7 per cent (67.48/115 x 100) of the total price per litre.

(ii) More than half of the money generated from the sale of petrol is taken by the government. Most would agree that this seems rather a lot!

(b) The government imposes indirect taxes on a range of goods and services. However, certain goods are targeted very aggressively. These will be goods which have inelastic demand. This is because consumers will avoid heavily taxed products if demand for them is elastic. Therefore, governments target goods like petrol which are either necessities or have no substitutes. However, most governments do not target goods such as food and water, which are essential to human survival.