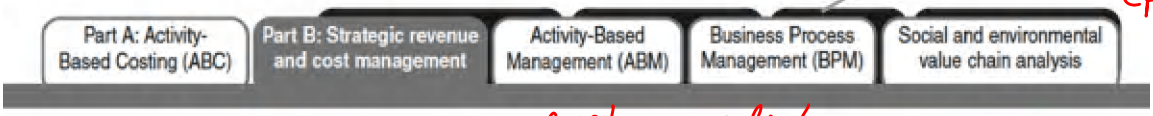
There are two forms of product functionality of interest to customers: hard functions and soft functions

price & quantity

cost

cheap → reselling

cpaa



custom made

differentiated

	Generic	Specified	Augmented
Product features	Basic value required (e.g. a drink to satisfy thirst) which is indistinguishable from any other beverage	Value received in conformity to contract specifications (e.g. a standard flavoured milk in 600 ml cartons)	Added value which extends beyond minimal expectations (e.g. a deluxe flavoured milk in 500 ml plastic bottles
Pricing role of SMA	Cost plus → Reduce cost	Price at competitive parity → Estimate competitor's price	Price at value to client → Estimate customer value

contract bidding

competitively priced

≃ target costing

not price

≈ auction, ebay

≈ one-time custom contract (relevant cost)

advanced SMA tool

5

Pricing decisions

Topic list	Syllabus reference
1 Pricing policy and the market	B4 (a)
2 Demand	B4 (b), (c)
3 Decisions to increase production and sales	B4 (e)
4 The profit-maximising price/output level	B4 (d), (f)
5 Price strategies	B4 (g), (h)

- maximize profit
- elasticity

Introduction

All profit organisations and many non-profit organisations face the task of setting a price for their products or services. Proper pricing of an organisation's products or services is essential to its profitability and hence its survival.

In this chapter we will begin by looking at the **factors which influence pricing** policy. Perhaps the most important of these is the **level of demand** for an organisation's product and how that demand changes as the price of the product changes (its **elasticity of demand**).

We will then turn our attention to the **profit-maximising price/output level** and a range of different **price strategies.**

Study guide

		Intellectual level
B4	**Pricing decisions**	
(a)	Explain the factors that influence the pricing of a product or service	2
(b)	Explain the price elasticity of demand	1
(c)	Derive and manipulate a straight line demand equation. Derive an equation for the total cost function (including volume-based discounts)	2
(d)	Calculate the optimum selling price and quantity for an organisation, equating marginal cost and marginal revenue	2
(e)	Evaluate a decision to increase production and sales levels, considering incremental costs, incremental revenues and other factors	2
(f)	Determine prices and output levels for profit maximisation using the demand based approach to pricing (both tabular and algebraic methods)	1
(g)	Explain different price strategies, including: (i) All forms of cost-plus (ii) Skimming (iii) Penetration (iv) Complementary product (v) Product-line (vi) Volume discounting (vii) Discrimination (viii) Relevant cost	2
(h)	Calculate a price from a given strategy using cost-plus and relevant cost	2

Exam guide

Exam questions on pricing are likely to be a mixture of calculation and discussion and the examiner will expect a **practical application** of pricing theories.

1 Pricing policy and the market

FAST FORWARD

In the modern world there are many more **influences on price** than cost (eg competitors, product range, quality).

1.1 Influences on price

Influence	Explanation/Example
Price sensitivity	Sensitivity to price levels will vary amongst purchasers. Those that can pass on the cost of purchases will be the least sensitive and will therefore respond more to other elements of perceived value. For example, a business traveller will be more concerned about the level of service in looking for an hotel than price, provided that it fits the corporate budget. In contrast, a family on holiday are likely to be very price sensitive when choosing an overnight stay.
Price perception	Price perception is the way customers react to prices. For example, customers may react to a price increase by buying more. This could be because they expect further price increases to follow (they are 'stocking up').

Influence	Explanation/Example
Quality	This is an aspect of price perception. In the absence of other information, customers tend to judge quality by price. Thus a price rise may indicate improvements in quality, a price reduction may signal reduced quality.
Intermediaries	If an organisation distributes products or services to the market through independent intermediaries, such intermediaries are likely to deal with a range of suppliers and their aims concern their own profits rather than those of suppliers.
Competitors	In some industries (such as petrol retailing) pricing moves in unison; in others, price changes by one supplier may initiate a price war. Competition is discussed in more detail below.
Suppliers	If an organisation's suppliers notice a price rise for the organisation's products, they may seek a rise in the price for their supplies to the organisation.
Inflation	In periods of inflation the organisation may need to change prices to reflect increases in the prices of supplies, labour, rent and so on.
Newness	When a new product is introduced for the first time there are no existing reference points such as customer or competitor behaviour; pricing decisions are most difficult to make in such circumstances. It may be possible to seek alternative reference points, such as the price in another market where the new product has already been launched, or the price set by a competitor.
Incomes	If incomes are rising, price may be a less important marketing variable than product quality and convenience of access (distribution). When income levels are falling and/or unemployment levels rising, price will be more important.
Product range	Products are often interrelated, being complements to each other or substitutes for one another. The management of the pricing function is likely to focus on the profit from the whole range rather than the profit on each single product. For example, a very low price is charged for a loss leader to make consumers buy additional products in the range which carry higher profit margins (eg selling razors at very low prices whilst selling the blades for them at a higher profit margin).
Ethics	Ethical considerations may be a further factor, for example whether or not to exploit short-term shortages through higher prices.

1.2 Markets

affect pricing / elasticity

FAST FORWARD

The price that an organisation can charge for its products will be determined to a greater or lesser degree by the **market** in which it operates.

Here are some familiar economic terms that might feature as background for a question or that you might want to use in a written answer.

Key terms

mkt price

Perfect competition: many buyers and many sellers all dealing in an identical product. Neither producer nor user has any market power and both must accept the prevailing market price. Pemic

Monopoly: one seller who dominates many buyers. The monopolist can use his market power to set a profit-maximising price. (must govt control)

Monopolistic competition: a large number of suppliers offer similar, but not identical, products. The similarities ensure elastic demand whereas the slight differences give some monopolistic power to the supplier. *

Oligopoly: where relatively few competitive companies dominate the market. Whilst each large firm has the ability to influence market prices, the unpredictable reaction from the other giants makes the final industry price indeterminate. Cartels are often formed.

Google soft differentiation

1.3 Competition

In **established industries** dominated by a few major firms, it is generally accepted that a price initiative by one firm will be countered by a price reaction by competitors. In these circumstances, prices tend to be **fairly stable**, unless pushed upwards by inflation or strong growth in demand.

If a rival **cuts its prices** in the expectation of increasing its market share, a firm has several options.

(a) It will **maintain its existing prices** if the expectation is that only a small market share would be lost, so that it is more profitable to keep prices at their existing level. Eventually, the rival firm may drop out of the market or be forced to raise its prices.

(b) It may maintain its prices but respond with a **non-price counter-attack**. This is a more positive response, because the firm will be securing or justifying its current prices with a product change, advertising, or better back-up services.

(c) It may **reduce its prices**. This should protect the firm's market share so that the main beneficiary from the price reduction will be the consumer.

(d) It may **raise its prices** *and respond with a* **non-price counter-attack**. The extra revenue from the higher prices might be used to finance an advertising campaign or product design changes. A price increase would be based on a campaign to emphasise the quality difference between the firm's and the rival's products.

Question **Pricing in the modern business environment**

What technique might be used to relate prices to cost in the modern business environment?

Answer

The answer, of course, is **target costing,** which you met in Chapter 2b. Price is determined by the market. Costs have to come below this price.

2 Demand

FAST FORWARD

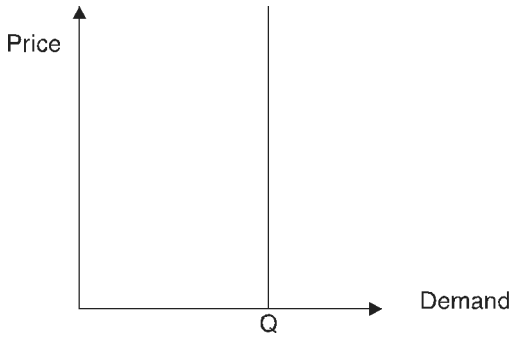
Economic theory argues that the **higher the price of a good**, the **lower** will be the **quantity demanded**.

2.1 The economic analysis of demand

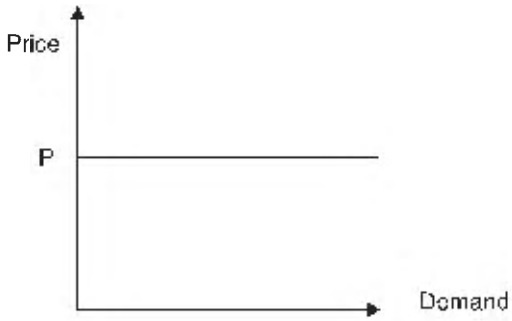
You know from your personal experience as a consumer that the theory of demand is essentially true, the higher the price of a good, the less will be demanded. We have already seen that in practice it is by no means as straightforward as this (some goods are bought *because* they are expensive, for example).

There are two extremes in the relationship between price and demand. A supplier can either **sell a certain quantity, Q, at any price** (as in graph (a)). Demand is totally unresponsive to changes in price and is said to be **completely inelastic**. Alternatively, **demand might be limitless at a certain price** P (as in graph (b)), but there would be no demand above price P and there would be little point in dropping the price below P. In such circumstances demand is said to be **completely elastic**.

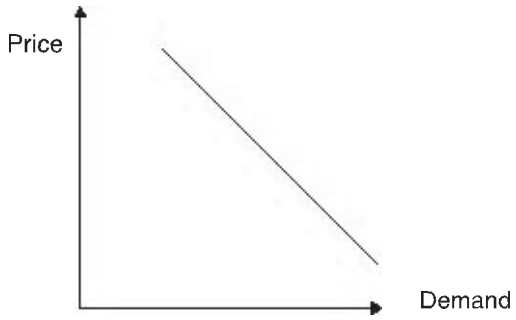
(a)



(b)



A more **normal situation** is shown below. The **downward-sloping** demand curve shows that demand will increase as prices are lowered. Demand is therefore **elastic**.



2.1.1 Price elasticity of demand (η)

FAST FORWARD

The **price elasticity of demand (PED)** is a measure of the extent of change in demand for a good in response to a change in its price.

Key term

Price elasticity of demand (η) is a measure of the extent of change in market demand for a good in response to a change in its price. It is measured as:

$$\frac{\text{The change in quantity demanded, as a \% of demand}}{\text{The change in price, as a \% of the price}}$$

Since the demand goes up when the price falls, and goes down when the price rises, the elasticity has a negative value, but it is usual to ignore the minus sign.

2.1.2 Example: Price elasticity of demand

The price of a good is \$1.20 per unit and annual demand is 800,000 units. Market research indicates that an increase in price of 10 cents per unit will result in a fall in annual demand of 75,000 units. What is the price elasticity of demand?

Solution

Annual demand at \$1.20 per unit is 800,000 units.

Annual demand at \$1.30 per unit is 725,000 units.

% change in demand	=	(75,000/800,000) × 100% = 9.375%
% change in price	=	(0.10/1.20) × 100% = 8.333%
Price elasticity of demand	=	(–9.375/8.333) = –1.125

Ignoring the minus sign, price elasticity is 1.125.

The demand for this good, at a price of \$1.20 per unit, would be referred to as **elastic** because the **price elasticity of demand is greater than 1**.

2.1.3 Elastic and inelastic demand

The value of demand elasticity may be anything from zero to infinity.

Key terms

Demand is referred to as **inelastic** if the absolute value is less than 1 and **elastic** if the absolute value is greater than 1.

Think about what this means.

(a) Where demand is **inelastic**, the **quantity demanded falls by a smaller percentage than the percentage increase in price.**

(b) Where demand is **elastic, demand falls** by a **larger percentage than the percentage rise in price.**

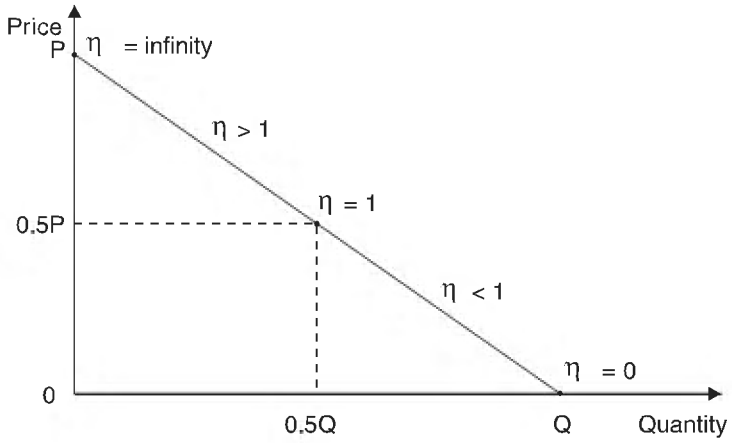
2.1.4 Price elasticity and the slope of the demand curve

Generally, **demand curves slope downwards**. Consumers are willing to buy more at lower prices than at higher prices. In general, **elasticity** will **vary** in value **along the length of a demand curve**.

(a) If a downward sloping demand curve becomes **steeper** over a particular range of quantity, then demand is becoming **more inelastic**.

(b) A **shallower** demand curve over a particular range indicates **more elastic** demand.

The ranges of price elasticity at different points on a downward sloping straight line demand curve are illustrated in the diagram below.



(a) At **higher prices** on a straight line demand curve (the **top** of the demand curve), **small percentage price reductions** can bring **large percentage increases in the quantity** demanded. This means that **demand is elastic** over these ranges, and **price reductions** bring **increases in total expenditure** by consumers on the commodity in question.

(b) At **lower prices** on a straight line demand curve (the **bottom** of the demand curve), **large percentage price reductions** can bring **small percentage increases in quantity**. This means that **demand is inelastic** over these price ranges, and **price increases** result in **increases in total expenditure**.

2.1.5 Special values of price elasticity

There are two special values of price elasticity of demand.

(a) **Demand is perfectly inelastic ($\eta = 0$).** There is **no change in quantity** demanded, **regardless of the change in price**. The demand curve is **a vertical straight line** (as in graph (a) in Section 2.1).

(b) **Perfectly elastic demand ($\eta = \infty$).** Consumers will want to **buy an infinite amount**, but **only up to a particular price** level. Any price increase above this level will reduce demand to zero. The demand curve is a **horizontal straight line** (as in graph (b) in Section 2.1).

2.1.6 Elasticity and the pricing decision

In practice, organisations will have only a rough idea of the shape of their demand curve: there will only be a limited amount of data about quantities sold at certain prices over a period of time *and,* of course, factors other than price might affect demand. Because any conclusions drawn from such data can only give an indication of likely future behaviour, management skill and expertise are also needed. Despite this limitation, an **awareness of the concept of elasticity can assist management with pricing decisions**.

(a) (i) In circumstances of **inelastic demand**, **prices should be increased** because revenues will increase and total costs will reduce (because quantities sold will reduce).

(ii) In circumstances of **elastic demand**, increases in prices will bring decreases in revenue and decreases in price will bring increases in revenue. Management therefore have to **decide** whether the **increase/decrease in costs will be less than/greater than the increases/decreases in revenue**.

(b) In situations of **very elastic demand**, overpricing can lead to a massive drop in quantity sold and hence a massive drop in profits whereas underpricing can lead to costly stock outs and, again, a significant drop in profits. **Elasticity must therefore be reduced by creating a customer preference which is unrelated to price** (through advertising and promotional activities).

(c) In situations of **very inelastic demand**, customers are **not sensitive to price**. **Quality, service, product mix and location** are therefore **more important** to a firm's pricing strategy.

Question — Elasticity

Read the four statements below. Where the statement is expressed in layman's terms, rephrase it using the appropriate variant of the term *elasticity.* Where it is already phrased in terms of elasticity, translate it into layman's terms.

(a) We doubled sales of product A by dropping the price from $1.99 to $1.75.
(b) Price elasticity of product B is low.
(c) Demand for product C is highly inelastic.
(d) A large reduction in price will be necessary to stimulate further demand for product D.

Answer

Situation (a) is an example of elastic demand; (b) is a case of *inelasticity* and should be appropriately worded; (c) is the same as (b); (d) is also an example of inelasticity.

2.2 Variables which influence demand

Here are some **variables which determine both the degree of elasticity and the volume of demand for a good in the market as a whole.**

Variable	Detail
Price of other goods	For some goods the market demand is connected to the price of other goods Such goods are of two types. (a) Substitutes, so that an increase in demand for one version of a good is likely to cause a decrease in demand for others. Common examples are rival brands of the same commodity (like Coca-Cola and Pepsi-Cola), bus journeys versus car journeys, or different forms of entertainment. (b) Complements, so that an increase in demand for one is likely to cause an increase in demand for the other. Examples are cups and saucers, cars and components, audits and tax consultancy.

Variable	Detail
Income	A rise in income gives households more to spend and they will want to buy more goods. However this phenomenon does not affect all goods in the same way. (a) Normal goods are those for which a rise in income increases the demand. (b) Inferior goods are those for which demand falls as income rises, such as cheap wine. (c) For some goods demand rises up to a certain point and then remains unchanged, because there is a limit to what consumers can or want to consume. Examples are basic foodstuffs such as salt and bread.
Tastes or fashion	A change in tastes or fashion will alter the demand for a good, or a particular variety of a good. Changes in taste may stem from psychological, social or economic causes. There is an argument that tastes and fashions are created by the producers of products and services. There is undeniably some truth in this, but the modern focus on responding to customers' needs and wants suggests otherwise.
Expectations	If consumers have expectations that prices will rise or that shortages will occur they will attempt to stock up on the product, thereby creating excess demand in the short term.
Obsolescence	Many products and services have to be replaced periodically because of obsolescence. (a) In early 2011 there will be substantial demand for audits for the year ended 31 December 2010. Demand will dry up once the statutory time limit for filing audited accounts is passed. In other words many services need to be bought repeatedly for reasons beyond the control of the consumer. A haircut is another example. (b) Physical goods are literally 'consumed'. Carpets become threadbare, glasses get broken, foodstuffs get eaten, children grow out of clothes. (c) Technological developments render some goods obsolete. Manual office equipment has been replaced by electronic equipment, because it does a better job, more quickly, quietly, efficiently and effectively.

2.3 Demand and the individual firm

We have looked at demand in the market as a whole. We also need to consider **factors that influence demand for one organisation's goods rather than another's.**

2.3.1 Product life cycle

FAST FORWARD

Most products pass through the five stages of the **product life cycle.**

To some extent this is an aspect of general demand and obsolescence: if you like we are talking about **built-in obsolescence** although this a rather cynical point of view. That aside, we can say that most products pass through the phases described in Chapter 2c.

Different versions of the same product may have **different life cycles**, and consumers are often aware of this. For example, the prospective buyer of a new car is more likely to purchase a recently introduced Ford than a Vauxhall that has been on the market for several years, even if there is nothing to choose in terms of quality and price.

2.3.2 Quality

One firm's product may be perceived to be better quality than another's, and may in some cases actually be so, if it uses sturdier materials, goes faster or does whatever it is meant to do in a 'better' way. Other things being equal, the **better quality good** will be **more in demand** than other versions.

2.3.3 Marketing

You may be familiar with the 'four Ps' of the marketing mix, all of which influence demand for a firm's goods.

(a) **Price**

(b) **Product**

(c) **Place** refers to the place **where a good can be purchased**, or is likely to be purchased.

  (i) If potential buyers find that a particular version of a good is difficult to obtain, they will turn to substitutes.

  (ii) Some goods have no more than local appeal.

(d) **Promotion** refers to the various means by which firms draw attention to their products and services.

  (i) A good **brand name** is a strong and relatively permanent influence on demand.

  (ii) Demand can be stimulated by a variety of **promotional tools**, such as free gifts, money off, shop displays, direct mail and media advertising.

In recent years, emphasis has been placed, especially in marketing, on the **importance of non-profit factors** in demand. Thus the roles of product quality, promotion, personal selling and distribution and, in overall terms, brands, have grown. Whilst it can be relatively easy for a competitor to copy a price cut, at least in the short term, it is much **more difficult to copy a successful brand image based on a unique selling proposition.** Successful branding can even imply premium pricing.

2.4 Deriving the demand equation 6/11

FAST FORWARD

You need to be able to derive the **demand equation** $P = a - bQ$.

Exam formulae

When demand is linear the equation for the demand curve is:

$P = a - bQ$

where P = the price

Q = the quantity demanded

a = the price at which demand would be nil

$b = \dfrac{\text{change in price}}{\text{change in quantity}}$

The constant a is calculated as follows.

$$a = \$(\text{current price}) + \left(\frac{\text{Current quantity at current price}}{\text{Change in quantity when price is changed by } \$b} \times \$b \right)$$

Note that 'b' represents the gradient of the demand curve. Since the demand goes up when the price falls, and goes down when the price rises, the elasticity has a negative value, but it is usual to ignore the minus sign.

This looks rather complicated in words, but it is very easy once the numbers are substituted.

2.4.1 Example: Deriving the demand equation

The current price of a product is $12. At this price the company sells 60 items a month. One month the company decides to raise the price to $15, but only 45 items are sold at this price. Determine the demand equation.

Solution

Step 1 **Find the price at which demand would be nil**

Assuming demand is linear, each increase of $3 in the price would result in a fall in demand of 15 units. For demand to be nil, the price needs to rise from its current level by as many times as there are 15 units in 60 units (60/15 = 4) ie to $12 + (4 × $3) = $24.

Using the formula above, this can be shown as a = $12 + ((60/15) × $3)= $24

Step 2 **Calculate b**

$$b = \frac{\text{change in price}}{\text{change in quantity}} = \frac{\$15 - \$12}{60 - 45} = \frac{3}{15} = 0.2$$

The demand equation is therefore P = 24 – 0.2Q

Step 3 **Check your equation**

We can check this by finding Q when P is $12.

$12 = 24 - (0.2Q)$
$0.2Q = 24 - 12$
$0.2Q = 12$
$Q = \frac{12}{0.2} = 60$

An alternative approach is to find 'b' first, then substitute the known value for 'b' into the demand function.

Step 1 **Calculate b**

$$b = \frac{\text{change in price}}{\text{change in quantity}} = \frac{\$15 - \$12}{60 - 45} = \frac{3}{15} = 0.2$$

Step 2 **Substitute the known value for 'b' into the demand function to find 'a'**

$P = a - (0.2Q)$

$12 = a - (0.2 \times 60)$

$12 = a - 12$

$a = 24$

The demand equation is therefore P = 24 – 0.2Q

Step 3 **Check your equation**

We can check this by finding Q when P is $12.

$12 = 24 - (0.2Q)$
$0.2Q = 24 - 12$
$0.2Q = 12$
$Q = \frac{12}{0.2} = 60$

Question **Deriving the demand equation**

The current price of a product is $30 and the producers sell 100 items a week at this price. One week the price is dropped by $3 as a special offer and the producers sell 150 items. Find an expression for the demand curve.

Answer

a $= \$30 + (100/50 \times \$3)$ $= \$36$

b $= \dfrac{\$3}{150 - 100} = 0.06$

P $= 36 - 0.06Q$

Check

27 $= 36 - 0.06Q$

$0.06Q = 36 - 27$

Q $= \dfrac{9}{0.06} = 150$

2.5 The total cost function

FAST FORWARD

Cost behaviour can be **modelled** using equations.

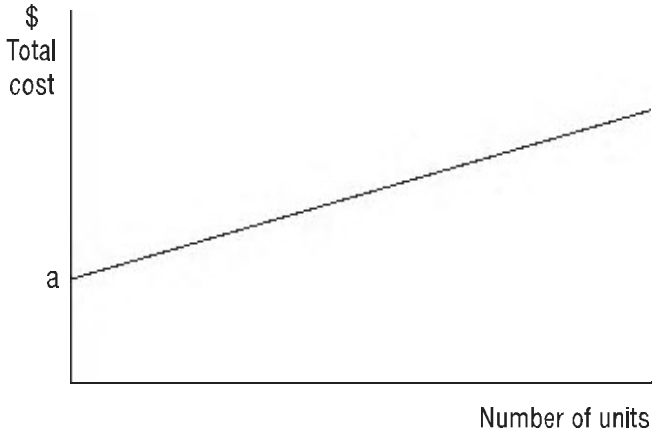
Determining the optimum price and output level requires that **cost and revenue behaviour** can be **modelled using equations**. These equations can range from simple to complex, although those you encounter in the exam will tend towards the 'simple' end of the range.

An organisation's total costs (TC) might be modelled by the equation TC = 6,500 + 0.75Q, where Q is the number of units sold.

Here the cost model is a simple linear equation of the form y = a + bx, where a ($6,500) represents the fixed costs and b ($0.75) represents the unit variable cost.

In your earlier studies, you will have covered how this equation can be derived using **linear regression analysis.** As you will remember, 'a' is the intercept of the line on the y axis and 'b' is the slope of the line.

The following graph demonstrates the total cost function.



There are a number of **problems** associated with using such models.

(a) The cost model assumes fixed costs remain unchanged over all ranges of output. (Think about the possibility of step costs, say.)

(b) The cost model assumes a constant unit variable cost over all ranges of output (Think about the implications of economies and diseconomies of scale.)

2.5.1 Volume based discounts

Key term

A **volume-based discount** is a discount given for buying in bulk.

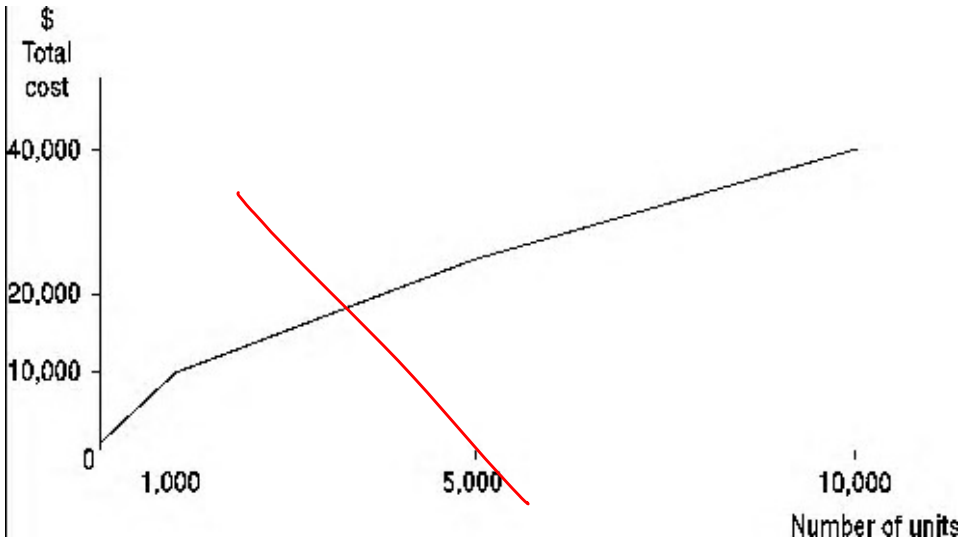
A volume-based discount will **reduce** the variable cost per unit. The value of b will therefore be lower the more units are purchased.

For example, the price of a unit of material used in production is $5 for the first 1,000 units, $4.50 for 1,001 to 5,000 units and $4 for 5,001 to 10,000 units.

If fixed costs remain at $1,000 up to 10,000 units of production and only material costs vary, there will be three cost equations to consider.

0 →	1,000 units:	y = 1,000 + 5x
1,001 →	5,000 units:	y = 1,000 + 4.5x
5,001 →	10,000 units:	y = 1,000 + 4x

This can be shown on a graph as:



Notice how the slope of the line becomes **less steep** as more units are made and the variable cost per unit **falls**.

3 Decisions to increase production and sales 12/07

FAST FORWARD

If you are required to evaluate a decision to increase production and sales levels, you will need to consider **incremental costs, incremental revenues** and other factors.

Key term

Incremental costs and revenues are the difference between costs and revenues for the corresponding items under each alternative being considered. *Drury*

The **incremental cost** of increasing production from 500 to 600 units per month is the additional cost of producing an extra 100 units each month. If fixed costs increase as a result of the decision, they are an incremental cost together with the increased variable costs of production.

3.1 Example: A decision to increase production

George manufactures a product which uses two types of material, A and B. Each unit of production currently sells for $10. A local trader has expressed an interest in buying 5,000 units but is only prepared to pay $9 per unit.

Current costs and revenues are as follows.

	$'000	$'000
Sales		350
Less production costs		
Material A – 1 kg per unit	25	
Material B – 1 litre per unit	50	
Labour – 1 hour per unit	75	
Variable overhead	50	
Fixed overhead	25	
Non-production costs	25	
Total cost		250
Budgeted profit		100

The following additional information has also been made available.

(a) There is minimal inventory of material available and prices for new material are expected to be 5% higher for Material A and 3% higher for Material B.

(b) George has been having problems with his workforce and is short of labour hours. He currently has the capacity to produce 36,000 units but would have to employ contract labour at $3.50 per hour to make any additional units.

(c) Included in the fixed production overhead is the salary of the production manager. He is stressed and exhausted and has threatened to leave unless he receives a pay rise of $5,000. George would not be able to fulfil any new orders without him.

Required

Evaluate whether George should accept the new order.

Solution

Workings

Current production = 350,000/10 = 35,000 units

$$\text{Current cost per unit of Material A} = \frac{\$25,000}{35,000} = \$0.71$$

$$\text{Current cost per unit of Material B} = \frac{\$50,000}{35,000} = \$1.43$$

$$\text{Current cost of labour} = \frac{\$75,000}{35,000} = \$2.14$$

	$	$
Incremental revenue (5,000 × $9)		45,000
Incremental costs		
Material A (1.05 × $0.71 × 5,000)	3,728	
Material B (1.03 × $1.43 × 5,000)	7,365	
Labour [(1,000 × $2.14) + (4,000 × $3.50)]	16,140	
Fixed overhead	5,000	
		32,233
Incremental profit		12,767

The new order would produce an additional $12,767 so is probably worthwhile but other factors may need to be considered. For example, the effect of a price cut on existing customer expectations and whether the workforce and production manager will be able to fulfil the new order with the same labour efficiency.

4 The profit-maximising price/output level

FAST FORWARD

Profits are maximised using marginalist theory when **marginal cost (MC) = marginal revenue (MR)**. The **optimal selling price** can be determined using equations (ie when MC = MR). The **optimum selling price** can also be determined using tabulation.

The overall objective of an organisation should be **profit maximisation**. In this section we look at how the profit-maximising price and output levels can be derived. Remember that, in microeconomic theory, profits are maximised when marginal revenue = marginal cost.

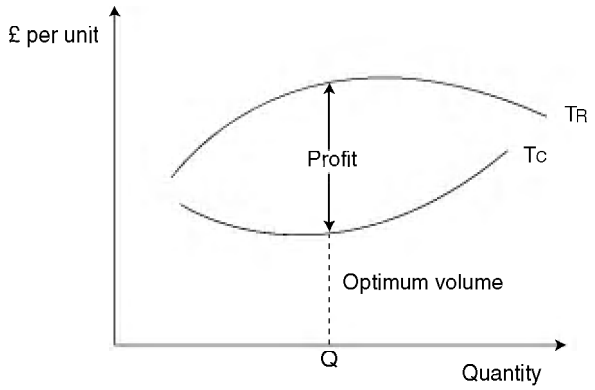
4.1 Microeconomic theory and profit maximisation

In economics, **profit maximisation** is the process by which a firm determines the price and output level that returns the greatest profit. There are two common approaches to this problem.

(a) The **Total revenue (TR) – Total cost (TC)** method is based on the fact that profit equals revenue minus cost.

(b) The **Marginal revenue (MR) – Marginal cost (MC)** method is based on the fact that total profit in a perfect market reaches its maximum point where marginal revenue equals marginal cost.

To obtain the profit maximising output quantity under the TR – TC method, we start by recognising that profit is equal to total revenue minus total cost.



From the graph above it is evident that the difference between **total costs** and **total revenue** is greatest at point Q. This is the profit maximising output quantity.

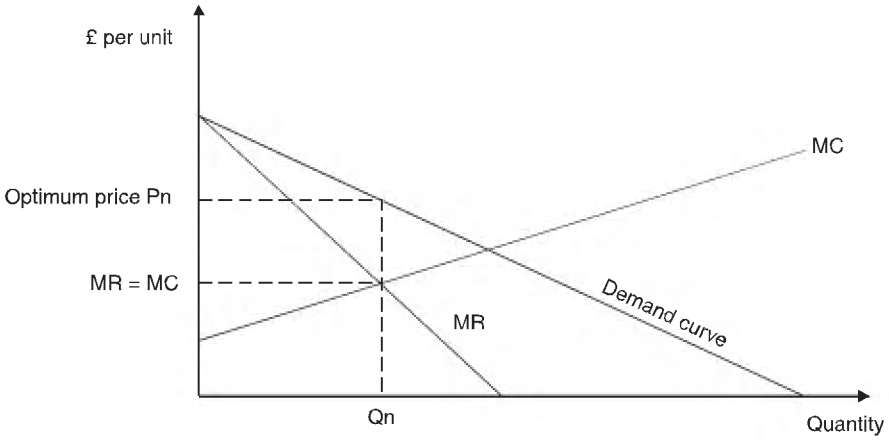
4.2 MC = MR 6/11

Microeconomic theory suggests that as output increases, the marginal cost per unit might rise (due to the law of diminishing returns) and whenever the firm is faced with a downward sloping demand curve, the **marginal revenue per unit will decline**.

Eventually, a level of output will be reached where the **extra cost** of making one extra unit of output is greater than the **extra revenue** obtained from its sale. It would then be unprofitable to make and sell that extra unit.

Profits will continue to be maximised only up to the output level where marginal cost has risen to be exactly equal to the marginal revenue.

Profits are maximised using marginalist theory when **marginal cost (MC) = marginal revenue (MR)**.



Profits are **maximised** at the point where **MC = MR**, ie at a volume of Qn units. If we add a demand curve to the graph, we can see that at an output level of Qn, the sales price per unit would be Pn.

It is important to make a clear distinction in your mind between the **sales price** and **marginal revenue**. In this example, the optimum price is Pn, but the marginal revenue is much less. This is because the 'additional' sales unit to reach output Qn has only been achieved by reducing the unit sales **price** from an amount higher than Pn for all the units to be sold, not just the marginal extra one. The increase in sales volume is therefore partly offset by a reduction in unit price; hence MR is lower than Pn.

Exam focus point

The examiner has noted that many candidates struggle to equate marginal cost and marginal revenue in order to calculate optimum price and quality.

4.3 Determining the profit-maximising selling price: using equations

The **optimal selling price** can be determined using equations (ie when **MC = MR**).

You could be **provided with equations for marginal cost and marginal revenue** and/or have to **devise them from information** in the question. By **equating the two equations** you can determine the optimal price. Remember, **marginal cost** is the **extra cost of producing one extra unit, marginal revenue** is the **extra revenue from producing one extra unit. Marginal revenue may not be the same as** the **price** charged for all units up to that demand level, as to increase volumes the price may have to be reduced.

Section 2.4 outlined the demand curve equation. The **marginal revenue equation** can be found by doubling the value of *b*. The **marginal cost** is the variable cost of production.

Exam formulae

$MR = a - 2bQ$

where P = the price
Q = the quantity demanded
a = the price at which demand would be nil
b = $\frac{\text{change in price}}{\text{change in quantity}}$

The constant 'a' is calculated as follows.

$$a = \$(\text{current price}) + \left(\frac{\text{Current quantity at current price}}{\text{Change in quantity when price is changed by \$b}} \times \$b \right)$$

The following step-by-step approach can be applied to most questions involving algebra and pricing.

Step 1 Establish the demand function (find the values for 'a' and 'b')

Step 2 Establish MC (the marginal cost). This will simply be the variable cost per unit

Step 3 State MR, assuming MR = a – 2bQ

Step 4 To maximise profit, equate MC and MR to find Q

Step 5 Substitute Q into the demand function and solve to find P (the optimum price)

You will need to be able to solve simple examples like those that follow.

4.3.1 Example: MC = MR

MOC makes and sells a copyrighted, executive game for two distinct markets, in which it has a monopoly. The fixed costs of production per month are $20,000 and variable costs per unit produced, and sold, are $40. (The monthly sales can be thought of as X, where $X = X_1 + X_2$, with X_1 and X_2 denoting monthly sales in their respective markets.) Detailed market research has revealed the demand functions in the markets to be as follows, with prices shown as P_1, P_2.

Market 1: $P_1 = 55 – 0.05X_1$
Market 2: $P_2 = 200 – 0.2X_2$

(Note. These formulae are simply **linear equations**. They show how the price (P) can be determined for a given level of demand (X). So in market 1, at a level of demand of 100, the price (P) will be $55 – (0.05 \times 100) = 50$.)

From these, the management accountant has derived that the marginal revenue functions in the two markets are as follows.

Market 1: $MR_1 = 55 – 0.1X_1$
Market 2: $MR_2 = 200 – 0.4X_2$

(Note. In market 1, the marginal revenue if 100 units are sold is $55 – (0.1 \times 100) = 45$.)

The management accountant believes there should be price discrimination; the price is currently $50 per game in either market.

Required

Analyse the information for the executive game and, given the management accountant's belief, do the following.

(a) Calculate the price to charge in each market, and the quantity to produce (and sell) each month, to maximise profit.

(b) Determine the revenue function for each market and the maximum monthly profit in total.

(c) Calculate and comment on the change in total profitability and prices.

Solution

(a) In both markets, **marginal cost = variable cost per unit** = $40

Profit is maximised when **marginal revenue = marginal cost**.

Market 1

$55 – 0.1X_1 = 40$
$0.1X_1 = 15$
$X_1 = 15/0.1 = 150$

and price $P_1 = 55 – (0.05 \times 150) = \$47.5$.

Hence the price in market 1 should be $47.50 per unit and 150 units should be produced.

Market 2

$200 – 0.4X_2 = 40$
$0.4X_2 = 160$
$X_2 = 160/0.4 = 400$

and price $P_2 = 200 – (0.2 \times 400) = \$120$.

Hence the price in market 2 should be \$120 per unit and 400 units should be produced.

Total number of items to be produced per month is 550.

(b) **Revenue = unit price × number of units sold**

Market 1

Revenue = $P_1X_1 = 55X_1 - 0.05X_1^2$

Market 2

Revenue = $P_2X_2 = 200X_2 - 0.2X_2^2$

From (a), profit is maximised when

$X_1 = 150$ and $X_2 = 400$

$P_1 = 47.5$ and $P_2 = 120$

At maximum profit:

Total revenue = (47.5 × 150) + (120 × 400) = \$55,125

Total costs = 20,000 + (40 × 550) = \$42,000

Total maximum monthly profit = \$13,125

(c) Currently the price is \$50 in both markets.

Market 1
$50 = 55 - 0.05X_1$
$0.05X_1 = 55 - 50 = 5$
$X_1 = 5/0.05 = 100$

Market 2
$50 = 200 - 0.2X_2$
$0.2X_2 = 200 - 50 = 150$
$X_2 = 150/0.2 = 750$

Therefore the **total number of units** = 100 + 750 = 850.

Total revenue = \$50 × 850 = \$42,500.

Total cost = 20,000 + (40 × 850) = \$54,000.

So the game **currently makes a loss** of \$11,500.

Hence, if the prices are changed to \$47.50 in market 1 and \$120 in market 2, the company can expect to turn a monthly loss of \$11,500 into a profit of \$13,125.

You will be provided with equations representing MC and MR if they are needed. Note, however, that if a question states that the extra cost of producing one extra item is \$20, say, you will be expected to realise that the MC is \$20. Likewise, if you are told that **100 units are sold for \$10 each**, but **101 can only be sold for \$9.99**, the **MR of the 101st item is (101 × \$9.99) – (100 × \$10) = \$8.99**.

Question

Deriving a MR equation from the demand curve

AB has used market research to determine that if a price of \$250 is charged for product G, demand will be 12,000 units. It has also been established that demand will rise or fall by 5 units for every \$1 fall/rise in the selling price. The marginal cost of product G is \$80.

Required

If marginal revenue = a –2bQ when the selling price (P) = a – bQ, calculate the profit-maximising selling price for product G.

Answer

$$b = \frac{\text{change in price}}{\text{change in quantity}} = \frac{\$1}{5} = 0.2$$

$a = \$250 + ((12{,}000/5) \times \$1) = \$2{,}650$

$MR = 2{,}650 - (2 \times 0.2)Q \quad = 2{,}650 - 0.4Q$

Profits are maximised when MC = MR, ie when $80 = 2{,}650 - 0.4Q$

$$2{,}650 - 80 = 2{,}570 \times \frac{10}{4} = 6{,}425$$

Profit-maximising demand = 6,425

Now, substitute the values into the demand curve equation to find the profit-maximising selling price

$P = a - bQ$

$P = 2{,}650 - (0.2 \times 6{,}425)$

$\therefore$ Profit-maximising price = $\$(2{,}650 - 1{,}285)$

= $1,365

4.4 Determining the profit-maximising selling price: visual inspection of a tabulation of data

The **optimum selling price** can also be determined using tabulation.

To determine the profit-maximising selling price:

(a) Work out the **demand curve** and hence the **price** and the **total revenue** (PQ) at various levels of demand.

(b) Calculate **total cost** and hence **marginal cost** at each level of demand.

(c) Finally calculate **profit** at each level of demand, thereby determining the price and level of demand at which profits are maximised.

Question

Tabulation approach to find profit-maximising price

An organisation operates in a market where there is imperfect competition, so that to sell more units of output, it must reduce the sales price of all the units it sells. The following data is available for prices and costs.

Total output	*Sales price per unit (AR)*	*Average cost of output (AC)*
Units	$	$ per unit
0	–	–
1	504	720
2	471	402
3	439	288
4	407	231
5	377	201
6	346	189
7	317	182
8	288	180
9	259	186
10	232	198

The total cost of zero output is $600.

Required

Complete the table below to determine the output level and price at which the organisation would maximise its profits, assuming that fractions of units cannot be made.

Units	*Price* $	*Total revenue* $	*Marginal revenue* $	*Total cost* $	*Marginal cost* $	*Profit* $
0						
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						

Answer

The correct answer is that profit is maximised at seven units of output and a price of $317, when MR is most nearly equal to MC.

Units	*Price* $	*Total revenue* $	*Marginal revenue* $	*Total cost* $	*Marginal cost* $	*Profit* $
0	0	0	0	600	-	(600)
1	504	504	504	720	120	(216)
2	471	942	438	804	84	138
3	439	1,317	375	864	60	453
4	407	1,628	311	924	60	704
5	377	1,885	257	1,005	81	880
6	346	2,076	191	1,134	129	942
7	317	2,219	143	1,274	140	945
8	288	2,304	85	1,440	166	864
9	259	2,331	27	1,674	234	657
10	232	2,320	(11)	1,980	306	340

5 Price strategies 6/10

FAST FORWARD

The price to be charged for a product or service is often one of the most important decisions made by managers. There are a number of alternative pricing strategies.

5.1 Cost-plus pricing

FAST FORWARD

Full cost-plus pricing is a method of determining the sales price by calculating the full cost of the product and adding a percentage mark-up for profit.

In practice cost is one of the most important influences on price. Many firms base price on simple **cost-plus rules** (costs are estimated and then a profit margin is added in order to set the price).

The 'full cost' may be a fully absorbed production cost only, or it may include some absorbed administration, selling and distribution overhead.

A business might have an idea of the percentage profit margin it would like to earn, and so might **decide on an average profit mark-up** as a general guideline for pricing decisions.

Businesses that carry out a large amount of **contract work or jobbing work**, for which individual job or contract prices must be quoted regularly would find this a useful method to adopt. The percentage profit **mark-up**, however, **does not have to be rigid and fixed**, but can be varied to suit different circumstances.

5.1.1 Example: Full cost-plus pricing

Markup has begun to produce a new product, Product X, for which the following cost estimates have been made.

	$
Direct materials	27
Direct labour: 4 hrs at $5 per hour	20
Variable production overheads: machining, ½ hr at $6 per hour	3
	50

Production fixed overheads are budgeted at $300,000 per month and because of the shortage of available machining capacity, the company will be restricted to 10,000 hours of machine time per month. The absorption rate will be a direct labour rate, however, and budgeted direct labour hours are 25,000 per month. It is estimated that the company could obtain a minimum contribution of $10 per machine hour on producing items other than product X.

The direct cost estimates are not certain as to material usage rates and direct labour productivity, and it is recognised that the estimates of direct materials and direct labour costs may be subject to an error of ± 15%. Machine time estimates are similarly subject to an error of ± 10%.

The company wishes to make a profit of 20% on full production cost from product X.

Required

Ascertain the full cost-plus based price.

Solution

Even for a relatively 'simple' cost-plus pricing estimate, some problems can arise, and certain assumptions must be made and stated. In this example, we can identify two problems.

- Should the opportunity cost of machine time be included in cost or not?
- What allowance, if any, should be made for the possible errors in cost estimates?

Different assumptions could be made.

(a) **Exclude machine time opportunity costs: ignore possible costing errors**

	$
Direct materials	27.00
Direct labour (4 hours)	20.00
Variable production overheads	3.00
Fixed production overheads (at $\frac{\$300,000}{25,000}$ = $12 per direct labour hour)	48.00
Full production cost	98.00
Profit mark-up (20%)	19.60
Selling price per unit of product X	117.60

(b) **Include machine time opportunity costs: ignore possible costing errors**

	$
Full production cost as in (a)	98.00
Opportunity cost of machine time: contribution forgone (½ hr × $10)	5.00
Adjusted full cost	103.00
Profit mark-up (20%)	20.60
Selling price per unit of product X	123.60

(c) **Exclude machine time opportunity costs but make full allowance for possible under-estimates of cost**

	$	$
Direct materials	27.00	
Direct labour	20.00	
	47.00	
Possible error (15%)	7.05	
		54.05
Variable production overheads	3.00	
Possible error (10%)	0.30	
		3.30
Fixed production overheads (4 hrs × $12)	48.00	
Possible error (labour time) (15%)	7.20	
		55.20
Potential full production cost		112.55
Profit mark-up (20%)		22.51
Selling price per unit of product X		135.06

(d) **Include machine time opportunity costs and make a full allowance for possible under-estimates of cost**

	$
Potential full production cost as in (c)	112.55
Opportunity cost of machine time:	
Potential contribution forgone (½ hr × $10 × 110%)	5.50
Adjusted potential full cost	118.05
Profit mark-up (20%)	23.61
Selling price per unit of product X	141.66

Using different assumptions, we could arrive at any of four different unit prices in the range $117.60 to $141.66.

beta under capm

5.1.2 Disadvantages of full cost-plus pricing

JIT demand pulled vs supply pushed

(a) It fails to recognise that since demand may be determining price, there will be a profit-maximising combination of price and demand.

(b) There may be a need to **adjust prices to market and demand conditions**.

(c) **Budgeted output volume** needs to be established. Output volume is a key factor in the overhead absorption rate.

(d) A **suitable basis for overhead absorption** must be selected, especially where a business produces more than one product.

FC/unit no known before ye

5.1.3 Advantages of full cost-plus pricing

(a) It is a **quick, simple and cheap** method of pricing which can be delegated to junior managers.

(b) Since the size of the profit margin can be varied, a decision based on a price in excess of full cost should ensure that a company working at normal capacity will **cover all of its fixed costs and make a profit.**

Question — **Full cost-plus method**

A company budgets to make 20,000 units which have a variable cost of production of $4 per unit. Fixed production costs are $60,000 per annum. If the selling price is to be 40% higher than full cost, what is the selling price of the product using the full cost-plus method?

Answer

Full cost per unit = variable cost + fixed cost

Variable cost = $4 per unit

Fixed cost = $\frac{\$60{,}000}{20{,}000}$ = $3 per unit

Full cost per unit = $(4 + 3) = $7

∴ Selling price using full cost-plus pricing method = $\$7.00 \times \frac{140\%}{100}$

= $9.80

5.2 Marginal cost-plus pricing

5.2.1 Introduction

FAST FORWARD

Marginal cost-plus pricing/mark-up pricing involves adding a profit margin to the marginal cost of production/sales.

Whereas a full cost-plus approach to pricing draws attention to net profit and the net profit margin, a variable cost-plus approach to pricing **draws attention to gross profit** and the **gross profit margin**, or **contribution**.

Question — Profit margin

A product has the following costs.

	$
Direct materials	5
Direct labour	3
Variable overheads	7

Fixed overheads are $10,000 per month. Budgeted sales per month are 400 units to allow the product to break even.

Required

Determine the profit margin which needs to be added to *marginal* cost to allow the product to break even.

Answer

Breakeven point is when total contribution equals fixed costs.

At breakeven point, $10,000 = 400 (price – $15)

∴ $25 = price – $15
∴ $40 = price
∴ Profit margin = (40 – 15) / 15 × 100% = 166%

5.2.2 Advantages of marginal cost-plus pricing

(a) It is a **simple and easy** method to use.

(b) The **mark-up percentage can be varied**, and so mark-up pricing can be adjusted to reflect demand conditions.

(c) It **draws management attention to contribution**, and the effects of higher or lower sales volumes on profit. For example, if a product costs $10 per unit and a mark-up of 150% ($15) is added to reach a price of $25 per unit, management should be clearly aware that every additional $1 of sales revenue would add 60 cents to contribution and profit ($15 ÷ $25 = $0.60).

(d) In practice, mark-up pricing is **used** in businesses **where there is a readily-identifiable basic variable cost**. Retail industries are the most obvious example, and it is quite common for the prices of goods in shops to be fixed by adding a mark-up (20% or 33.3%, say) to the purchase cost.

5.2.3 Disadvantages of marginal cost-plus pricing

(a) Although the size of the mark-up can be varied in accordance with demand conditions, it does not ensure that sufficient attention is paid to demand conditions, competitors' prices and profit maximisation.

(b) It **ignores fixed overheads** in the pricing decision, but the sales price must be sufficiently high to ensure that a profit is made after covering fixed costs.

5.3 Full cost pricing versus marginal cost pricing

Perhaps the most important **criticism** of full cost pricing is that it **fails to recognise** that since sales demand may be determined by the sales price, there will be a **profit-maximising combination** of price and demand. A full cost based approach to pricing will be most unlikely, except by coincidence or 'luck', to arrive at the profit-maximising price. In contrast, a marginal costing approach to looking at costs and prices would be more likely to help with identifying a profit-maximising price.

5.3.1 Example: Full cost versus profit-maximising prices

Tigger has budgeted to make 50,000 units of its product, timm. The variable cost of a timm is $5 and annual fixed costs are expected to be $150,000.

The financial director of Tigger has suggested that a profit margin of 25% on full cost should be charged for every product sold.

The marketing director has challenged the wisdom of this suggestion, and has produced the following estimates of sales demand for timms.

Price per unit	*Demand*
$	Units
9	42,000
10	38,000
11	35,000
12	32,000
13	27,000

Required

(a) Calculate the profit for the year if a full cost price is charged.
(b) Calculate the profit-maximising price.

Assume in both (a) and (b) that 50,000 units of timm are produced regardless of sales volume.

Solution

(a) (i) The full cost per unit is $5 variable cost plus $3 fixed costs, ie $8 in total. A 25% mark-up on this cost gives a selling price of $10 per unit so that sales demand would be 38,000 units. (Production is given as 50,000 units.)

	$	$
Profit (absorption costing)		
Sales		380,000
Costs of production (50,000 units)		
Variable (50,000 × $5)	250,000	
Fixed (50,000 × $3)	150,000	
	400,000	
Less increase in inventory (12,000 units × 8)	(96,000)	
Cost of sales		304,000
Profit		76,000

(ii) **Profit using marginal costing** instead of absorption costing, so that fixed overhead costs are written off in the period they occur, would be as follows. (The 38,000 unit demand level is chosen for comparison.)

	$
Contribution (38,000 × $(10 – 5))	190,000
Fixed costs	150,000
Profit	40,000

Since the company cannot go on indefinitely producing an output volume in excess of sales volume, this profit figure is more indicative of the profitability of timms in the longer term.

(b) A **profit-maximising price** is one which gives the greatest net (relevant) cash flow, which in this case is the **contribution-maximising price**.

Price	*Unit contribution*	*Demand*	
$	$	Units	$
9	4	42,000	168,000
10	5	38,000	190,000
11	6	35,000	210,000
12	7	32,000	224,000
13	8	27,000	216,000

The profit maximising price is $12, with annual sales demand of 32,000 units.

This example shows that a **cost based price** is **unlikely to be the profit-maximising** price, and that a **marginal costing approach**, calculating the total contribution at a variety of different selling prices, will be **more helpful** for establishing what the profit-maximising price ought to be.

5.3.2 Cost plus pricing versus target costing

As you should remember from Chapter 2b, **target prices** are set in order to achieve a desired market share. Deduction of a desired profit margin produces the cost that has to be achieved. Design specifications and production methods are examined to establish ways in which the target cost can be met without reducing the value of the product to the customer.

Such an approach is likely to **offer greater competitive advantage** than cost plus pricing, being far more **strategically orientated** as it **takes account of the external environment**.

5.4 Market skimming pricing 6/11

FAST FORWARD

New product pricing strategies include **market skimming** and **market penetration pricing.**

Key term

Price skimming involves charging high prices when a product is first launched in order to maximise short-term profitability. Initially there is heavy spending on advertising and sales promotion to obtain sales. As the product moves into the later stages of its life cycle (growth, maturity and decline) progressively lower prices are charged. The profitable 'cream' is thus skimmed off in stages until sales can only be sustained at lower prices.

The aim of market skimming is to gain **high unit profits** early in the product's life. High unit prices make it more likely that **competitors** will enter the market than if lower prices were to be charged.

Such a policy may be appropriate in the cases below.

(a) The product is **new and different**, so that customers are prepared to pay high prices so as to be one up on other people who do not own it.

(b) The strength of **demand** and the sensitivity of demand to price are **unknown**. It is better from the point of view of marketing to start by charging high prices and then reduce them if the demand for the product turns out to be price elastic than to start by charging low prices and then attempt to raise them substantially if demand appears to be insensitive to higher prices.

(c) High prices in the early stages of a product's life might generate **high initial cash flows**. A firm with liquidity problems may prefer market-skimming for this reason.

(d) The firm can identify **different market segments** for the product, each prepared to pay progressively lower prices. It may therefore be possible to continue to sell at higher prices to some market segments when lower prices are charged in others. This is discussed further below.

(e) Products may have a **short life cycle**, and so need to recover their development costs and make a profit relatively quickly.

Products to which the policy has been applied include:

- Calculators
- Video recorders
- Desktop computers

5.5 Market penetration pricing 6/11

Key term

Penetration pricing is a policy of low prices when a product is first launched in order to obtain sufficient penetration into the market.

A penetration policy may be appropriate in the cases below.

(a) The firm wishes to **discourage new entrants** into the market.

(b) The firm wishes to **shorten the initial period** of the product's life cycle in order to enter the growth and maturity stages as quickly as possible.

(c) There are significant **economies of scale** to be achieved from a high volume of output.

(d) Demand is **highly elastic** and so would respond well to low prices.

Penetration prices are prices which aim to secure a substantial share in a substantial total market. A firm might therefore deliberately build **excess production capacity** and set its prices very low. As demand builds up the spare capacity will be used up gradually and unit costs will fall; the firm might even reduce prices further as unit costs fall. In this way, early losses will enable the firm to dominate the market and have the lowest costs.

5.6 Complementary product pricing

Key term

Complementary products are goods that tend to be bought and used together.

Complementary products are sold separately but are **connected** and dependent on each other for sales, for example, an electric toothbrush and replacement toothbrush heads. The electric toothbrush may be priced competitively to attract demand but the replacement heads can be relatively expensive.

A **loss leader** is when a company sets a very low price for one product intending to make consumers buy other products in the range which carry higher profit margins. Another example is selling razors at very low prices whilst selling the blades for them at a higher profit margin. People will buy many of the high profit items but only one of the low profit items – yet they are 'locked in' to the former by the latter. This can also be described as **captive product pricing**.

5.7 Product-line pricing

Key term

A **product line** is a group of products that are related to one another.

A **product line** is the marketing strategy of offering for sale several related products. A line can comprise related products of various sizes, types, colours, qualities, or prices. Demand for and costs of the products are likely to be **interrelated**.

There is a range of product line pricing strategies.

(a) Set prices proportional to full or marginal cost with the same percentage profit margin for all products. This means that prices are dependent on cost and ignore demand.

(b) Set prices reflecting the demand relationships between the products so that an overall required rate of return is achieved.

5.8 Volume discounting

Key term

A **volume discount** is a reduction in price given for larger than average purchases.

The aim of a volume discount is to increase sales from large customers. The discount acts as a form of **differentiation** between types of customer (wholesale, retail and so on).

The reduced costs of a large order will hopefully compensate for the loss of revenue from offering the discount.

5.9 Price discrimination

FAST FORWARD

The use of **price discrimination** means that the same product can be sold at different prices to different customers. This can be very difficult to implement in practice because it relies for success upon the continued existence of certain market conditions.

In certain circumstances the **same product** can be sold at different prices to **different customers**.

Key term

Price discrimination is the practice of charging different prices for the same product to different groups of buyers when these prices are not reflective of cost differences.

There are a number of bases on which such discriminating prices can be set.

(a) **By market segment.** A cross-channel ferry company would market its services at different prices in England and France, for example. Services such as cinemas and hairdressers are often available at lower prices to old age pensioners and/or juveniles.

(b) **By product version**. Many car models have 'add on' extras which enable one brand to appeal to a wider cross-section of customers. The final price need not reflect the cost price of the add on extras directly: usually the top of the range model would carry a price much in excess of the cost of provision of the extras, as a prestige appeal.

(c) **By place**. Theatre seats are usually sold according to their location so that patrons pay different prices for the same performance according to the seat type they occupy.

(d) **By time**. This is perhaps the most popular type of price discrimination. Off-peak travel bargains, hotel prices and telephone charges are all attempts to increase sales revenue by covering variable but not necessarily average cost of provision. Railway companies are successful price discriminators, charging more to rush hour rail commuters whose demand is inelastic at certain times of the day.

Price discrimination can only be effective if a number of **conditions** hold.

(a) The market must be **segmentable** in price terms, and different sectors must show different intensities of demand. Each of the sectors must be identifiable, distinct and separate from the others, and be accessible to the firm's marketing communications.

(b) There must be little or **no** chance of a **black market** developing (this would allow those in the lower priced segment to resell to those in the higher priced segment).

(c) There must be little or **no** chance that **competitors** can and will undercut the firm's prices in the higher priced (and/or most profitable) market segments.

(d) The cost of segmenting and **administering** the arrangements should not exceed the extra revenue derived from the price discrimination strategy.

Try the following question which, although it has a few 'tricks', **looks more daunting than it is** if you keep your head and take care.

Question — Differential pricing

Curltown Cinemas operates a chain of 30 cinemas. Standard admission price is $7 per person, but this is subject to certain discounts. Average attendance at a cinema per month on normal price days is 5,000 people, but this is expected to be subject to seasonal variation, as follows.

Month	J	F	M	A	M	J	J	A	S	O	N	D
%	+10	–2	0	+5	–5	–5	+10	+7	–4	–4	0	+12

In December, January, July and August audiences are made up of 60% under-14s, who pay half-price admission. For the rest of the year under 14s represent only 10% of the audience. One day per month all tickets are sold at a special offer price of $1, irrespective of the age of the customer. This invariably guarantees a full house of 200 customers.

Required

(a) What is Curltown Cinemas' total revenue from cinema admissions for a year?

(b) If Curltown puts up prices for over-14s (other than the $1 special offer price) to $8 what will its total revenue from cinema admissions be for the year?

(c) Should the special offer be continued?

Answer

(a) This is simply a matter of reading the question carefully and patiently tabulating the data using a **different layout** to the one given in the question. Note that you save yourself potential error if you convert percentages into decimals as you transfer the question information into your own table. Don't forget that there are 30 cinemas.

Month	*Variation*	*Average no*	*Adjusted no*	*Full price*	*Revenue @ $7.00*	*Half price*	*Revenue @ $3.50*
					$		$
Jan	+0.10	5,000	5,500	0.4	15,400.00	0.6	11,550.00
Feb	-0.02	5,000	4,900	0.9	30,870.00	0.1	1,715.00
Mar	+0.00	5,000	5,000	0.9	31,500.00	0.1	1,750.00
Apr	+0.05	5,000	5,250	0.9	33,075.00	0.1	1,837.50
May	-0.05	5,000	4,750	0.9	29,925.00	0.1	1,662.50
Jun	-0.05	5,000	4,750	0.9	29,925.00	0.1	1,662.50
Jul	+0.10	5,000	5,500	0.4	15,400.00	0.6	11,550.00
Aug	+0.07	5,000	5,350	0.4	14,980.00	0.6	11,235.00
Sept	-0.04	5,000	4,800	0.9	30,240.00	0.1	1,680.00
Oct	-0.04	5,000	4,800	0.9	30,240.00	0.1	1,680.00
Nov	0.00	5,000	5,000	0.9	31,500.00	0.1	1,750.00
Dec	+0.12	5,000	5,600	0.4	15,680.00	0.6	11,760.00
					308,735.00		59,832.50

	$
Total normal price ($308,735.00 + $59,832.50)	368,567.50
Special offer (12 × $1 × 200)	2,400.00
Total per cinema	370,967.50
Total per 30 cinemas	11,129,025.00

(b) **There is no need to work out all the numbers again at the new prices.**

	$
Total as calculated above	11,129,025.00
Less: current adult normal price ($308,735 × 30)	(9,262,050.00)
Add: revised adult normal price ($308,735 × 30 × 8/7)	10,585,200.00
	12,452,175.00

(c) If the income of $200 per cinema on the twelve special offer days is compared with an average of, say, $368,567.50/(365 – 12 days) = over $1,000, then it is clearly not worthwhile. The cinemas get average attendances of (5000 × 12)/365 = about 164 people in any case, even without special offers. (You could do **rough calculations** to estimate the overall loss of revenue per annum. Try it, making any **assumptions** you need, if you haven't done so, but not at the expense of written comments.)

However, the offer is a **loss-leader** which probably has other benefits. It will be liked by customers, and if the film they see is a good one they will recommend it to their friends. It may help to encourage the cinema-going habit amongst potential new regular customers. You may have thought of other relevant comments, either in favour of the policy or against it.

Exam focus point

An exam question on this topic would have less calculations and more interpretation so make sure you really think about the implications of continuing the special offer.