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Marginal and absorption costing

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1 Marginal cost and marginal costing	D4 (a)
2 The principles of marginal costing	D4 (a)
3 Marginal costing and absorption costing and the calculation of profit	D4 (b), (c)
4 Reconciling profits	D4 (d)
5 Marginal costing versus absorption costing	D4 (e)

Introduction

This chapter defines **marginal costing** and compares it with absorption costing. Whereas absorption costing recognises fixed costs (usually fixed production costs) as part of the cost of a unit of output and hence as product costs, marginal costing treats all fixed costs as period costs. Two such different costing methods obviously each have their supporters and so we will be looking at the arguments both in favour of and against each method. Each costing method, because of the different inventory valuation used, produces a different profit figure and we will be looking at this particular point in detail.

Study guide

		Intellectual level
D4	Marginal and absorption costing	
(a)	Explain the importance and apply the concept of contribution	1
(b)	Demonstrate and discuss the effect of absorption and marginal costing on inventory valuation and profit determination	2
(c)	Calculate profit or loss under absorption and marginal costing	2
(d)	Reconcile the profits or losses calculated under absorption and marginal costing	2
(e)	Describe the advantages and disadvantages of absorption and marginal costing	1

Exam guide

Look out for questions in your examination which require you to calculate profit or losses using absorption and marginal costing.

1 Marginal cost and marginal costing

1.1 Introduction

FAST FORWARD

Marginal cost is the variable cost of one unit of product or service.

Key term

Marginal costing is an alternative method of costing to absorption costing. In marginal costing, only variable costs are charged as a cost of sale and a contribution is calculated (sales revenue minus variable cost of sales). Closing inventories of work in progress or finished goods are valued at marginal (variable) production cost. Fixed costs are treated as a period cost, and are charged in full to the profit and loss account of the accounting period in which they are incurred.

The **marginal production cost** per unit of an item usually consists of the following.

- Direct materials
- Direct labour
- Variable production overheads

Direct labour costs might be excluded from marginal costs when the work force is a given number of employees on a fixed wage or salary. Even so, it is not uncommon for direct labour to be treated as a variable cost, even when employees are paid a basic wage for a fixed working week. If in doubt, you should treat direct labour as a variable cost unless given clear indications to the contrary. Direct labour is often a step cost, with sufficiently short steps to make labour costs act in a variable fashion.

The **marginal cost of sales** usually consists of the marginal cost of production adjusted for inventory movements plus the variable selling costs, which would include items such as sales commission, and possibly some variable distribution costs.

1.2 Contribution

FAST FORWARD

Contribution is an important measure in marginal costing, and it is calculated as the difference between sales value and marginal or variable cost of sales.

Contribution is of fundamental importance in marginal costing, and the term 'contribution' is really short for 'contribution towards covering fixed overheads and making a profit'.

2 The principles of marginal costing

The principles of marginal costing are as follows.

- (a) **Period fixed costs are the same, for any volume of sales and production** (provided that the level of activity is within the 'relevant range'). Therefore, by selling an extra item of product or service the following will happen.
 - Revenue will increase by the sales value of the item sold.
 - Costs will increase by the variable cost per unit.
 - Profit will increase by the amount of contribution earned from the extra item.
- (b) Similarly, if the volume of sales falls by one item, the profit will fall by the amount of contribution earned from the item.
- (c) **Profit measurement should therefore be based on an analysis of total contribution.** Since fixed costs relate to a period of time, and do not change with increases or decreases in sales volume, it is misleading to charge units of sale with a share of fixed costs. Absorption costing is therefore misleading, and it is more appropriate to deduct fixed costs from total contribution for the period to derive a profit figure.
- (d) When a unit of product is made, the extra costs incurred in its manufacture are the **variable production costs**. Fixed costs are unaffected, and no extra fixed costs are incurred when output is increased. It is therefore argued that **the valuation of closing inventories should be at variable production cost** (direct materials, direct labour, direct expenses (if any) and variable production overhead) because these are the only costs properly attributable to the product.

2.1 Example: Marginal costing principles

Rain Until September Co makes a product, the Splash, which has a variable production cost of \$6 per unit and a sales price of \$10 per unit. At the beginning of September 20X0, there were no opening inventories and production during the month was 20,000 units. Fixed costs for the month were \$45,000 (production, administration, sales and distribution). There were no variable marketing costs.

Required

Calculate the contribution and profit for September 20X0, using marginal costing principles, if sales were as follows.

- (a) 10,000 Splashes
- (b) 15,000 Splashes
- (c) 20,000 Splashes

Solution

The stages in the profit calculation are as follows.

- To **identify the variable cost of sales, and then the contribution.**
- Deduct fixed costs from the total contribution to derive the profit.
- Value all closing inventories at marginal production cost (\$6 per unit).

	10,000 Splashes		15,000 Splashes		20,000 Splashes	
	\$	\$	\$	\$	\$	\$
Sales (at \$10)		100,000		150,000		200,000
Opening inventory	0		0		0	
Variable production cost	<u>120,000</u>		<u>120,000</u>		<u>120,000</u>	
	120,000		120,000		120,000	
Less value of closing inventory (at marginal cost)	<u>60,000</u>		<u>30,000</u>		—	
Variable cost of sales		60,000		90,000		120,000
Contribution		<u>40,000</u>		<u>60,000</u>		<u>80,000</u>
Less fixed costs		<u>45,000</u>		<u>45,000</u>		<u>45,000</u>
Profit/(loss)		<u>(5,000)</u>		<u>15,000</u>		<u>35,000</u>
Profit (loss) per unit		\$(0.50)		\$1		\$1.75
Contribution per unit		\$4		\$4		\$4

The conclusions which may be drawn from this example are as follows.

- The **profit per unit varies** at differing levels of sales, because the average fixed overhead cost per unit changes with the volume of output and sales.
- The **contribution per unit is constant** at all levels of output and sales. Total contribution, which is the contribution per unit multiplied by the number of units sold, increases in direct proportion to the volume of sales.
- Since the **contribution per unit does not change**, the most effective way of calculating the expected profit at any level of output and sales would be as follows.
 - First calculate the total contribution.
 - Then deduct fixed costs as a period charge in order to find the profit.
- In our example the expected profit from the sale of 17,000 Splashes would be as follows.

	\$
Total contribution (17,000 × \$4)	68,000
Less fixed costs	<u>45,000</u>
Profit	<u>23,000</u>

- If total contribution **exceeds fixed costs**, a profit is made
- If total contribution **exactly equals fixed costs**, no profit or loss is made
- If total contribution is **less than fixed costs**, there will be a loss



Question

Marginal costing principles

Mill Stream makes two products, the Mill and the Stream. Information relating to each of these products for April 20X1 is as follows.

	Mill	Stream
Opening inventory	nil	nil
Production (units)	15,000	6,000
Sales (units)	10,000	5,000
Sales price per unit	\$20	\$30
Unit costs	\$	\$
Direct materials	8	14
Direct labour	4	2
Variable production overhead	2	1
Variable sales overhead	2	3

Fixed costs for the month	\$
Production costs	40,000
Administration costs	15,000
Sales and distribution costs	25,000

Required

- (a) Using marginal costing principles and the method in 2.1(d) above, calculate the profit in April 20X1.
 (b) Calculate the profit if sales had been 15,000 units of Mill and 6,000 units of Stream.

Answer

(a)	\$
Contribution from Mills (unit contribution = \$20 – \$16 = \$4 × 10,000)	40,000
Contribution from Streams (unit contribution = \$30 – \$20 = \$10 × 5,000)	50,000
Total contribution	90,000
Fixed costs for the period	80,000
Profit	<u>10,000</u>
(b) At a higher volume of sales, profit would be as follows.	\$
Contribution from sales of 15,000 Mills (× \$4)	60,000
Contribution from sales of 6,000 Streams (× \$10)	60,000
Total contribution	120,000
Less fixed costs	80,000
Profit	<u>40,000</u>

2.2 Profit or contribution information

The main advantage of **contribution information** (rather than profit information) is that it allows an easy calculation of profit if sales increase or decrease from a certain level. By comparing total contribution with fixed overheads, it is possible to determine whether profits or losses will be made at certain sales levels.

Profit information, on the other hand, does not lend itself to easy manipulation but note how easy it was to calculate profits using contribution information in the question entitled *Marginal costing principles*.

Contribution information is more useful for **decision making** than profit information, as we shall see when we go on to study decision making in Section F of this Study Text.

3 Marginal costing and absorption costing and the calculation of profit**3.1 Introduction****FAST FORWARD**

In **marginal costing**, fixed production costs are treated as **period costs** and are written off as they are incurred. In **absorption costing**, fixed production costs are absorbed into the cost of units and are carried forward in inventory to be charged against sales for the next period. Inventory values using absorption costing are therefore greater than those calculated using marginal costing.

Marginal costing as a cost accounting system is significantly different from absorption costing. It is an **alternative method** of accounting for costs and profit, which rejects the principles of absorbing fixed overheads into unit costs.

Marginal costing	Absorption costing
Closing inventories are valued at marginal production cost.	Closing inventories are valued at full production cost.
Fixed costs are period costs.	Fixed costs are absorbed into unit costs.
Cost of sales does not include a share of fixed overheads.	Cost of sales does include a share of fixed overheads (see note below).

Note. The share of fixed overheads included in cost of sales are from the previous period (in opening inventory values). Some of the fixed overheads from the current period will be excluded by being carried forward in closing inventory values.

In **marginal costing**, it is necessary to identify the following.

- Variable costs
- Contribution
- Fixed costs

In **absorption costing** (sometimes known as **full costing**), it is not necessary to distinguish variable costs from fixed costs.

3.2 Example: Marginal and absorption costing compared

Look back at the information contained in the question entitled: *Marginal costing principles*. Suppose that the budgeted production for April 20X1 was 15,000 units of Mill and 6,000 units of Stream, and production overhead is absorbed on the basis of budgeted direct labour costs.

Required

Calculate the profit if production was as budgeted, and sales were as follows.

- 10,000 units of Mill and 5,000 units of Stream
- 15,000 units of Mill and 6,000 units of Stream

Administration, sales and distribution costs should be charged as a period cost.

Solution

Budgeted production overhead is calculated as follows.

	\$
Fixed	40,000
Variable: Mills (15,000 × \$2)	30,000
Streams (6,000 × \$1)	<u>6,000</u>
Total	<u>76,000</u>

The **production overhead absorption rate** would be calculated as follows.

$$\frac{\text{Budgeted production overhead}}{\text{Budgeted direct labour cost}} = \frac{\$76,000}{(15,000 \times \$4) + (6,000 \times \$2)} \times 100\%$$

$$= 105.56\% \text{ of direct labour cost}$$

- (a) If sales are 10,000 units of Mill and 5,000 units of Stream, profit would be as follows.

	<i>Absorption costing</i>		<i>Total</i>
	<i>Mills</i>	<i>Streams</i>	
	\$	\$	\$
<i>Costs of production</i>			
Direct materials	120,000	84,000	204,000
Direct labour	60,000	12,000	72,000
Overhead (105.56% of labour)	63,333	12,667	76,000
	<u>243,333</u>	<u>108,667</u>	<u>352,000</u>
Less closing stocks (W1)	81,111	18,111	99,222
Production cost of sales	<u>162,222</u>	<u>90,556</u>	<u>252,778</u>
Administration costs			15,000
<i>Sales and distribution costs</i>			
Variable (W2)			35,000
Fixed			<u>25,000</u>
Total cost of sales			<u>327,778</u>
Sales	<u>200,000</u>	<u>150,000</u>	<u>350,000</u>
Profit			<u>22,222</u>

Note. There is no under-/over-absorption of overhead, since actual production is the same as budgeted production.

The profit derived using absorption costing techniques is different from the profit (\$10,000) using marginal costing techniques at this volume of sales (see earlier question).

- (b) If production and sales are exactly the same, (15,000 units of Mill and 6,000 units of Stream) profit would be \$40,000.

	\$
Sales (300,000 + 180,000)	480,000
Cost of sales (W3)	440,000
Profit	<u>40,000</u>

* No closing inventory if sales and production are equal.

Workings

1 Closing inventories

- (a) If 15,000 units of Mills are produced and only 10,000 units are sold, there will be closing inventories of 5,000 units (15,000 – 10,000).

Therefore, of the production costs of \$243,333, 5,000 units of the 15,000 units produced ($5,000/15,000 = 1/3$) will be carried forward in closing inventory ie $1/3 \times \$243,333 = \$81,111$.

- (b) Similarly, if 6,000 units of Streams are produced and only 5,000 units are sold there will be closing inventories of 1,000 units (6,000– 5,000).

Therefore, of the production cost of \$108,667, 1,000 units of the 6,000 units produced ($1,000/6,000 = 1/6$) will be carried forward in closing inventory ie $1/6 \times \$108,667 = \$18,111$.

2 Variable sales and distribution costs

Mills

Variable sales and distribution costs = \$2 (from Question entitled 'marginal costing principles')
 × 10,000 units
 = \$20,000

Streams

Variable sales and distribution costs = \$3 (from Question entitled 'marginal costing principles')
 × 5,000 units

= \$15,000

∴ Total sales and distribution costs = \$20,000 + \$15,000
= \$35,000

3 Cost of sales

	\$	\$
Costs of production (from part (a))		352,000
Administration costs (from Question entitled 'marginal costing principles')		15,000
Fixed sales and distribution costs (from Question entitled 'marginal costing principles')		25,000
<i>Variable sales overhead</i>		
Mills (15,000 × \$2)	30,000	
Streams (6,000 × \$3)	<u>18,000</u>	
		<u>48,000</u>
		<u>440,000</u>

This is the same as the profit calculated by marginal costing techniques in the earlier question.

We can draw a number of conclusions from this example.

- (a) Marginal costing and absorption costing are different techniques for assessing profit in a period.
- (b) If there are **changes in inventories during a period**, so that opening inventory or closing inventory values are different, **marginal costing and absorption costing give different results** for profit obtained.
- (c) **If the opening and closing inventory volumes and values are the same, marginal costing and absorption costing will give the same profit figure.** This is because the total cost of sales during the period would be the same, no matter how calculated.

3.3 The long-run effect on profit

In the long run, total profit for a company will be the same whether marginal costing or absorption costing is used. Different accounting conventions merely affect the profit of individual accounting periods.

3.4 Example: Comparison of total profits

To illustrate this point, let us suppose that a company makes and sells a single product. At the beginning of period 1, there are no opening inventories of the product, for which the variable production cost is \$4 and the sales price \$6 per unit. Fixed costs are \$2,000 per period, of which \$1,500 are fixed production costs.

	<i>Period 1</i>	<i>Period 2</i>
Sales	1,200 units	1,800 units
Production	1,500 units	1,500 units

Required

Determine the profit in each period using the following methods of costing.

- (a) Absorption costing. Assume normal output is 1,500 units per period.
- (b) Marginal costing.

Solution

- (a) **Absorption costing:** the absorption rate for fixed production overhead is

$$\frac{\$1,500}{1,500 \text{ units}} = \$1 \text{ per unit}$$

	Period 1		Period 2		Total	
	\$	\$	\$	\$	\$	\$
Sales		7,200		10,800		18,000
Production costs						
Variable	6,000		6,000		12,000	
Fixed	1,500		1,500		3,000	
	<u>7,500</u>		<u>7,500</u>		<u>15,000</u>	
Add opening inventory b/f	—		1,500			
					=	
	7,500		9,000			
Less closing inventory c/f (W1)	<u>1,500</u>		—			
Production cost of sales	6,000		9,000		15,000	
Other costs	<u>500</u>		<u>500</u>		<u>1,000</u>	
Total cost of sales		<u>6,500</u>		<u>9,500</u>		<u>16,000</u>
Unadjusted profit		700		1,300		2,000
(Under-)/over-absorbed overhead		—		—		—
Profit		<u>700</u>		<u>1,300</u>		<u>2,000</u>

- (b) **Marginal costing**

	Period 1		Period 2		Total	
	\$	\$	\$	\$	\$	\$
Sales		7,200		10,800		18,000
Variable production cost	6,000		6,000		12,000	
Add opening inventory b/f	—		1,200			
	<u>6,000</u>		<u>7,200</u>			
Less closing inventory c/f (W2)	<u>1,200</u>		—		—	
Variable production cost of sales		<u>4,800</u>		<u>7,200</u>		<u>12,000</u>
Contribution		2,400		3,600		6,000
Fixed costs		<u>2,000</u>		<u>2,000</u>		<u>4,000</u>
Profit		<u>400</u>		<u>1,600</u>		<u>2,000</u>

Workings

1 **Closing inventory – absorption costing**

If 1,500 units are produced in period 1 and only 1,200 units are sold, there will be 300 units left in inventory.

Each unit of the product has a total production cost of \$5 per unit using absorption costing.

	\$
Variable production cost	4
Fixed production overhead	<u>1</u>
Total production cost	<u>5</u>

$$\begin{aligned} \therefore \text{Closing inventory valuation} &= 300 \text{ units} \times \$5 \\ &= \$1,500 \end{aligned}$$

2 **Closing inventory – marginal costing**

From (W1) above, there are 300 units of closing inventory.

Each unit of the product has a variable production cost of \$4 per unit using marginal costing (there is no fixed production overhead included as there is under the absorption costing method).

$$\begin{aligned} \therefore \text{Closing inventory valuation} &= 300 \text{ units} \times \$4 \\ &= \$1,200 \end{aligned}$$

Notes

- (a) **The total profit over the two periods is the same for each method of costing, but the profit in each period is different.**
- (b) In absorption costing, fixed production overhead of \$300 is carried forward from period 1 into period 2 in inventory values, and becomes a charge to profit in period 2. In marginal costing all fixed costs are charged in the period they are incurred, therefore the profit in period 1 is \$300 lower and in period 2 is \$300 higher than the absorption costing profit.



Question

AC versus MC

The overhead absorption rate for product X is \$10 per machine hour. Each unit of product X requires five machine hours. Inventory of product X on 1.1.X1 was 150 units and on 31.12.X1 it was 100 units. What is the difference in profit between results reported using absorption costing and results reported using marginal costing?

- A The absorption costing profit would be \$2,500 less
 B The absorption costing profit would be \$2,500 greater
 C The absorption costing profit would be \$5,000 less
 D The absorption costing profit would be \$5,000 greater

Answer

Difference in profit = **change** in inventory levels \times fixed overhead absorption per unit = $(150 - 100) \times \$10 \times 5 = \$2,500$ **lower** profit, because inventory levels **decreased**. The correct answer is therefore option A.

The key is the change in the volume of inventory. Inventory levels have **decreased** therefore absorption costing will report a **lower** profit. This eliminates options B and D.

Option C is incorrect because it is based on the closing inventory only ($100 \text{ units} \times \$10 \times 5 \text{ hours}$).

4 Reconciling profits

4.1 Introduction

FAST FORWARD

Reported profit figures using marginal costing or absorption costing will differ if there is any change in the level of inventories in the period. If production is equal to sales, there will be no difference in calculated profits using the costing methods.

The difference in profits reported under the two costing systems is due to the different inventory valuation methods used.

If inventory levels increase between the beginning and end of a period, absorption costing will report the higher profit. This is because some of the fixed production overhead incurred during the period will be carried forward in closing inventory (which reduces cost of sales) to be set against sales revenue in the following period instead of being written off in full against profit in the period concerned.

If inventory levels decrease, absorption costing will report the lower profit because as well as the fixed overhead incurred, fixed production overhead which had been carried forward in opening inventory is released and is also included in cost of sales.

4.2 Example: Reconciling profits

The profits reported under absorption costing and marginal costing for period 1 in the example in Paragraph 3.4 would be reconciled as follows.

Marginal costing profit	\$ 400
Adjust for fixed overhead in inventory:	
Inventory increase of 300 units × \$1 per unit	300
Absorption costing profit	<u>700</u>



Question

Absorption costing profit

When opening inventories were 8,500 litres and closing inventories 6,750 litres, a firm had a profit of \$62,100 using marginal costing.

Assuming that the fixed overhead absorption rate was \$3 per litre, what would be the profit using absorption costing?

A \$41,850

B \$56,850

C \$67,350

D \$82,350

Answer

Difference in profit = $(8,500 - 6,750) \times \$3 = \$5,250$

Absorption costing profit = $\$62,100 - \$5,250 = \$56,850$

The correct answer is B.

Since inventory levels reduced, the absorption costing profit will be lower than the marginal costing profit. You can therefore eliminate options C and D.

Exam focus point

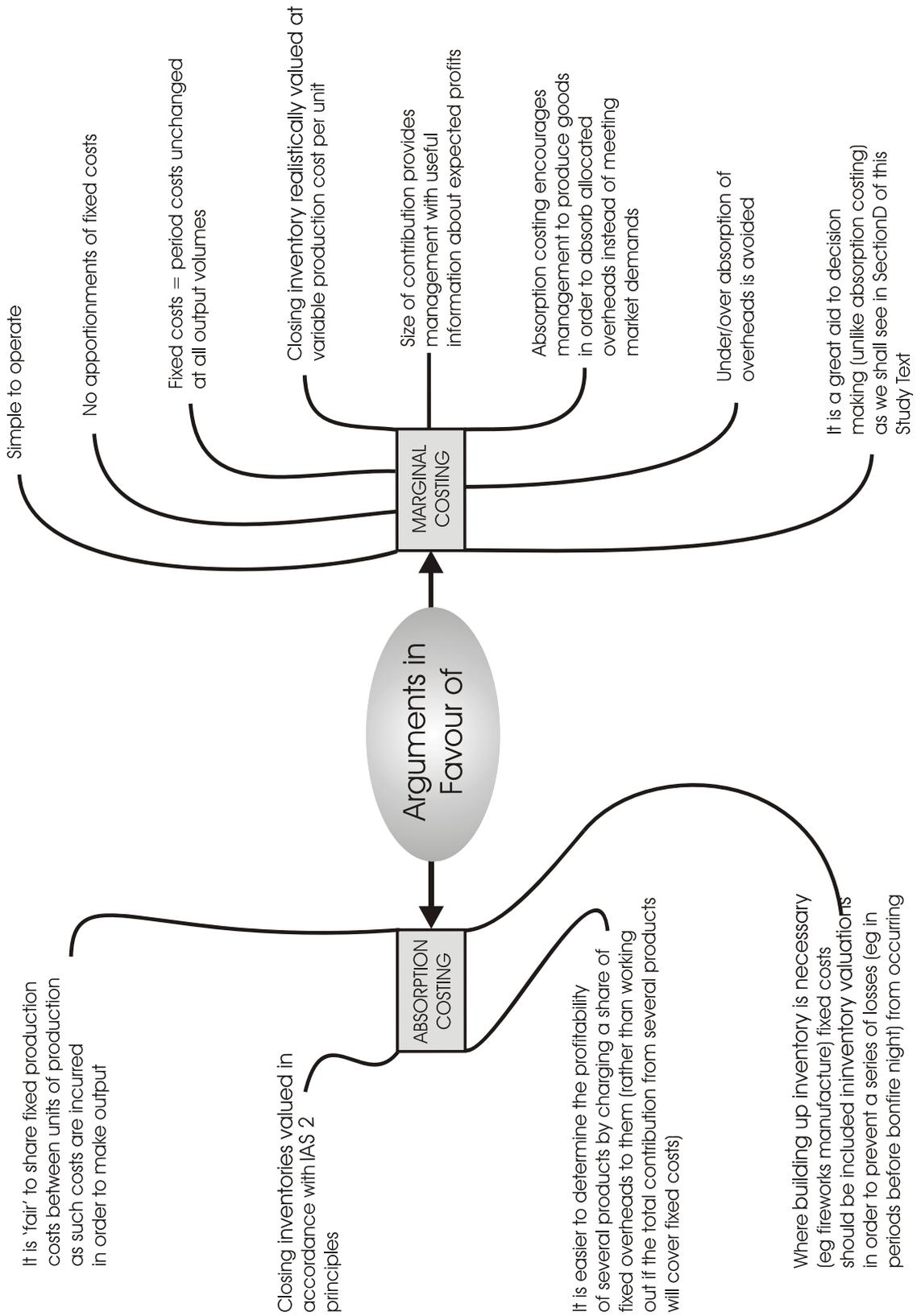
The effect on profit of using the two different costing methods can be confusing. You *must* get it straight in your mind before the examination. Remember that if opening inventory values are greater than closing inventory values, marginal costing shows the greater profit.

5 Marginal costing versus absorption costing

FAST FORWARD

In your examination you may be asked to calculate the profit for an accounting period using either of the two methods of accounting. **Absorption costing** is most often used for routine profit reporting and must be used for financial accounting purposes. **Marginal costing** provides better management information for planning and decision making. There are a number of arguments both for and against each of the costing systems.

The following diagram summarises the arguments in favour of both marginal and absorption costing.



Chapter roundup

- **Marginal cost** is the variable cost of one unit of product or service.
- **Contribution** is an important measure in marginal costing, and it is calculated as the difference between sales value and marginal or variable cost of sales.
- In **marginal costing**, fixed production costs are treated as **period costs** and are written off as they are incurred. In **absorption costing**, fixed production costs are absorbed into the cost of units and are carried forward in inventory to be charged against sales for the next period. Inventory values using absorption costing are therefore greater than those calculated using marginal costing.
- **Reported profit figures using marginal costing or absorption costing will differ if there is any change in the level of inventories in the period.** If production is equal to sales, there will be no difference in calculated profits using these costing methods.
- In your examination you may be asked to calculate the profit for an accounting period using either of the two methods of accounting. **Absorption costing** is most often used for routine profit reporting and must be used for financial accounting purposes. **Marginal costing** provides better management information for planning and decision making. There are a number of arguments both for and against each of the costing systems.

Quick quiz

- 1 What is marginal costing?
- 2 What is a period cost in marginal costing?
- 3 Sales value – marginal cost of sales =
- 4 What is a breakeven point?
- 5 Marginal costing and absorption costing are different techniques for assessing profit in a period. If there are changes in inventory during a period, marginal costing and absorption costing give different results for profit obtained.
Which of the following statements are true?
I If inventory levels increase, marginal costing will report the higher profit.
II If inventory levels decrease, marginal costing will report the lower profit.
III If inventory levels decrease, marginal costing will report the higher profit.
IV If the opening and closing inventory volumes are the same, marginal costing and absorption costing will give the same profit figure.
A All of the above
B I, II and IV
C I and IV
D III and IV
- 6 Which of the following are arguments in favour of marginal costing?
(a) Closing stock (inventory) is valued in accordance with IAS 2.
(b) It is simple to operate.
(c) There is no under or over absorption of overheads.
(d) Fixed costs are the same regardless of activity levels.
(e) The information from this costing method may be used for decision making.

Answers to quick quiz

- 1 Marginal costing is an alternative method of costing to absorption costing. In marginal costing, only variable costs are charged as a cost of sale and a contribution is calculated (sales revenue – variable cost of sales).
- 2 A fixed cost
- 3 Contribution
- 4 The point at which total contribution exactly equals fixed costs (no profit or loss is made)
- 5 D
- 6 (b), (c), (d), (e)

Now try the questions below from the Exam Question Bank

Number	Level	Marks	Time
Q9	MCQ/OTQ	n/a	n/a