IVE Business Administration
工商管理

Member of VTC Group
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Course Title: Marginal and Absorption Costing

Professional Development Programme on Enriching Knowledge of the Business, Accounting and Financial Studies (BAFS) Curriculum <Elective Part>

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Learning Outcomes

Upon completion of this course, teacher participants should be able to:

- compare and contrast between marginal costing and absorption costing;
- calculate and present net profit under marginal costing and absorption costing; and
- explain and evaluate the uses of marginal costing and absorption costing.

Syllabus in HKDSE Examination

- Compare the use of marginal and absorption costing in preparing:
  (i) Manufacturing accounts
  (ii) Income statements

  } Operating Statements

- Compare the advantages and disadvantages of adopting marginal and absorption costing

Contents

- Segregation of cost into variable and fixed elements (Illustration 1)
- Marginal costing vs. absorption costing (Illustrations 2-5)
- Normal absorption costing (Illustration 6)
- Overhead absorption rate (Illustration 6)
- Calculation and treatment of overhead over-absorbed/under-absorbed (Illustration 6)
- Advantages and disadvantages of marginal costing and absorption costing
- Case study – integrated illustrative question

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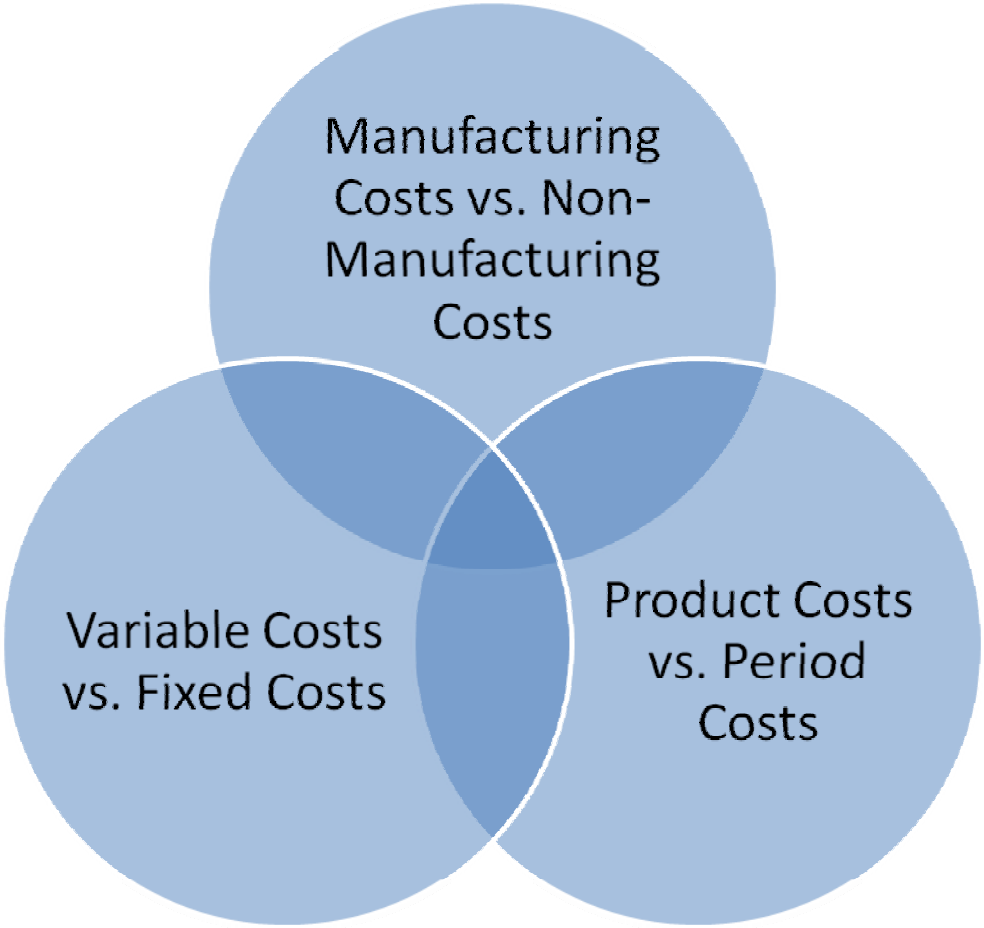
Prior Knowledge Required



Segregation of Cost into Variable and Fixed Elements

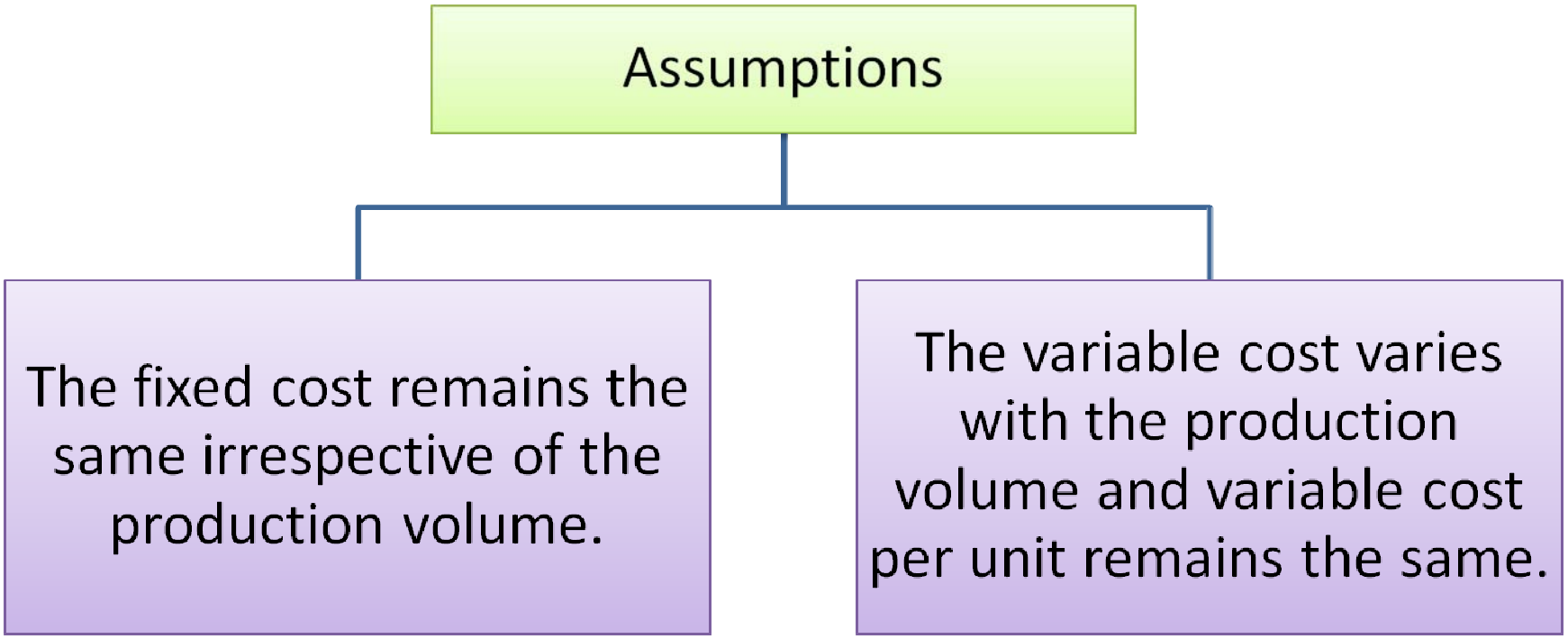


Illustration 1
Segregation of Cost into Variable and Fixed Elements

The manufacturing cost varies with production volumes as follows:

Production Volume	Total Manufacturing Cost
1,000 units	$400,000
1,800 units	$600,000

Illustration 1

Segregation of Cost into Variable and Fixed Elements

$$\text{Variable cost per unit} = \frac{\text{Additional cost}}{\text{Additional units}} = \frac{\$600{,}000 - \$400{,}000}{1{,}800 \text{ units} - 1{,}000 \text{ units}} = \frac{\$200{,}000}{800 \text{ units}} = \$250$$

Total fixed cost = $400,000 - $250 x 1,000 = $150,000

or

$600,000 - $250 x 1,800 = $150,000

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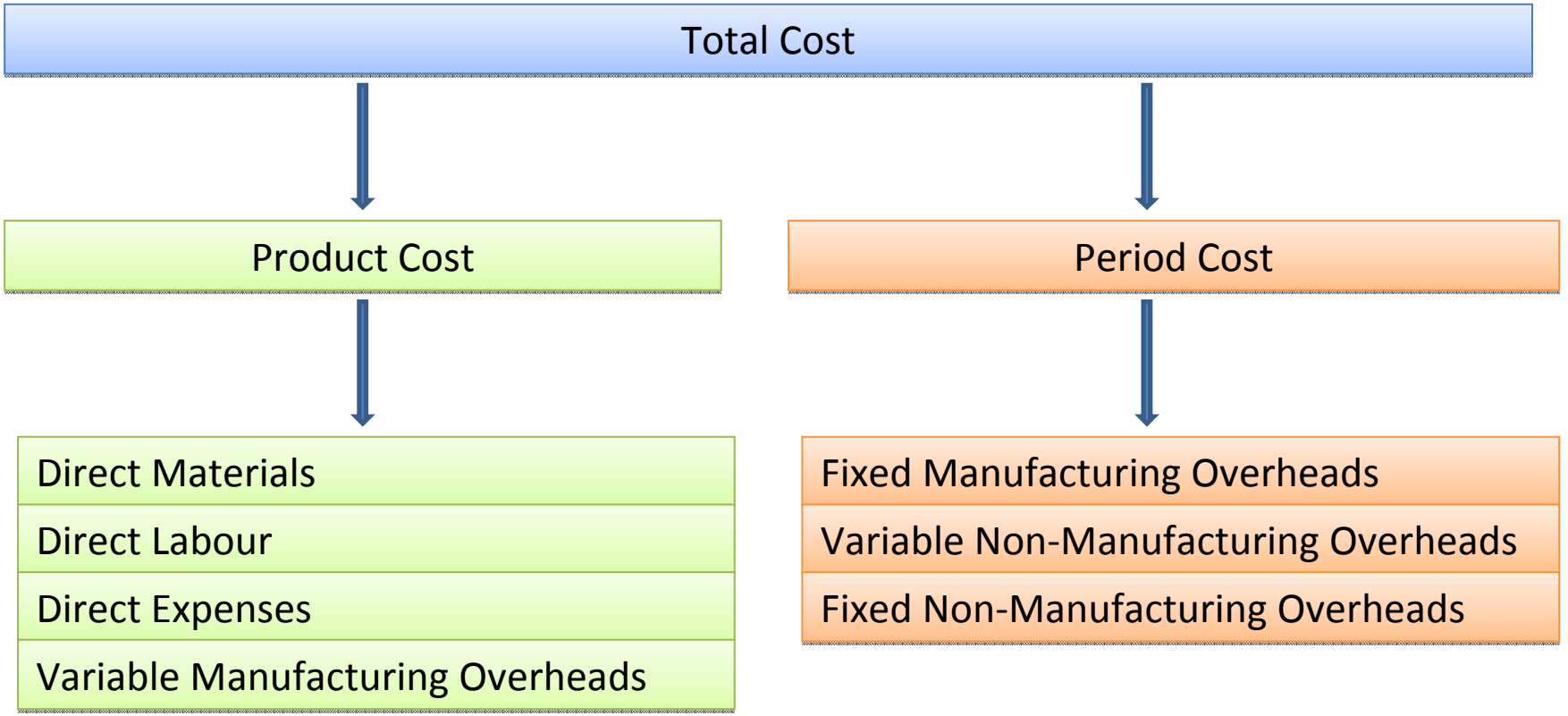
Marginal Costing
(also known as "Variable Costing")

only variable manufacturing costs are charged to product costs

fixed costs (whether manufacturing or non-manufacturing) are treated as period costs



Marginal Costing

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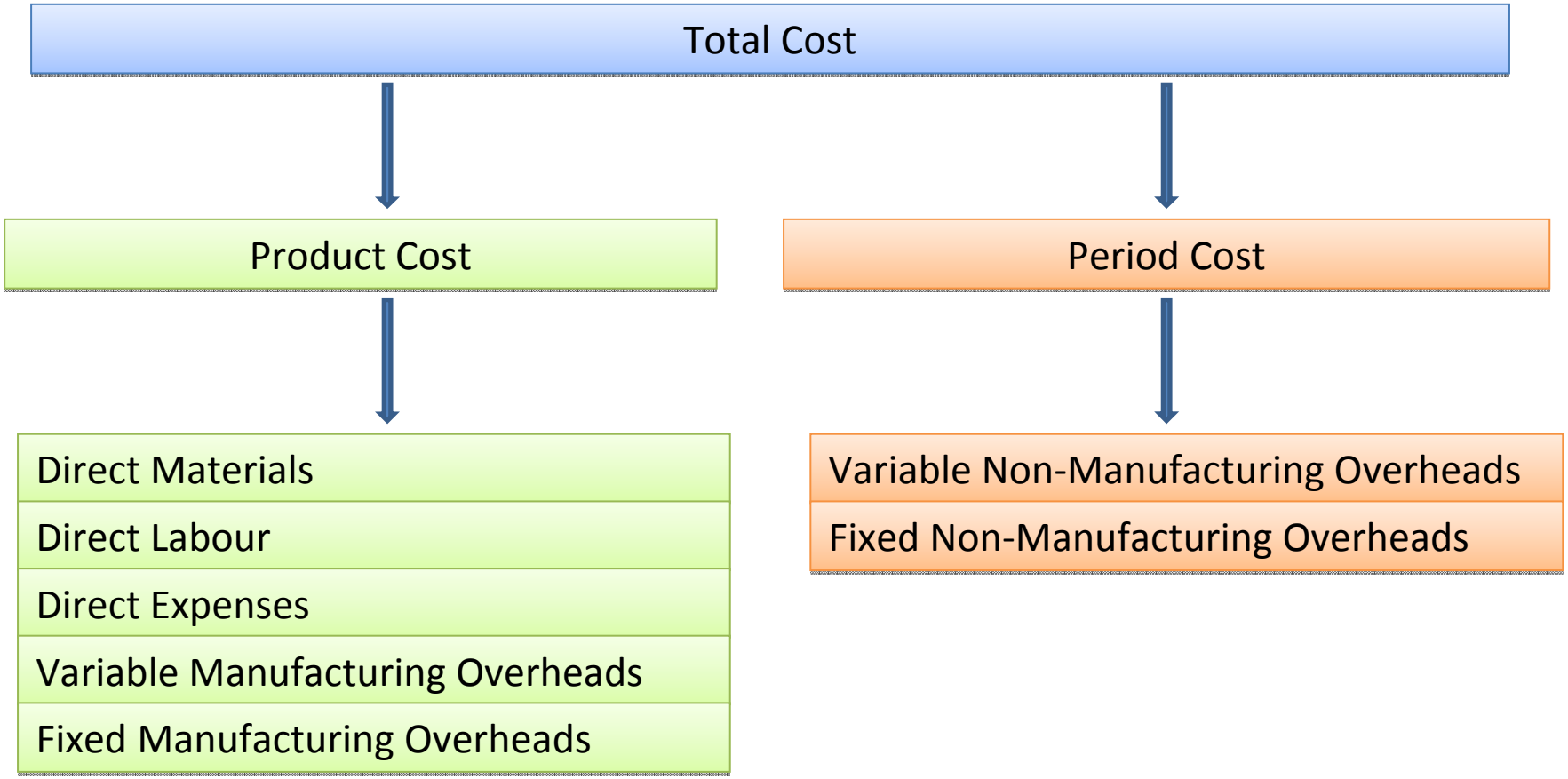
Absorption Costing (also known as "Full Costing")

all manufacturing costs (whether variable or fixed) are charged to product costs

non-manufacturing are treated as period costs



Absorption Costing

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Illustration 2

Marginal Costing vs. Absorption Costing

A manufacturing company produces a single product. During the year ended 31 December 2009, 10,000 units were produced and sold. There was no opening inventory. The costs of manufacturing during the year were shown as follows:

Costs	$
Direct Materials	600,000
Direct Labour	200,000
Variable Manufacturing Overheads	40,000
Fixed Manufacturing Overheads	300,000
Variable Selling Overheads	187,500
Fixed Selling and Administrative Overheads	250,000

All the 10,000 units were sold at $200 each.

Illustration 2 – Marginal Costing

Product Cost under Marginal Costing	$
Direct Materials	600,000
Direct Labour	200,000
Variable Manufacturing Overheads	40,000
Total Product Costs	840,000

Illustration 2 – Marginal Costing

Period Cost under Marginal Costing	$
Fixed Manufacturing Overheads	300,000
Variable Selling Overheads	187,500
Fixed Selling and Administrative Overheads	250,000
Total Period Cost charged to Income Statement	737,500

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Illustration 2 – Marginal Costing

Operating Statement under Marginal Costing for the year ended 31 December 2009	$
Sales (10,000 units at $200 each)	2,000,000
Less: Variable Cost of Sales	(840,000)
Product Contribution Margin	1,160,000
Less: Variable Selling Overheads	(187,500)
Total Contribution Margin	972,500
Less: Fixed Manufacturing Overheads	(300,000)
Fixed Selling and Administrative Overheads	(250,000)
Net Profit	422,500

Illustration 2 – Absorption Costing

Product Cost under Absorption Costing	$
Direct Materials	600,000
Direct Labour	200,000
Variable Manufacturing Overheads	40,000
Fixed Manufacturing Overheads	300,000
Total Product Costs	1,140,000

Illustration 2 – Absorption Costing

Period Cost under Absorption Costing	$
Variable Selling Overheads	187,500
Fixed Selling and Administrative Overheads	250,000
Total Period Cost charged to Income Statement	437,500

Illustration 2 – Absorption Costing

Operating Statement under Absorption Costing	$
Sales (10,000 units at $200 each)	2,000,000
Less: Cost of Sales	(1,140,000)
Gross Profit	860,000
Less: Variable Selling Overheads	(187,500)
Fixed Selling and Administrative Overheads	(250,000)
Net Profit	422,500

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Illustration 2

Marginal Costing and Absorption Costing: Implications

Hence, profits under marginal costing and absorption costing will be the same when

- there is no opening inventory **and**
- there is no closing inventory.

How about if there is opening inventory and/or closing inventory?

Comparison on Impacts of Inventory on Net Profit

Inventory	Impact on Profit	Reason
No opening inventory and no closing inventory (Illustration 2 above)	No difference in profit between absorption costing and marginal costing	All the fixed manufacturing overheads are charged against the current-year profit (either as product cost or period cost)
Fixed manufacturing overheads in opening and closing inventories are of same amount (**not** necessarily production volume = sales volume)	No difference in profit between absorption costing and marginal costing	Fixed cost element brought forward from last period and absorbed in opening inventory is fully compensated by fixed cost element carried forward to next period and absorbed in closing inventory

Comparison on Impacts of Inventory on Net Profit

Inventory	Impact on Profit	Reason
Fixed manufacturing overhead in closing inventory is greater than that in opening inventory (always but **not** necessarily production volume > sales volume)	Profit under absorption costing will be higher than that under marginal costing	A greater amount of fixed manufacturing overhead is included in closing inventory and carried forward to next accounting period
Fixed manufacturing overhead in closing inventory is smaller than that in opening inventory (always but **not** necessarily production volume < sales volume)	Profit under absorption costing will be lower than that under marginal costing	A greater amount of fixed manufacturing overhead in opening inventory is charged against the current-year profit

Impacts of Inventory on Net Profit - Summary

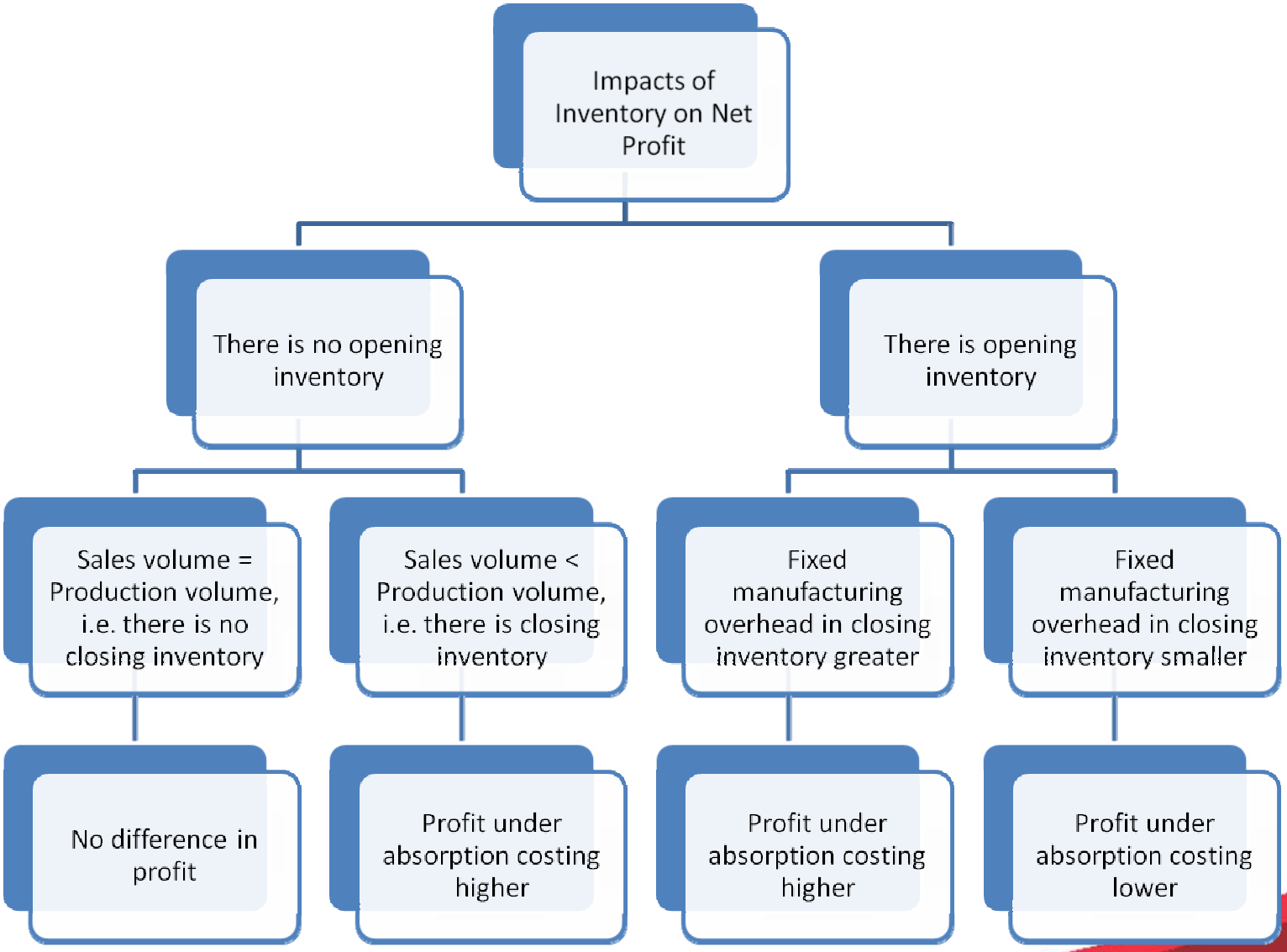

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Illustration 3
When there is Closing Inventory

Use the data of illustration 2 (slide 13) except that there was closing inventory of 2,000 units, i.e. only 8,000 units were sold during the year and as a corollary the variable selling overheads would only be $150,000 ($187,500 x 8,000/10,000).

Illustration 3 – Marginal Costing

Product Cost under Marginal Costing	$
Direct Materials	600,000
Direct Labour	200,000
Variable Manufacturing Overheads	40,000
Total Product Costs	840,000

Variable Cost of Goods Sold for the Year ($840,000 x 8,000/10,000)	$672,000
Closing Inventory c/f to Next Year ($840,000 x 2,000/10,000)	$168,000

Illustration 3 – Marginal Costing

Period Cost under Marginal Costing	$
Fixed Manufacturing Overheads	300,000
Variable Selling Overheads	150,000
Fixed Selling Overheads	250,000
Total Period Cost charged to Income Statement	700,000

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Illustration 3 – Marginal Costing

Operating Statement under Marginal Costing for the year ended 31 December 2009	$
Sales (8,000 units at $200 each)	1,600,000
Less: Variable Cost of Goods Sold	(672,000)
Product Contribution Margin	928,000
Less: Variable Selling Overheads	(150,000)
Total Contribution Margin	778,000
Less: Fixed Manufacturing Overheads	(300,000)
Fixed Selling and Administrative Overheads	(250,000)
Net Profit	228,000

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Illustration 3 – Absorption Costing

Product Cost under Absorption Costing	$
Direct Materials	600,000
Direct Labour	200,000
Variable Manufacturing Overheads	40,000
Fixed Manufacturing Overheads	300,000
Total Product Costs	1,140,000

Cost of Goods Sold for the Year ($1,140,000 x 8,000/10,000)	$912,000
Closing Inventory c/f to Next Year ($1,140,000 x 2,000/10,000)	$228,000

Illustration 3 – Absorption Costing

Period Cost under Absorption Costing	$
Variable Selling Overheads	150,000
Fixed Selling and Administrative Overheads	250,000
Total Period Cost charged to Income Statement	400,000

Illustration 3 – Absorption Costing

Operating Statement under Absorption Costing	$
Sales (8,000 units at $200 each)	1,600,000
Less: Cost of Goods Sold	(912,000)
Gross Profit	688,000
Less: Variable Selling Overheads	(150,000)
Fixed Selling and Administrative Overheads	(250,000)
Net Profit	288,000

Illustration 3

Reconciliation: Marginal Costing and Absorption Costing

	$
Net Profit under Absorption Costing (slide 31)	288,00
Less: Fixed Manufacturing Overheads in Closing Inventory ($300,000/10,000 x 2,000) ($30 per unit)	(60,000)
Net Profit under Marginal Costing (slide 28)	228,00
	0

Illustration 4

Fixed Overhead in Closing Inventory Less Than Opening Inventory

Continue with illustration 3 (with closing inventory of 2,000 units as at 31 December 2009). During the year ended 31 December 2010, 9,000 units were produced and the costs of manufacturing were:

Costs	
Direct Materials	$70 per unit
Direct Labour	$25 per unit
Variable Manufacturing Overheads	$5 per unit
Variable Selling Overheads	$16 per unit
Fixed Manufacturing Overheads	$261,000
Fixed Selling and Administrative Overheads	$280,000

10,000 units were sold at $210 each.

Illustration 4 – Marginal Costing

Operating Statement under Marginal Costing for the year ended 31 December 2010	$	$
Sales ($210 x 10,000)		2,100,000
Less: Cost of Goods Sold:		
Opening Inventory ($84 x 2,000) (slide 26)	168,000	
Variable Cost of Goods Completed ($100 x 9,000)	900,000	
Less: Closing Inventory (assuming FIFO, $100 x 1,000)	(100,000)	(968,000)
Product Contribution Margin		1,132,000
Less: Variable Selling Overheads ($16 x 10,000)		(160,000)
Total Contribution Margin		972,000
Less: Fixed Manufacturing Overheads		(261,000)
Fixed Selling and Administrative Overheads		(280,000)
Net Profit		431,000

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Illustration 4 – Absorption Costing

Operating Statement under Absorption Costing for the year ended 31 December 2010	$	$
Sales ($210 x 10,000)		2,100,000
Less: Cost of Goods Sold:		
Opening Inventory ($114 x 2,000) (slide 29)	228,000	
Cost of Goods Completed ($100 x 9,000 + $261,000)	1,161,000	
Less: Closing Inventory [assuming FIFO, [($100 + $261,000/9,000) x 1,000]	(129,000)	(1,260,000)
Gross Profit		840,000
Less: Variable Selling Overheads ($16 x 10,000)		(160,000)
Fixed Selling and Administrative Overheads		(280,000)
Net Profit		400,000

Illustration 4
Reconciliation: Marginal Costing and Absorption Costing

	$
Net Profit under Absorption Costing	400,000
Add: Fixed Manufacturing Overheads in Opening Inventory ($300,000/10,000 x 2,000) ($30 per unit)	60,000
Less: Fixed Manufacturing Overheads in Closing Inventory ($261,000/9,000 x 1,000) ($29 per unit)	(29,000)
Net Profit under Marginal Costing	431,000

Illustration 5

Production Volume = Sales Volume but Fixed Overheads Absorbed in Opening Inventory and Closing Inventory Different

Use the data of illustration 4 (slide 33) except that only 9,000 units were sold during the year, i.e. production volume was equal to the sales volume and as a result there was closing inventory of 2,000 units.

Illustration 5 – Marginal Costing

Operating Statement under Marginal Costing for the year ended 31 December 2010	$	$
Sales ($210 x 9,000)		1,890,000
Less: Cost of Goods Sold:		
Opening Inventory ($84 x 2,000) (slide 26)	168,000	
Variable Cost of Goods Completed ($100 x 9,000)	900,000	
Less: Closing Inventory (assuming FIFO, $100 x 2,000)	(200,000)	(868,000)
Product Contribution Margin		1,022,000
Less: Variable Selling Overheads ($16 x 9,000)		(144,000)
Total Contribution Margin		878,000
Less: Fixed Manufacturing Overheads		(261,000)
Fixed Selling and Administrative Overheads		(280,000)
Net Profit		337,000

Illustration 5 – Absorption Costing

Operating Statement under Absorption Costing for the year ended 31 December 2010	$	$
Sales ($210 x 9,000)		1,890,000
Less: Cost of Goods Sold:		
Opening Inventory ($114 x 2,000) (slide 29)	228,000	
Cost of Goods Completed ($100 x 9,000 + $261,000)	1,161,000	
Less: Closing Inventory [assuming FIFO, [($100 + $261,000/9,000) x 2,000]	(258,000)	(1,131,000)
Gross Profit		759,000
Less: Variable Selling Overheads ($16 x 9,000)		(144,000)
Fixed Selling and Administrative Overheads		(280,000)
Net Profit		335,000

Illustration 5 – Difference in Profit

- Hence, even if production volume is equal to the sales volume, it does not necessarily mean that the profits under marginal costing and absorption costing are the same.
- It all depends on how much fixed manufacturing overhead is absorbed in a single unit of opening inventory and closing inventory respectively.

Illustration 5
Reconciliation: Marginal Costing and Absorption Costing

	$
Net Profit under Absorption Costing (slide 39)	335,000
Add: Fixed Manufacturing Overheads in Opening Inventory ($300,000/10,000 x 2,000) ($30 per unit)	60,000
Less: Fixed Manufacturing Overheads in Closing Inventory ($261,000/9,000 x 2,000) ($29 per unit)	(58,000)
Net Profit under Marginal Costing (slide 38)	337,000

Format

Reconciliation: Marginal Costing and Absorption Costing

	$
Net Profit under Absorption Costing	X
Add: Fixed Manufacturing Overhead in Opening Inventory	X
Less: Fixed Manufacturing Overhead in Closing Inventory	(X)
Net Profit under Marginal Costing	X

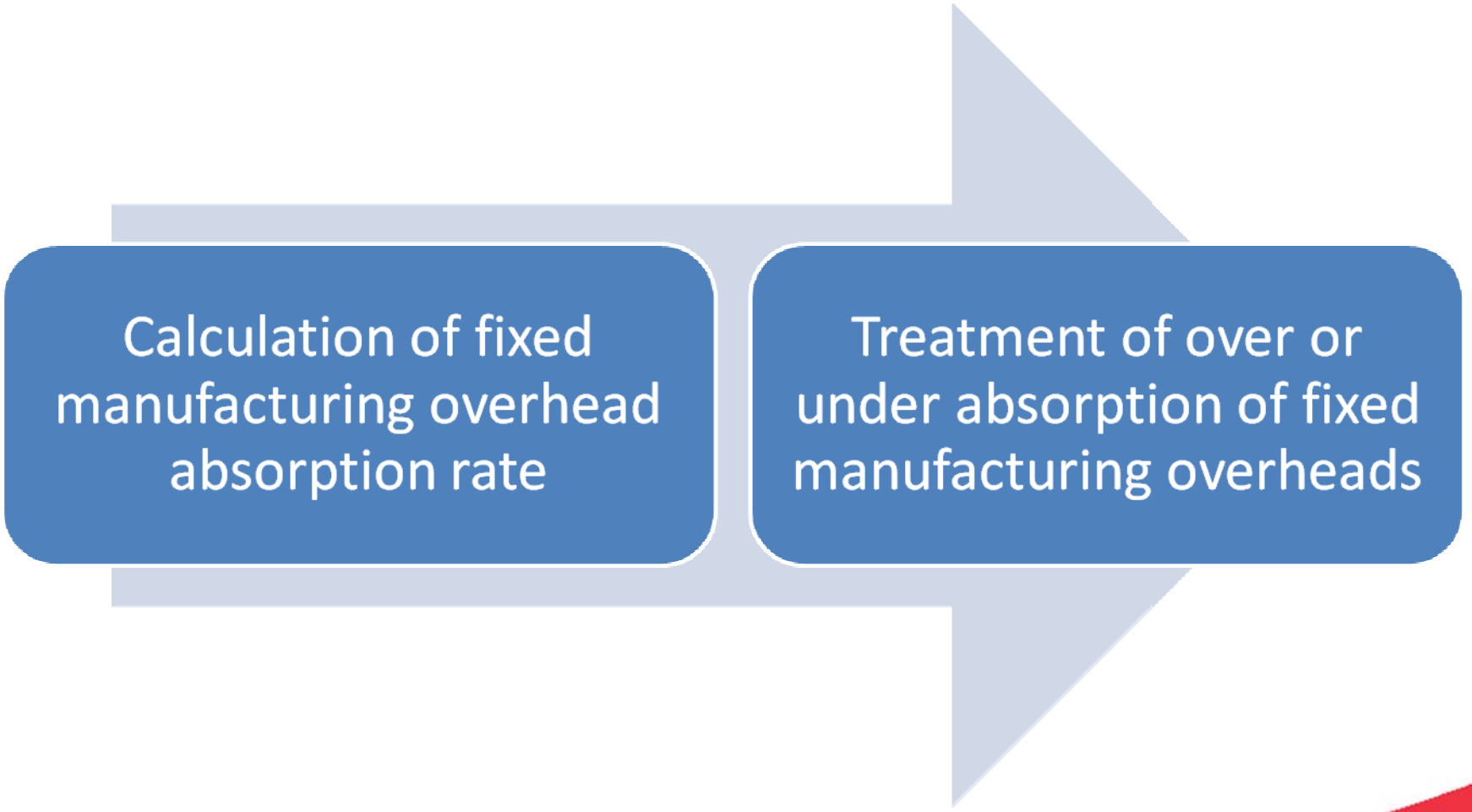
Why are there two systems?

	Uses
Absorption Costing	External reporting (HKAS 2 Inventories)
Marginal Costing	Planning and decision making

Two Approaches to Absorption Costing

Actual Absorption Costing	*Normal Absorption Costing*
Absorbed on actual basis (As illustrations 2 -5 but it is impractical because overhead absorption has to be waited until expiry of the accounting period)	Absorbed on pre-determined overhead absorption (This is the usual practice and is implied unless stated otherwise)

Issues for Normal Absorption Costing



Calculation of Fixed Manufacturing Overhead Absorption Rate (OAR)

$$\frac{\text{Budgeted Fixed Manufacturing Overhead}}{\text{Normal Level of Production Activity}}$$

Normal level of production activity can be:

- Production units
- Labour hours
- Machine hours
- Material usage

Over-absorption/Under-absorption of Overhead

Over-absorption:
Absorbed > Actual

Under-absorption:
Absorbed < Actual

Treatment of Over or Under Absorption of Overheads

***O*ver-absorption**: Over-absorbed amount ***D*educted from cost of goods sold**

***U*nder-absorption**: Under-absorbed amount ***A*dded to cost of goods sold**

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Illustration 6
Normal Absorption Costing

Refer to illustration 4 (slide 33). Assume for the year ended 31 December 2010, the budgeted fixed manufacturing overhead was $300,000 and the normal level of production activity was 10,000 units.

Illustration 6 – Overhead Absorption Rate

$$\text{OAR} = \frac{\$300{,}000}{10{,}000 \text{ units}}$$
$$= \$30 \text{ per unit}$$

Illustration 6 – Over-absorption/Under-absorption of Overheads

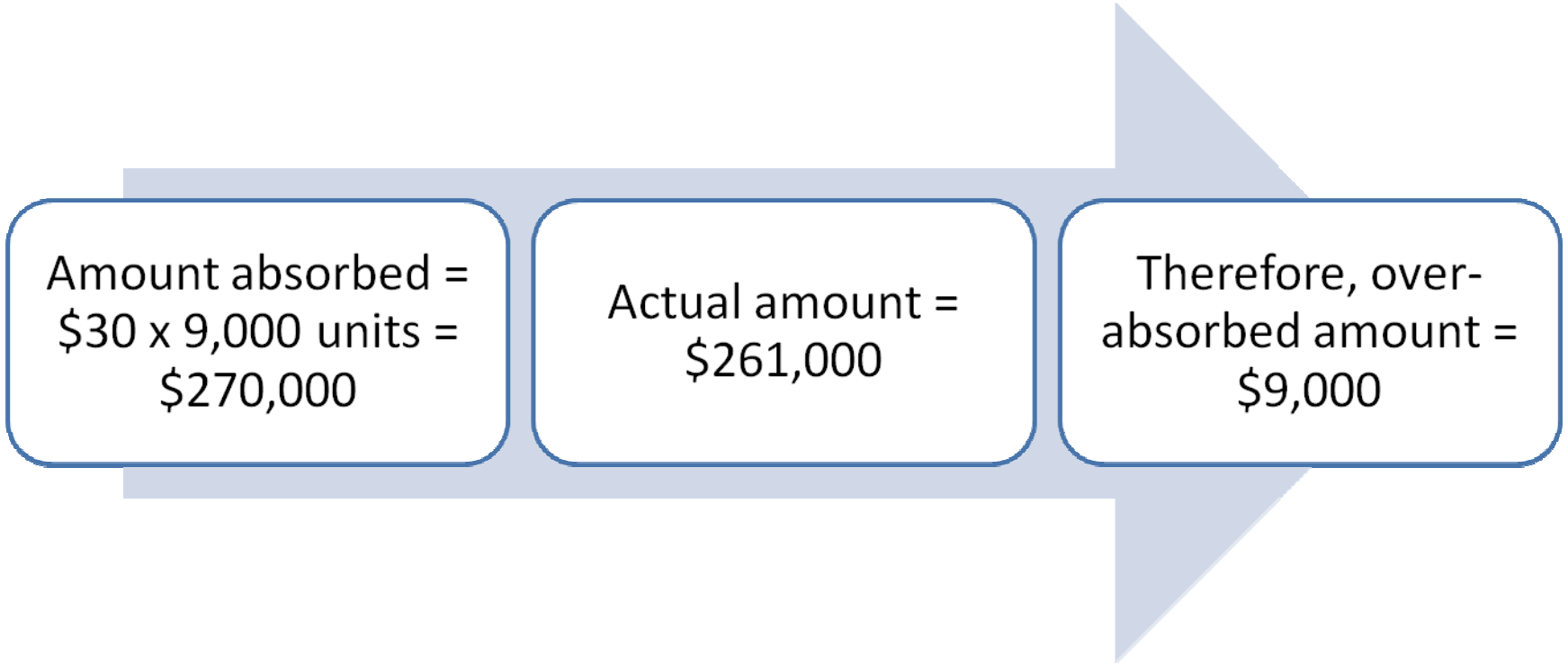

Illustration 6 – Normal Absorption Costing

Operating Statement under Normal Absorption Costing for the year ended 31 December 2010	$	$
Sales ($210 x 100,000)		2,100,000
Less: Cost of Goods Sold:		
Opening Inventory ($114 x 2,000)	228,000	
Cost of Goods Completed [($100 +$30) x 9,000)	1,170,000	
Less: Closing Inventory [assuming FIFO, ($100 + $30) x 1,000]	(130,000)	
	1,268,000	
Less: Fixed Manufacturing Overheads Over-absorbed	(9,000)	(1,259,000)
Gross Profit		841,000
Less: Variable Selling Overheads		(160,000)
Fixed Selling and Administrative Overheads		(280,000)
Net Profit		401,000

Illustration 6
Actual Absorption Costing and Normal Absorption Costing

Net Profit under Normal Absorption Costing is greater than that under Actual Absorption Costing

because

Portion of over-absorbed overhead is included in the closing inventory and carried to next period

Illustration 6
Reconciliation: Actual Absorption Costing and Normal Absorption Costing

	$
Net Profit under Normal Absorption Costing (slide 52)	401,000
Less: Over-absorbed Fixed Manufacturing Overheads in Closing Inventory ($9,000/9,000 x 1,000)	(1,000)
Net Profit under Actual Absorption Costing (slide 35)	400,000

Illustration 6
Reconciliation: Normal Absorption Costing and Marginal Costing

	$
Net Profit under Normal Absorption Costing (slide 52)	401,000
Add: Fixed Manufacturing Overheads in Opening Inventory ($300,000/10,000 x 2,000)	60,000
Less: Fixed Manufacturing Overheads in Closing Inventory ($300,000/10,000 x 1,000)	(30,000)
Net Profit under Marginal Costing (slide 34)	431,000

Summary - Similarities

Marginal Costing	Absorption Costing
Variable manufacturing costs are treated as product costs.	
Non-manufacturing costs (whether variable or fixed) are treated as period costs.	

Summary - Differences

Marginal Costing	Absorption Costing
Fixed manufacturing costs are treated as period costs.	Fixed manufacturing costs are treated as product costs.
No problem of over-absorption or under-absorption of fixed manufacturing overheads.	Actual absorption costing: No problem of over-absorption or under-absorption of fixed manufacturing overheads.
	Normal absorption costing: There is problem of over-absorption or under-absorption of fixed manufacturing overheads.
Operating statement shows contribution margin (sales revenue less variable costs).	Operating statement shows gross profit (sales revenue less cost of goods sold).
Net profit is the excess of contribution margin over fixed costs.	Net profit is the excess of gross profit over non-manufacturing costs .
Distinction between variable costs and fixed costs is relatively important.	Distinction between manufacturing costs and non-manufacturing costs is relatively important.
Particularly useful for short-term decision making.	Required for external reporting.

Operating Statement Format – Marginal Costing

	$	$
Sales revenue		X
Less: Variable cost of goods sold		
Opening inventory	X	
Variable cost of goods completed	X	
Less: Closing inventory	(X)	(X)
Product contribution margin		X
Less: Variable non-manufacturing overheads		(X)
Total contribution margin		X
Less: Fixed costs		(X)
Net profit		(X)

Operating Statement Format – Absorption Costing

	$	$
Sales revenue		X
Less: Cost of goods sold		
Opening inventory	X	
Manufacturing cost of goods completed	X	
Less: Closing inventory	(X)	
	X	
Add/Less: Overheads under-absorbed /(over-absorbed)	X	X
Gross Profit		X
Less: Non-manufacturing costs		(X)
Net profit		(X)

Activity
Integrated Illustrative Question

Question (1)

A manufacturing company produces and sells a single product. The following budgeted data had been prepared for a one-year period:

	Level of Activity	
	100%	60%
	$'000	$'000
Sales revenue	14,400	8,640
Total manufacturing costs	10,200	7,320
Total selling and administrative costs (Variable part varies with sales volume)	3,000	2,520

Question (2)

In compiling the above budgeted data, it had been assumed that sales volume was equal to the production volume. In addition, the normal level of activity was 100% at which it was estimated that 60,000 units could be produced in the period.

Question (3)

The actual results for the period are exhibited as follows:

1.66,000 units were produced and 62,000 units were sold.

2.Unit selling price, unit variable costs and fixed overheads are the same as budgeted.

3.There was no opening inventory.

Question (4)

Required

a) Calculate the manufacturing overhead absorption rate.

b) Calculate the amount of fixed manufacturing overhead absorbed in the products.

c) Calculate the amount of fixed manufacturing overhead over-absorbed or under-absorbed.

d) Prepare the operating statement under absorption costing.

e) Prepare the operating statement under marginal costing.

f) Reconcile the profits under absorption costing and marginal costing.

Answers

a) Manufacturing overhead absorption rate = $50 per unit

b) Fixed manufacturing overhead absorbed = $3,300,000

c) Fixed manufacturing overhead over-absorbed or under-absorbed = $300,000

d) Profit under absorption costing = $1,600,000

e) Profit under marginal costing = $1,400,000

f) Difference in profits is due to fixed manufacturing overhead absorbed in closing inventory amounting to $200,000

Advantages of Absorption Costing

- It is consistent with the matching concept in which manufacturing costs of sales are matched with the sales revenue. This is why financial reporting standard requires absorption costing.
- It facilitates cost-plus pricing strategy. In the long run for survival and profitability, prices must cover fixed costs.

Disadvantages of Absorption Costing

- Absorption of manufacturing fixed overheads to product units by means of overhead absorption rate can sometimes be arbitrary.
- Reported profits can be manipulated by adjusting inventory level in the short run. For example, reported profit can be boosted by inventory piling at the year end.

Advantages of Marginal Costing

- It facilitates various short-term decisions making, e.g. breakeven analysis.
- It is relatively simple in the sense that it avoids overhead apportionment and absorption problems.

Disadvantages of Marginal Costing

- Segregation of manufacturing overheads into fixed and variable elements can sometimes be difficult and impracticable.
- It gives the wrong impression that fixed manufacturing overheads have no relationship with the manufacturing because it is excluded from product costs.

Further Readings

Burgstahler, D., Horngren, C., Schatzberg, J., Stratton, W., & Sundem, G. (2008). ***Introduction to Management Accounting***, 14th ed. Upper Saddle River: Prentice Hall. Chapters 4 & 13.

Drury, C. (2008). ***Management and Cost Accounting***, 7th ed. London: South-Western Cengage Learning. Chapters 7 & 10.

Horngren, C. T., Datar, S. M., Foster, G., Raian, M. & Ittner, C. (2009). ***Cost Accounting: A Managerial Emphasis***, 13th ed. Upper Saddle River: Prentice Hall. Chapters 5 & 9.

Lucey, T. (2009). ***Costing***, 7th ed. London: South-Western Cengage Learning. Chapter 19.