Tutorial Letter 102/0/2024

ADVANCED MANAGEMENT ACCOUNTING

MAC4861

NMA4861

ZMA4861

Year module

Department of Financial Intelligence

This tutorial letter contains important information about your module.

BARCODE

Define tomorrow.

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ADVANCED MANAGEMENT ACCOUNTING (MAC4861)
TUTORIAL LETTER 102 / 2024
CONTENTS

MODULE PURPOSE

This module is intended for students who are studying towards a Postgraduate Diploma in Accounting Sciences (CTA Level 1) and ultimately towards the Certificate in the Theory of Accounting (CTA), a prerequisite for the professional qualification of Chartered Accountant (SA) (registered with SAICA). This module will help you to develop the prerequisite competencies relating to Management Decision Making and Control (MDC); as well as Strategy, Risk Management (SRM), and Financial Management (FM).

INTRODUCTION AND OVERVIEW

This tutorial letter aims to provide students with tutorial matters relating to Management Decision Making and Control topics (often referred to as Costing). This tutorial letter will build upon your prior knowledge and introduce a few new concepts relating to decision-making and control.

PRE-REQUISITES

The parts and learning units in this tutorial letter build, to a large extent, upon prior knowledge obtained in your undergraduate Management Accounting studies. It is therefore assumed that you have achieved the necessary prior learning. Please refer to your undergraduate study material if necessary.

STRUCTURE OF THIS TUTORIAL LETTER

This tutorial letter is structured in three parts, each containing several learning units. Please refer to the diagram following this section for a schematic presentation of the module. A learning unit is the main study area within a part, and each learning unit is further divided into sub-learning units. You will find the outcomes that you are required to achieve for each learning unit in this tutorial letter at the beginning of each learning unit. Self-assessment activities are provided at the end of each learning unit so that you can assess whether you have mastered the learning outcomes.

The finance topics have already been dealt with in the previous tutorial letters. The costing topics will be dealt with in this tutorial letter, and additional costing questions will follow in a subsequent tutorial letter.

We suggest you allocate your time to this tutorial letter according to the following approximate allocation.

Part 1   Cost accounting bases and allocation (30%)

Part 2   Planning and control (40%)

Part 3   Decision-making (20%)

Integrated self-assessment test (10%)

CONTENT – THIS MODULE

The diagram below contains a schematic presentation of the content of this module.

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│                            MAC4861                                   │
│                 Advanced Management Accounting                       │
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┌──────────────┐  ┌──────────────┐  ┌──────────────┐  ┌──────────────┐
│ Planning and │  │ Management   │  │ Strategy,    │  │ Prior exams, │
│ general      │  │ decision-    │  │ Risk,        │  │ questions    │
│              │  │ making and   │  │ Management,  │  │ and revision │
│              │  │ control      │  │ Financial    │  │              │
│              │  │              │  │ Management   │  │              │
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│          │     │ tutorial     │   │              │  │              │
│          │     │ letter)      │   │              │  │              │
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│ CASALL1-     │
│ series (30*) │
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PART 1 Cost accounting bases and allocation	PART 2 Planning and control	PART 3 Decision-making

| Learning units

1. Nature, classification, and allocation of cost
2. Product costing systems | Learning unit

3. Planning, budgeting, and control | Learning units

4. Standard costing
5. Performance measurement | Learning units

6. Information application to decisions
7. Information for decision-making |

Integrated self-assessment

TEST 1 - Tuesday, 26 March 2024*	TEST 2 - Tuesday, 07 May 2024*

*Provisional test dates

STUDY MATERIAL AND RESOURCES

Prescribed study material
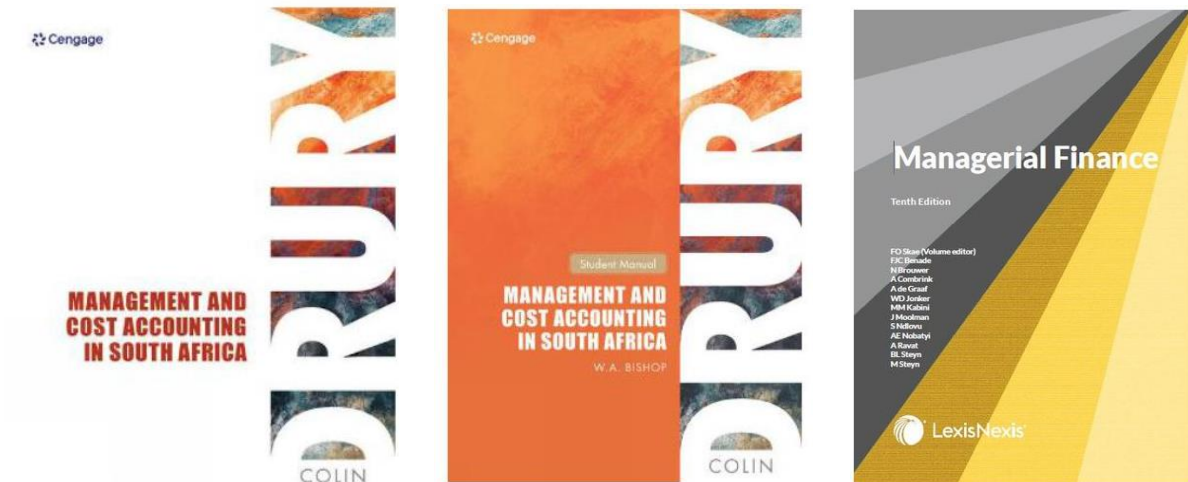
The prescribed textbooks for this module are:

- Management and Cost Accounting in South Africa (**including Student's Manual**), 1st edition (Drury, C)
- *Managerial Finance*, 10th edition (Skae *et al*. 2024)

Important note:

In principle, this tutorial letter and the next refer to the textbook *Management and Cost Accounting in South Africa* (**including Student's Manual**), SA 1st edition (Drury, C.), which is vital to your success in this course. This tutorial letter does refer to the 10th edition for those students who still want to utilise that version.

The purpose of the content of this tutorial letter is to supplement the information in the textbook in areas where it is considered necessary. It in no way replaces or can be considered a substitute for the textbook. It, therefore, remains imperative that you work through the textbook in detail

The Management and Cost Accounting (Drury) SA 1st edition edition textbook includes open-access to digital support resources. Students can access it by going to www.cengagebrain.co.uk and searching for MANAGEMENT AND COST ACCOUNTING in South Africa 1st edition.
These books can be purchased hard copy or in the e-book format.

_my_Unisa resources

Please make use of myUnisa as it contains further resources to help you master this module. The following resources are available on myUnisa (made available at appropriate times during the year):

1. Log-in to MyUnisa
2. Go to your Dashboard where you will find:
3. Welcome message;
4. Welcome and introduction;
   • Questions and Answers for lecturers and students can be sent to to MAC4861@unisa.ac.za, alternatively you can book a consultation with your lecturers by clicking here.
   • For on-line lectures/ classes we will send you invites
5. Additional Resources;
6. Announcements containing important information/updates relating to this module.
7. Assessment for your formative and summative results.
8. Calendar for important dates.
9. FAQ for frequently asked questions.
10. Lessons containing studymaterial, on-line lectures, screencasts, activities, etc.
11. Official study material containing your tutorial letters for this module.
12. Prescribed Material for your textbooks.
13. Discussion Forum
	_my_ UNISA | university of south africa | 150 YEARS
	
	✖
	
	Part 1 COSTING: Introducti…
	
	Lesson 1: Nature, classific…
	
	Lesson 2: Product Costing …
	
	Lesson 3: Planning and Co…
	
	Lesson 4: STANDARD COS…
	
	Lesson 5: Performance me…
	
	Lesson 6: Information appli…
	
	Lesson 7: Decision-making…
	
	Costing exam preparation l…

TESTS

The learning units assessed by Test 1 will cover predominately (but not exclusively) the content of learning units 1 – 3; and Test 2 will cover predominately (but not exclusively) the content of learning units 4 – 7. **Please note that the modules will be written on a rotational basis on the different test dates – refer to CASALL1 Tutorial letter 301.**

It is important to realise that the final examination (exam) papers of this module will integrate between the various learning units (costing and finance). In preparation for the exam, you can therefore also expect some level of integration in the tests.

Supplementary literature / additional reading

Refer to the Management Accounting Glossary and Bibliography at the end of this Tutorial letter. Also refer to the recommended reading (including company websites) as indicated in the study material.

General information and CTA news

For general information and CTA news please refer to the CTA Support Page.
The CTA support page can be accessed from our CAS website landing page.
The URL for this page is: https://www.unisa.ac.za/sites/corporate/default/Colleges/Accounting-Sciences/CTA-student-support

CONCLUSION
We trust that the preceding sections will assist you in approaching your studies (linked to this tutorial letter) in a methodical manner and with a greater level of understanding.

We hope you enjoy this part of your studies!

Regards,
Your Advanced Management Accounting lecturers

PART 1 – COST ACCOUNTING BASES AND ALLOCATION

PART 1 – PURPOSE

The purpose of part 1 is to equip students with a critical and informed understanding of

- Key costing terms and guidelines
- concepts and established principles

in order to classify, record and present costs for the valuation of inventories and compile Statements of Profit or Loss and Other Comprehensive Income on different bases.

PART 1 CONSISTS OF THE FOLLOWING LEARNING UNITS:

LEARNING UNIT	TITLE
LEARNING UNIT 1	NATURE, CLASSIFICATION AND ALLOCATION OF COST
LEARNING UNIT 2	PRODUCT COSTING SYSTEMS

Introduction

Management accounting deals with **managing** accounting information within the organisation, focussing on:

- critical information so that operational and strategic planning can be undertaken,
- **decisions** can be made, and
- **control** can be exercised and problems addressed.

There is **no** formal framework which regulates management accounting.

A logical mind and approach are required to address the aforementioned focus areas.

You will now be introduced to **Management Decision Making and Control** topics (often referred to as **Costing**) at a postgraduate level.

You will build upon your prior knowledge and introduce a few new concepts relating to decision-making and control.

PART 1, LEARNING UNIT 1 – NATURE, CLASSIFICATION AND ALLOCATION OF COST

THIS LEARNING UNIT CONSISTS OF THE FOLLOWING SUB-LEARNING UNITS:

LEARNING UNIT	TITLE
LEARNING UNIT 1.1	Nature and classification of cost
LEARNING UNIT 1.2	Variable and absorption costing
LEARNING UNIT 1.3	Activity-based costing (ABC)

After studying this learning unit, you should achieve the following Learning outcomes:

> **LEARNING OUTCOMES**
>
> After studying this topic, you should be able to do the following:
>
> 1.1.   Describe the definitions relevant to costing terms and systems.
> 1.1.   Classify costs and apply cost concepts and cost estimation techniques in various scenarios.
> 1.2.   Apply knowledge of variable and absorption costing systems in a case study scenario.
> 1.2.   Advise on an applicable method when analysing a scenario.
> 1.2. Apply results of the total fixed overhead variance calculation to a practical case study and correctly account for it in the Statement of Profit or Loss and other Comprehensive Income.
> 1.3.   Apply an activity-based costing approach to costing information in a scenario.
> 1.3.   Advise management on which type of costing system is appropriate and how the systems differ.

LEARNING UNIT 1.1   Nature and classification of cost

LEARNING OUTCOMES

After studying this topic, you should be able to do the following:

1.1. Describe the definitions relevant to costing terms and systems.
1.1.   Classify costs, apply cost concepts, and cost estimation techniques in various scenarios.

Prior learning

This course assumes students have already mastered the work equivalent to that presented in Unisa's preceding undergraduate degree. Please ensure that you are up to date with the prior learning for the nature, classification and allocation of costs. If not, please refer to your **undergraduate study material** and revise the textbook (Drury) using the page numbers below:

Before you start with this section, you may like to revise important costing terms and concepts in Drury SA 1st edition and *My*Unisa **Lessons 1 for the on-live screencast.**

Prior learning	Drury SA 1st edition	Drury 10th edition
Before studying this topic, you should be able to: • Define and illustrate a cost object. • Understand the meaning of the important cost definitions. • Distinguish between variable and fixed costs. • Apply and describe the different methods of estimating costs. • Calculate regression equations using the least-squares methods and evaluate the goodness of fit, using the coefficient of correlation and coefficient of determination. • Apply the high-low method.	**Applicable references:** **Drury Chapter 2:** An introduction to cost terms and concepts. Pages 29-49 **Drury Chapter 3:** Cost estimation and cost behaviour. Pages 56 - 76	**Applicable references:** **Drury Chapter 2:** An introduction to cost terms and concepts. Pages 22–39 **Drury Chapter 24:** Cost estimation and cost behaviour. Pages 646–657

1. Introduction

Learning unit 1.1 covers important **costing concepts**, definitions and tools that are used throughout the costing syllabus. It is important at this stage that students do not undermine the importance of studying for understanding. A solid foundation will enable an enjoyable "Costing" journey.

The following are brief descriptions of the critical terms in this learning unit. Bear in mind that the classification of costs will vary between organisations and within a particular organisation according to a particular management function.

The purpose of the content below is to supplement the textbook's information in areas considered necessary. It in no way replaces or can be considered to be a substitute for the textbook. It, therefore, remains imperative that you work through the textbook in detail.

2. Costing terms

Cost

The cost of any item, whether production or service-driven, is determined by a quantifiable measurement and a value measurement.

Cost classification

Classification is linked to the intended use of cost information, i.e. for inventory valuation, planning, decision-making or control purposes.

Cost behaviour

Cost behaviour is driven by the different levels of activity and a variety of measures.

Cost estimation

Different methods are used for cost estimation, of which the high-low method is frequently found in questions.

3. High-low method

High-low method: a mathematical technique used to separate mixed costs into their **fixed and variable** components.

Total cost = (Variable cost x Units produced) + Fixed costs

Step 1: Determine Variable cost per unit

= Cost at highest activity level – Cost at lowest activity level
Units produced at highest activity level – units produced at lowest activity level

Step 2: Determine fixed cost

Fixed costs = Total cost - (Variable cost x Units produced)
Note that in practice, you would probably not use this method as it is more crude than statistical or software-driven solutions (Drury SA 1st ed, pages 62-63 or 10th ed, pages 651 – 652). We will highlight a few problem areas in the application of the high-low method, as it is often one of the first steps in answering a question and often misconstrued.

This method takes the highest and lowest activity levels and associated costs from the available information and calculates the change in volume and cost between them. The assumption is that the change in total costs between the two levels is attributable to the variable costs because fixed costs stay the same within a normal capacity range (0%–100%).

> **Focus notes**
>
> 1.   The costs should be from the same fiscal period, i.e. the effect of inflation should be negated. When working with figures derived under different inflationary conditions, all figures should first be **INDEXED** to the same year. Thereafter, the high-low method can be applied.
>
> 2.   The selection of high and low is based on the **activity level,** not on the cost or value level.
>
> 3.   Always remember that a high-low scenario only applies when there are different costs for two activity levels during a specified period. You <u>CAN'T</u> compare a budgeted and actual activity and do a high-low method application based on that. The high-low method is based on two levels of budgeted activity or two levels of actual activity.
>
> 4.   If you notice an inconsistent (unusual) increase or reduction in total costs relative to a specific activity, (non-linearity,) ignore that activity level in your consideration of the high and low points. It is important that you review all the data points, before deciding on the high and low levels.

Note: Additional Costing terms and Concepts will be provided for each respective Learning Unit.

Activity 1.1.1: Basic revision example

Attempt question: (Drury Textbook)
1st SA ed: Example 2.2 p 51 (Solution p 839)
10th ed: Question 2.28 p 40 (Solution p 740)

This question is for revision of sunk and opportunity costs for decision-making. Keep in mind that Mrs L/J has 2 options: Should Mrs Lethabile/ Johnston continue with the business or should she sublet the shop to her friend? What will the costs/salary of the two options be?

Activity 1.1.2: Basic revision example

Month	Activity level units	Total overhead cost R
July	110	5 500
August	90	4 500
September	80	4 400
October	100	5 000
November	130	6 000
December	120	5 600

REQUIRED

Determine the fixed and variable costs based on the given activity levels.

Feedback 1.1.2

Step 1: Choose the highest and lowest level of activity

The highest level of activity occurred in November, and the lowest was in September. The amount of fixed cost will be constant every month (fixed costs don't change). Therefore, the difference resulting from the increased activity will be the variable cost.

Step 2: Calculate the variable cost using the difference between the highest and lowest level of activity

	Activity level units	R
November	130	6 000
September	(80)	(4 400)
Change	50	1 600

The extra variable cost is R1 600. We can use this information to calculate the variable cost per unit.

Variable cost per unit   = R1 600/50
                                          R32/unit

Step 3: Determine the fixed cost

The fixed cost can be determined by substituting the information calculated above as follows:

OR

November (130 units)	R		September (80 units)	R
Total cost	6 000		Total cost	4 400
Variable cost (130 x **R32**)	(4 160)		Variable cost (80 x **R32**)	(2 560)
Fixed cost	1 840		Fixed cost	1 840

Activity 1.1.3 - Extended example

Marthi Ltd presents the following budgeted information for one of their new production facilities:

	Year 1	Year 2	Year 3	Year 4
Total overheads (R)	276 000	380 000	420 000	390 000
Total production (units)	12 000	25 000	30 000	35 000

REQUIRED

Determine the overhead rate.

Feedback 1.1.3

In total terms, the overhead *decreases with R30 000 (R390 000- R420 000)* from the 30 000 to 35 000 unit level. Thus, *high-low* should be applied to 12 000 and 30 000 where constant change takes place. One can conclude that between 30 000 and 35 000, either the fixed or variable costs or both are expected to change (probably due to the experience curve effect).

We will use the abbreviations VOH for variable overhead and FOH for fixed overhead.

VOH per unit	=	$\dfrac{R(420\ 000 - 276\ 000)}{30\ 000 - \ 12\ 000}$
	=	$\dfrac{R144\ 000}{18\ 000}$
	=	R8 per unit
∴ Total FOH	=	R420 000 – (30 000 x R8)
	=	R180 000

In substituting the above on the 35 000 level, the total cost is: (35 000 x R8) + R180 000 = R460 000, corroborating the decision to exclude this level from the process.

Activity 1.1.4
Attempt question: (Drury Textbook)
1st SA ed: Question 3.17 p 78 (Solution p 840)
10th ed: Question 24.15 p 665 (Solution p 821)

Feedback 1.1.4
Note the effect of a stepped increase in fixed costs.

Video

Watch the screencast about a brief introduction costing terms and concepts available on *My*Unisa refer to lesson 1.1.

4. Summary
In this study unit, we revisited cost classification, behaviour and estimation with emphasis on applying the high-low method.

LEARNING UNIT 1.2   Variable and absorption costing

LEARNING OUTCOMES

After studying this topic, you should be able to do the following:

1.2. Apply knowledge of variable and absorption costing systems in a case study scenario.
1.2. Advise on an applicable method when analysing a scenario.
1.2. Apply results of the total fixed overhead variance calculation to a practical case study and
        correctly account for it in the Statement of Profit or Loss and other Comprehensive Income.

Prior learning

This course assumes that students have already mastered the work equivalent to that presented in Unisa's preceding undergraduate degree. Please ensure that you are up to date with the prior learning for variable and absorption costing. If not, please refer to your **undergraduate study material** and revise the textbook (Drury) using the page numbers below:

Prior learning	Drury SA 1st edition	Drury 10th edition
Before studying this topic, you should be able to do the following: • Distinguish between different types of cost systems. • Describe the various denominator levels that can be used with an absorption costing system. • Select an appropriate allocation base and a suitable denominator or capacity level. • Distinguish between a blanket (plant-wide) overhead rate and a departmental overhead rate. • Apply primary (first stage) and secondary (second stage) allocations of overheads when determining departmental overhead rates. • Reallocate service departments' overheads where service departments render services to each other and to production departments. • Justify why budgeted overhead rates should be used in preference to actual overhead rates. • Calculate and explain the accounting treatment of the under-/over-recovery of overheads. • Explain the differences between an absorption costing and a variable costing system. • Prepare profit statements based on an absorption and variable costing system and reconcile and explain the difference in profits. • Explain the arguments for and against variable and absorption costing. • Provide advice on the allocation of non-manufacturing overheads in manufacturing and service organisations for decision-making purposes.	**Applicable references:** **Drury: Chapter 4:** Cost assignment. Pages 80 – 11. **Drury: Chapter 4:** Budgeted overhead rates and Under- and over-recovery of overheads. Pages 94 – 102. **Drury: Chapter 4 Appendix 4.1** Inter-service department reallocations. Pages 104 – 109. **Drury: Chapter 7:** Absorption and variable costing systems. Pages 175 – 199. Now study IAS2 again.	**Applicable references:** **Drury: Chapter 3:** Cost assignment. Pages 44–51. **Drury: Chapter 3:** Budgeted overhead rates and under- and over-recovery of overheads. Pages 61–66. **Drury: Chapter 3: Appendix 3.1** Inter-service department reallocations. Pages 68–72. **Drury: Chapter 7:** Income effects of alternative cost accumulation systems. Pages 149–162. Leave out the following Appendix 7.1 Derivation of the profit function for an absorption costing system. Pages 163–164 Now study IAS2 again.

1. Introduction

In the previous study unit, we used the nature of a cost to classify it as either fixed or variable, although in practice many costs will have a dual nature or follow a step pattern. We will now use these classifications to assign overhead costs to products.

In this learning unit, we revisit types of cost accumulation systems, namely absorption costing and variable/direct costing systems, specifically those using traditional volume-based measures. In the next topic, we will look at another absorption costing system, namely activity-based costing (ABC).

The purpose of the content below is to supplement the textbook's information in areas considered necessary. It in no way replaces or can be considered to be a substitute for the textbook. It, therefore, remains imperative that you work through the textbook in detail

Under **absorption costing,** ALL manufacturing costs, including fixed manufacturing overhead, are included in the cost of the product.

Under **variable costing,** only variable manufacturing costs (including variable manufacturing overheads) are included in the cost of the product.

International Accounting Statement 2 (**IAS 2**) makes absorption costing compulsory for external reporting.

For internal use, variable costing gives a clearer picture for the evaluation of the performance of divisions and for certain short-term decision-making scenarios.

2. Critical topics:

Bases of assigning overheads to cost objects

- Absorption vs variable costing

- Traditional volume-based measures

- Selecting an appropriate denominator level for the allocation of fixed production overheads

- Accounting treatment of over/under-recovery of fixed production overheads (volume and expenditure) variances

3. Costing Concepts

Extensive costing systems for tracking costs

Cost accumulation systems

Backflush accounting (Learning unit 2.1)

Variable / Direct costing (Learning unit 1.2)

Absorption costing (Learning unit 1.2)

Traditional volume-based measures

Activity -Based- Costing (ABC) (Learning unit 1.3)
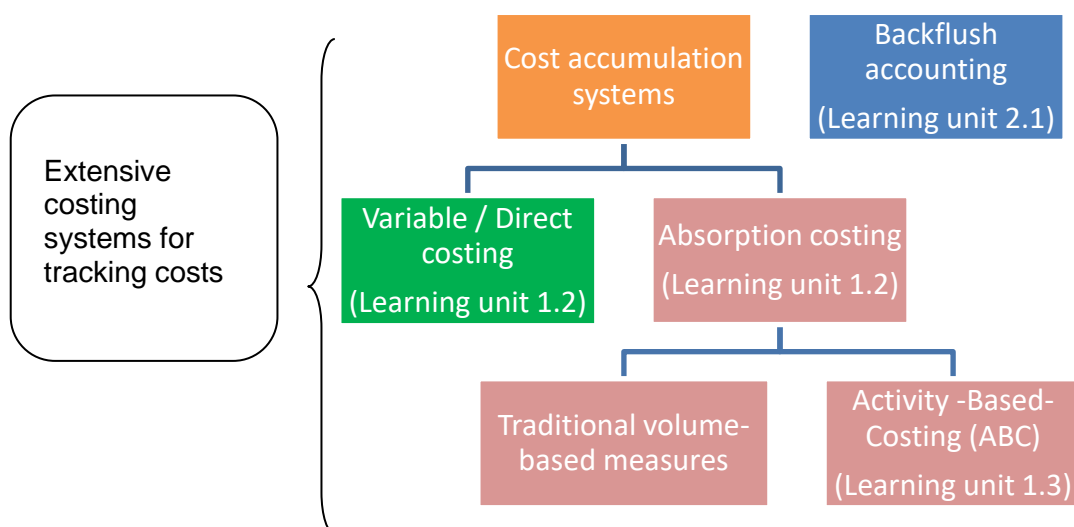
The **traditional** and **ABC** costing methods assist in assigning the **fixed cost of conversion** to products and, therefore, are part of **Absorption costing system**.

1. Financial accounting reporting perspective

According to IAS 2:10 Measurement of inventories, costs **should include** all of the following:

- Costs of purchase (including taxes, transport and handling), net of trade discounts received
- **Costs of conversion (including fixed and variable overheads)**
- Other costs incurred in bringing the inventory to its present location and condition

Inventory costs should **not** include: (IAS 2.16 and 2.18)

- Abnormal waste (Refer to Learning unit 2.2: Process Costing)
- Storage costs
- Administration overheads unrelated to production
- Selling costs, etc.

From the above it is clear that for IAS accounting purposes the Statement of Profit or Loss and other Comprehensive Income and Statement of Financial Position (SFP) is prepared on the **absorption costing basis**, i.e. fixed production overhead is included in the cost of inventories.
This means that the cost of inventory includes the following production costs:

Material - included directly in production costs
Labour - included directly in production costs (Refer to further note on why labour can be a fixed cost)
Overhead - allocated to production using a selected basis

Absorption costing ⟶ used for financial accounting
Variable costing ⟶ used for management accounts and decision-making purposes

You should also know the purpose and use of the Variable and Absorption costing systems and how they differ:
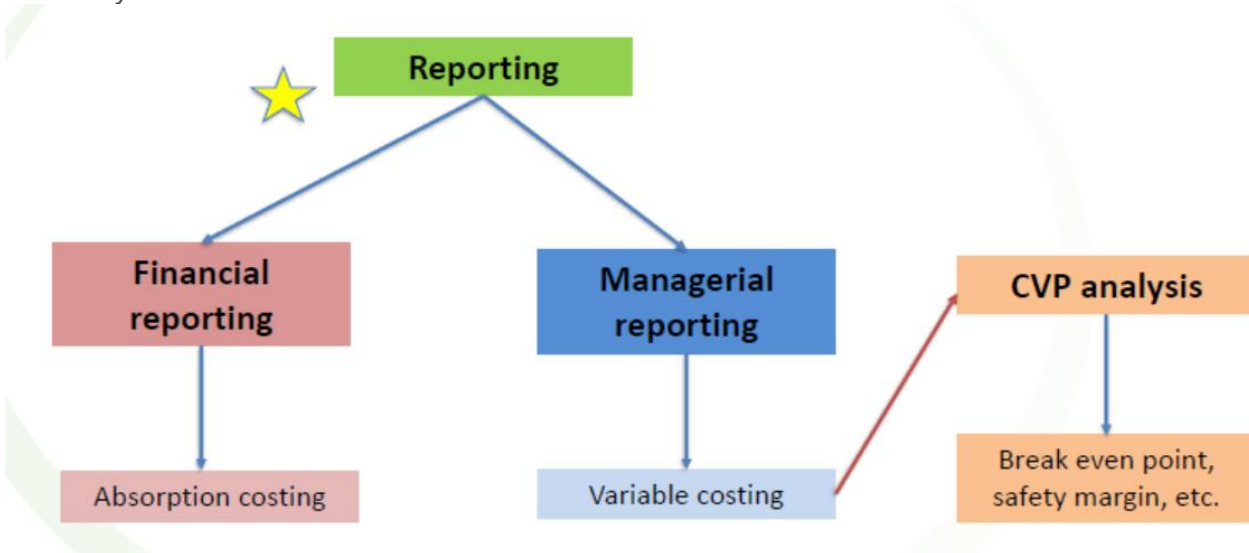
Managerial reporting, such as Cost-Volume-Profit (CVP), forms part of Learning unit 3: Planning and Control.
[Note: Costing terms and concepts are dealt with throughout the various Learning units.]

2.   Illustration of the difference between absorption and variable/direct costing

Refer to the two different Statement of Profit or Loss and Other Comprehensive Income below for an illustration of how the profits are determined under each basis and how the presentation differs:

Absorption costing		R	Variable/Direct costing		R
Turnover		4 800	Turnover		4 800
Less:		(3 840)	Less:		(2 880)
Cost of sales	Fixed and variable manufacturing		Variable cost of sales	ONLY variable manufacturing	
Opening inventory		720	Opening inventory		540
Production cost		3 360	Production cost		2 520
Less: Closing inventory		(240)	Less: Closing inventory		(180)
		960			1 920
Total Fixed overhead variance (Under- or over-recovery of overheads)		(72)			
			Less: Other variable costs (non-manufacturing)		(75)
Volume variance (fixed manufacturing overheads / labour)		(60)			
Expenditure variance		(12)			
Gross profit		888	Contribution		1 845
Less: All non-manufacturing costs (fixed and variable) (period cost)		(375)	Less: Fixed costs (manufacturing and non-manufacturing) (total actual amount)		(1 212)
Profit		513	Profit		633

3.   Additional information:

Variable Costing requires Contribution calculation:

Contribution = Turnover (Sales) – ALL variable costs

When **variable costing** is applied:
Total fixed production overheads variance = Expenditure variance **only**.
The **fixed production overheads volume variance is not applicable**.

The Fixed production overhead expenditure variances is shown when preparing a Statement of Profit or Loss and Other Comprehensive Income on the variable costing method.

Absorption costing requires Gross Profit calculation:

Gross Profit = Turnover (Sales) – ALL production costs (Cost of Sales)

When **absorption costing** is applied:
Total fixed production overheads variance = **Volume variance + Expenditure variance.**

An **adverse volume variance** means the actual production volume is **less** than the budgeted production volume used. Favourable volume variance: actual production volume is **more** than the budgeted production volume used. *[Refer to Learning unit 4: Standard costing for a more detailed explanation.]*

The **total** fixed production overheads variance for overhead/labour should be included ABOVE the gross profit line, as part of the production cost for the period under review.

(*Note: due to different teaching applications, volume variance below the line will still earn marks when clearly shown).*

The volume and expenditure variances are reflected on the Statement of Profit or Loss and Other Comprehensive Income if the absorption costing method is applied.

The discussion which follows covers questions and answers that students generally experience problems with:

Why is labour in most instances a fixed cost? Should I treat labour the same way that I treat other fixed manufacturing production overhead?

"Labour costs have traditionally been regarded as variable on the assumption that management can retrench workers in the event that production levels decline. In practice, downsizing and retrenching workers is not a unilateral decision, and negotiations with unions are required before wide-scale retrenchments can be implemented. In any event, retrenchments are not an everyday occurrence. To assume that labour costs are variable because of the potential to reduce these may be inappropriate." Machines or plants can also be taken out of production. That does not make costs relating to machines or plants variable!

Furthermore, in many production facilities, employees oversee automated machines. Their labour effort cannot be traced to individual units. This type of labour would then be classified as overhead and usually fixed for the same reason as explained above.

Therefore, **labour is often a fixed cost and should then be treated like fixed overheads**. In scenarios presented to you, we will clearly indicate if some labour is variable, i.e. piece work. In the absence of this you may assume that the manufacturing labour component is included in fixed production overheads.

So why are you using the estimated/budgeted fixed overheads and calculating a rate? When do you calculate the cost of your product? Do you need to know the cost price as you sell it throughout the year or do you calculate it when you have all the information at the end of the year?

You don't know what your actual overhead is going to be until the end of the year, but you can't delay your cost calculations until the end of the year. How will you quote the selling price of your products if you don't know the cost price? We estimate the activity level to calculate a budgeted overhead rate because we need to know the estimated cost price of our production, and we need to know this before the end of the year. Refer to page 94 in Drury SA 1st edition or page 61 in Drury 10th edition for a full explanation of why budgeted overhead rates are used.

□ SAICA 2008 QE 1: Amandla Engineering

4.   How do we allocate manufacturing overheads to products?

Note: Allocation of manufacturing overheads forms part of Absorption costing.

Manufacturing overheads cannot be traced directly to products. They are assigned to products using cost allocations. A cost allocation is a process of estimating the cost of resources consumed by products that involve the use of surrogate rather than direct measures, as set out in LEARNING UNIT 1.1

To calculate the budgeted overhead rate:

	Budgeted manufacturing overhead
Budgeted overhead rate =	Appropriate allocation base

> **Focus note:**
> Please study Drury (SA 1st edition) pages 192 – 193 or Drury (10th ed) pages 158–160 in depth. The most appropriate allocation base (denominator) is the AVERAGE long-run capacity utilisation (i.e., plant life). If this is not given, you may use the next period's *budgeted* activity.
>
> Refer to IAS 2 par 13 on the dangers of over or under-costing products when using the next period's budgeted activity level.

The following activities are popular for allocating overheads because they are simple to calculate:

- Direct labour hours
- Machine hours

Other traditional bases used may be:

- Labour cost Rands
- Units produced

The above are normally referred to as traditional or volume-based bases.

Activity 1.2.1 – Traditional bases applied

The budgeted fixed production overhead for 20x8 is R900 000. The average long-run utilisation and related costs for this plant are:

- Direct labour hours   – 36 000 hours
- Machine hours   – 22 500 hours
- Units produced   – 45 000 units
- Labour cost   – R540 000

REQUIRED

Calculate a budgeted fixed overhead rate for each of the traditional measures above.

Feedback 1.2.1

FOH rate based on direct labour hours	R900 000 ÷ 36 000 hours
	R25 per Direct labour hour
FOH rate based on machine hours	R900 000 ÷ 22 500 hours
	R40 per Machine hours
FOH rate based on units produced	R900 000 ÷ 45 000 units
	R20 per unit
FOH rate based on direct labour Rate cost	R900 000 ÷ R540 000
	R1,667 per R1 direct labour
	Or 166,67% of labour

7. Calculating fixed production overhead variances (Absorption costing)

TOTAL FIXED PRODUCTION OVERHEAD VARIANCE (Under-/over recovery)

Volume variance	Expenditure variance
(difference between original budgeted and the amount allocated to actual production)	Applicable if there is a difference between budgeted and actual cost in **rand** terms.
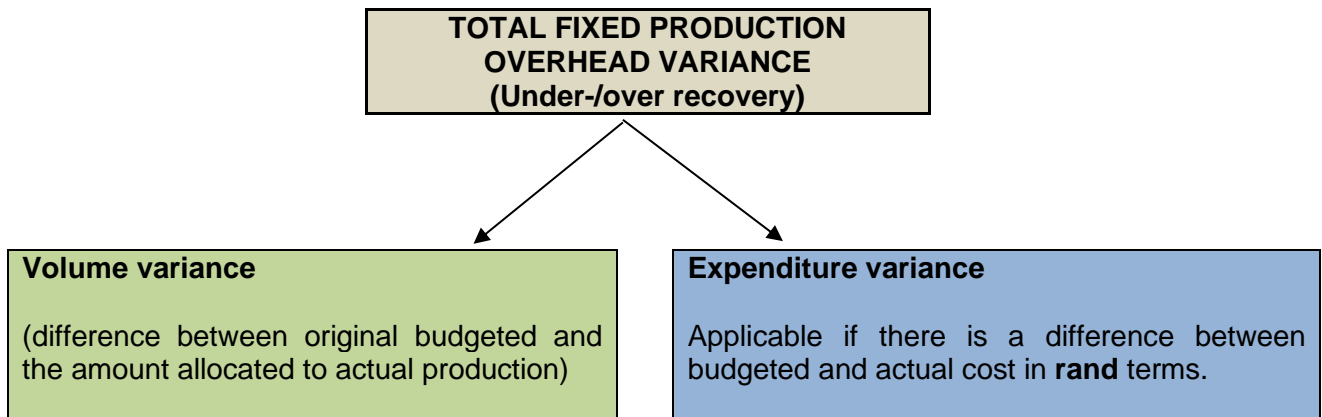
Focus note

Even though fixed production cost variance is reported on a total basis, for management accounting purposes, you should be able to distinguish between volume and expenditure variance as a cost control measure.

You can calculate an expenditure variance even if you do not apply a full standard costing system and for variable costing.

Activity 1.2.2 – Basic example: Overhead recovery and variances

Budgeted activity = normal average long-run capital utilisation

Budgeted fixed production overheads	R2 000 000	
Budgeted annual activity	1 000 000	direct labour hours
Actual overheads	R2 125 000	
Actual activity	900 000	direct labour hours

REQUIRED

Use the above information to calculate the volume and expenditure variances.

Feedback 1.2.2

<u>**STEP 1**</u>: Calculation of budgeted rate = Budgeted OH appropriate allocation base
Budgeted rate = R2 000 000/1 000 000 hours
= R2/hour

<u>**STEP 2**</u>: Rate x actual production volume

Therefore, absorbed into production (R2 x 900 000 actual hours)	R1 800 000
Budget (based on 1 000 000 hours)	R2 000 000
Volume variance (difference between absorbed and budgeted hours)	R 200 000

Is this an over- or under-recovery (favourable or unfavourable)?

> If all goes according to plan, we would have **allocated all fixed production overhead costs** to the production account. However, due to the volume variance this does not happen.

The T-accounts would look like this:

Dr		Cr	
Actual production overheads			
	R		R
		Production costs	2 000 000
Bank/creditors	2 125 000	To expenditure variances	125 000
		Closing balance	
	2 125 000		2 125 000

Dr		Cr	
Production overheads control (= Budget)			
	R		R
From actual	2 000 000	To production	1 800 000
		To volume var.	200 000
	2 000 000		2 000 000

Dr		Cr	
Production			
	R		R
All overheads	1 800 000	To inventory	xxx
	xxx		

Dr		Cr	
Volume variance			
	R		R
Prod o/h	200 000		xxx
	xxx		

If there is a debit balance left in the production overheads control account, it means the costs are not yet recovered. A credit balance means more costs are recovered.

> Therefore it is an **adverse** volume variance of R200 000 (**unfavourable**) as we were not able to utilise our machine effectively and allocate the total budgeted fixed overhead using the fixed overhead rate.

<u>Expenditure variance</u>

This is a separate calculation and is **NOT** concerned with the recovery of fixed overheads.
Expenditure variance   = Actual overhead expense – budgeted overhead expense
Expenditure variance   = R2 125 000 – R2 000 000
= R125 000 **Unfavourable**

This is treated as a period cost and should not be debited to production costs (expense account).

> **Note:**
> You have to indicate variance as **"Favourable"** or **"Unfavourable/Adverse"** and **indicate signs "+ or −"**
>
> In the illustrative example you will see that both the **volume and expenditure** variance for **absorption costing system** are included separately:
> ➢ **NOT** as Cost of Sales;
> ➢ **NOT** as **part of the production cost;**
> ➢ **But** separately **above** the **Gross profit** line.
>
> Remember that actual **fixed costs** are below the contribution line for the **Variable costing system** and are expensed and treated as a period cost.

Activity 1.2.3 – Overhead recovery

Use the same information as in activity 1.2.2, but now assume that:

Actual annual activity	1 050 000 direct labour hours

REQUIRED

Calculate the volume and expenditure variances.

Feedback 1.2.3

Charged to production (R2 x 1 050 000 actual hours)	R 2 100 000
Budgeted overheads (Based on 1 000 000 hours)	R 2 000 000
Volume variance **(Favourable)**	R 100 000

This is a **favourable** volume variance and would usually be a credit or negative period "cost". Refer to Activity 1.2.5 part d) for the accounting treatment where this variance is **"unusually"** high.

Activity 1.2.4 – Overhead and volumes

The Rubber Company's Cape Town factory budgeted that their 20x8 overhead would be R4 800 000. Their normal average long-run manufacturing level is 80 000 fan belts. The actual costs for 20x8 were R4 890 000 and 75 000 fan belts were manufactured.

REQUIRED

Calculate the volume variance and explain how it will be treated.

Feedback 1.2.4

The fixed overhead rate is determined based on the normal average capacity level, in this case 80 000 units.

Budgeted overhead rate

= R4 800 000 ÷ 80 000 fan belts
= R60/fan belt

Expenditure variance

	Actual incurred	R4 890 000
∴	Budget	R4 800 000
	Variance: Expenditure	R90 000 Unfavourable

Volume variance

Manufactured units are less than the allocation base, there is thus an 'under-recovery' (less) of cost as each unit manufactured will receive the budgeted rate.

∴ 'Under-allocation': volume variance   R   300 000

[80 000 units – 75 000 units] (5 000 units x R60)

OR

Detailed disclosure:	Budgeted	R4 800 000
	Allocated to production	4 500 000

Alternative:	R4 800 000 – R4 500 000	R300 000 Volume variance

It appears as if there is a favourable variance (in rand terms), but you should consider the units manufactured, which are less than budget and therefore **unfavourable**. Under absorption costing the volume variance is unfavourable and must be treated as a period cost.

Please note that the above activities use fixed production overhead costs. If a question states that labour cost is FIXED, labour cost should be treated in exactly the same manner as fixed overhead cost.

For management accounting purposes, you must show the expenditure and volume variances separately on the statement of profit or loss and other comprehensive income above the gross profit line. **Don't just include the actual fixed production overhead costs.**

Activity 1.2.5 – Advanced scenario

What topics does this activity cover?

*   High-low method
*   Absorption costing
*   Allocation of overheads
*   Variable costing

Question (C1)   **22 Marks**

You were involved in the preparation of the budget at the beginning of this year. The company manufactures only one product. Estimates of annual sales, production and sales, distribution and administration costs for a one-year period, on which your plans were based, are set out below:

C1: Note mark allocation and calculate how long it should take you to answer this question. **22 x1.5 = 33 minutes**

Activity level	**80%**	**100%**
Sales and production (C) (C2.1)	720 000 units	900 000 units
Sales	R5 760 000,00	R7 200 000,00
Production costs	R2 970 000,00	R3 420 000,00
Sales, distribution and administration costs	R1 864 000,00	R2 080 000,00

C2.1 Sales = Production Therefore, no movement in inventory forecasted/ budgeted.
C2: There are two levels of production and 2 costs, therefore you should use the high-low method to determine the fixed and variable components

The production costs and the sales, distribution and administration costs are total costs, therefore include both variable and fixed costs (C3). Fixed costs are incurred evenly throughout the year.

C3: Production and sales and distribution have BOTH fixed and variable components. You have to split these costs using the high-low method. Fixed costs incurred evenly throughout the year. Make a note of this – refer to reporting period.

The normal average long-run level of activity used for allocating fixed production overheads is 900 000 units per annum. (C4)

C4: Make a note of this. You will need it to calculate fixed overheads absorbed in part (a). C4.1: This is the actual figures.

The following information pertains to inventory for the first quarter which has just ended: (C4.1)

- Opening inventory of finished goods   5 000 units
- Units manufactured   240 000 units
- Units sold   228 000 units (C5)

C5: You can use this information to calculate closing inventory.

- The actual fixed costs incurred equal budgeted amounts. (C6)

C6: **No** expenditure variance. This applies to ALL fixed costs

Required:

(a)   Calculate the following for the first quarter if absorption costing (C7) is used:

C7: Fixed production overheads allocated to production. Budgeted overheads divided by appropriate allocation base.

1.   The total amount of fixed production overheads absorbed during the quarter (C8) that has just ended.   (5 ½)

C8: What **was produced** for the quarter, **not** sold.

2.   The <u>volume variance</u> (C9) for fixed production costs for the quarter, and   (2 ½)

C9: Compare budget to actual production.   **Read the required:** Per **Quarter** not per annum.

3.   The profit for the quarter, as shown in the Statement of profit or loss and other comprehensive income (C10)   (8)

C10: Prepare a detailed Statement of profit or loss

(b)   Prepare the journal entry to record the volume variance calculated above. The <u>narration may be omitted</u>.   (1)

(c)   Calculate the <u>net profit or loss for the quarter if variable costing</u> (C11)
       (direct costing) is used. (You are advised to simply <u>adjust the absorption costing profit figure</u> already calculated, (C12) rather than drawing up an income statement on a contribution basis.)
                                                                                            (3)

C11: What is variable costing? Note the different terms in brackets for variable costing. C12: Time saving. Don't waste time drawing up a new income statement. **Read the required**

(d)   What should the <u>value of inventories be in terms of IAS 2</u> (International Accounting Standards), given that the high level of production is considered to be **materially** different (C13) from the budget? Assume that year-end considerations must be taken into account now already.   (2)

C13: Value of closing inventory per the Statement of Financial Position. Please note the high level of production comment. Will one have to adjust closing inventory?

(e)
You may assume that sales revenue and variable costs per unit equal budgeted amounts. (C14)

C14: No variances from budget – can value inventory at budgeted cost per unit, except for adjustment may be required as result of production volume.

Ignore all forms of taxation.

(Source: AGA – adapted)

Feedback 1.2.5

(a) High-low method for production costs and sales distribution and admin costs:

Calculations:

Production costs	R
Total production costs @ 900 000 units	3 420 000
Total production costs @ 720 000 units	2 970 000
	450 000

Variable production cost per unit	= 450 000/ (900 000 – 720 000)
	= **R2,50**

Total production costs	3 420 000
Variable production costs	2 250 000 (900 000 x **R2,50**)
Fixed production costs	1 170 000

Sales, distribution and admin costs (S,D&A)

Total S,D&A costs @ 900 000 units	2 080 000,00
Total S,D&A cost @ 720 000 units	1 864 000,00
	216 000,00

Variable S,D&A cost per unit	=	216 000/(900 000 – 720 000)
	=	**R1,20**

Total S,D&A costs	2 080 000	
Variable S,D&A costs	1 080 000	(900 000 x **R1,20**)
Fixed S,D&A costs	1 000 000	

High-low method used to separate fixed and variable costs.

Opening inventory	5 000 units
Units produced	240 000 units
Unit sold	(228 000) units
Closing inventory	17 000 units

Normal average long-run level of activity used for rate.

Budgeted fixed production overhead rate = R1 170 000/900 000 units
= **R1,30** per unit

Cost per unit = R2,50 (VC) + R1,30 (FC) = R3,80

(a)

1.   Fixed production overhead amount absorbed   = 240 000 units x R1,30
= R312 000

Units manufactured drive absorption of cost.

2.   Fixed production overhead incurred
(= budget therefore : R1 170 000 x ¼)   R 292 500*
Overhead absorbed   R 312 000**
Volume variance (over recovery)   R   19 500

Use fixed overheads for the quarter only!!!
*900 000 X 1/4
=225 000 X R1.30
**240 000 X R1.30

3.   Profit using absorption costing   **R**

Sales (228 000 x R8)	1 824 000
Cost of sales:	(866 400)
Opening inventory (5 000 x R3,80) Production	19 000
(240 000 x R3,80)	912 000
Closing inventory (17 000 x R3,80)	(64 600)
Sales less Cost of sales	**957 600**
Total Fixed overhead variance	19 500
Favourable volume variance 19 500	
Expenditure variance 0	
Gross profit	**977 100**
Selling, distribution and admin costs:	
Variable (228 000 x R1,20)	(273 600)
Fixed (**1/4** x R1 000 000)	
	(250 000)
Net profit	**453 500**

As per part 2

Variable cost now linked to number of units sold.

Used fixed overheads for the quarter only!!! X1/4

(b)   Dr Production overhead control   R19 500
Cr Profit and loss/Cost of sales   R19 500

N1: Start with absorption costing profit per above.

(c)   Absorption costing profit (N1)   453 500
        Fixed overhead deferred in Inventory (N2)
        (12 000 x R1,30), now expensed   (15 600)

        Variable costing profit   R437 900

> N2: This is calculated as follows:
> 5 000 x 1.30 = 6 500
> (opening inventory)
> **Less**
> 17 000 x1.3 = (22 100)
> (closing inventory)

The difference between absorption and variable profits will always be the fixed production overheads component per unit multiplied by the inventory movement in units:

        Opening inventory units x fixed production overheads
        per unit (5 000 X R1.3)   R   6 500
        Less closing inventory units x fixed production
        overheads per unit (17 000 X R1,3)   (R 22 100)
        Difference in profits   R 15 600

Note:

Remember that when you work with annual profits, the fixed production overheads component per unit of the opening inventory will be different from the closing period as it is derived from different production periods. You may need to do some calculations to compute the operational inventory values.
The volume and expenditure variances are "exposed" under both systems and will not make a difference.

(d)   **Additional explanation: Abnormally higher levels of production**

IAS 2 par 13, states that the allocation of fixed production overheads to the costs of conversion is based on the **normal average capacity** of the production facilities. However, in periods of **abnormally high production**, the amount of fixed overhead allocated to each unit of production is **decreased** so that inventories are not measured above cost. (This is normally only applied at year-end.)

The scenario states that the normal level of activity used for budgeting purposes is **900 000** units per annum which, was used to determine the overhead rate of **R1,30** per unit.

The Required states that "the high level of production is considered materially different from the budget" and that year-end considerations must be considered. The production level for the specific quarter should then be compared to the normal level of activity of 900 000 per annum. The production for the quarter is converted to an annual figure:
240 000 (quarter) x 4 = 960 000 units per annum.

This is **abnormally high** (+6,67%) compared to 900 000 and therefore the overhead rate should be decreased by using 960 000 units instead of 900 000. Using 900 000 has resulted in a higher rate and therefore overstated the inventory value.

The rate is recalculated: R 1 170 000 / 960 000 = R1,21875 per unit.
Difference between new rate and previous rate: R1,30 – R1,21875 = R0,08125
Closing inventory (17 000 units) already includes R1,30 per unit which, must be written down:
 = 17 000 units x R0,08125 per unit = R1 381,25

Note: The fixed production overhead component of units sold has already been expensed. Only the value of inventory carried in the SFP is affected, as it is overstated.

Inventory value (17 000 x R3,80)	64 600
Less: Deferred volume variance	(1 381)
	63 219

Workings:
Closing inventory (17 000 units) to be written down as follows:
17 000 x (R1,30 – R1 170 000 / 960 000) = R1 381,25

| Dr | Income | R1 381,25 | |
| | Cr Inventory | | R1 381,25 |

Activity 1.2.6

Attempt questions from the Drury **Student Manual**:

Miozip Company	Question 7.10 (SA 1st ed) page 41 to 42, solution p 258 to 259
	Question 7.10 (10th ed) pages 42-43, solution p 237 to 238
R Ltd	Question 7.7 (a and b only) (SA 1st ed) page 39, solution p 254 to 255
	Question 7.7 (a and b only) (10th ed) page 40, solution p 233 to 234

Attempt question from the Drury **Textbook:**

Question 7.13 (SA 1st ed) pages 196, solution page 846
Question 7.16 (10th ed) page 164, solution page 749

Feedback 1.2.6

Question 7.10 – Miozip Company

Ensure that you have revised the examples in Chapter 7 that explain the differences between the profits of a variable and absorption costing system.

Variable costing: As sales INCREASE, Profits INCREASE– it is straightforward.

Absorption costing: It depends on production and sales. If you produce an excess in one year (sales < production), then the "leftover" inventory is carried in the current year's closing inventory and carried forward to next year's opening inventory, therefore affecting the cost of sales value, which has an effect on the profit.

REFLECTION 1:

If the Statement of Profit or Loss and other Comprehensive is prepared on an **absorption costing** basis, the **fixed production overhead costs are carried in opening and closing inventory** thus distorting the actual cost of sales and affecting the final profit figure.

If required to perform "appropriate supporting calculations". Consider what calculations I should show to prove that the absorption costing system distorts the profits? What is an ideal costing system? Variable costing. This is because profit varies directly with sales. As sales increase, profit increases.

WORK SMART: Time management: Don't prepare an entire Statement of Profit or Loss and other Comprehensive income. What is the **difference** between a **variable costing** system and an **absorption costing** system?

Fixed overheads are included in opening and closing inventory in the cost of sales of the **absorption costing** system. Calculate how much fixed production overheads have been included in opening and closing inventory and recalculate what your profit would have been if the effect of fixed overheads was excluded.

TIP: You are given the total opening and closing inventory. You know what the cost per unit is (given in the scenario), therefore you will be able to calculate the units for opening and closing inventory.

REMEMBER:

> In **a variable costing system**, fixed manufacturing overheads and other fixed non-manufacturing costs are treated as **period costs** and are thus charged directly against profits.
>
> In an **absorption costing system**, fixed manufacturing overheads are a **product cost** and are therefore included in the **valuation of inventory (part of cost of sales).**
> This means that cost of sales and thus profits will be affected by the changes in inventory.
> Therefore the inventory movements can have an un/favourable effect on profits even though sales/revenue increases.

REFLECTION 2:

READ CAREFULLY:

What information has been given in the scenario?
Are there:
* Variable costs
* Semi-variable costs (high-low?)
* Fixed overheads (What do they want me to do with this?)

If the company uses a **variable/marginal costing** system and Management wants to compare this to an **absorption costing** system.

REMEMBER:

1. How is a Statement of Profit or Loss and Other Comprehensive Income prepared on a **variable costing** basis?
2. What does preparing a Statement of Profit or Loss and Other Comprehensive Income mean on an **absorption costing** basis?
   * The fixed overheads are included in the cost of the product
   * To assign overheads I have to calculate a budgeted overhead rate: Overhead rate = Budgeted overheads (rand) / Allocation basis (labour hours, machine hours, units)
   * Expenditure variance? Is there an expenditure variance? There will be an expenditure variance if there is a difference between budgeted and actual overheads.

Where do I start?

* Sort out your <u>costs per unit</u>. What is my product cost? What is the variable product cost? What is the fixed product cost? (Remember that you will have to allocate the fixed overhead cost to each product using an overhead rate.)
* What are my <u>units</u>?
* Note: there is no additional or lower allocation of fixed costs in the absorption costing Statement of Profit or Loss and Other Comprehensive Income in part i) of the solution.
* Guidance for the absorption costing Statement of Profit or Loss and Other

Compare your answers to the solutions on the pages as indicated above. Where you have gone wrong, **reflect** upon why it has happened, as that will improve the learning process. Is there anything specific/strange/unusual in the solutions that you want to point out?

Video

Watch the videos about a brief variable and fixed cost concepts; variable and absorption costing and overn and under recovery of overheads available on *My*Unisa refer to lesson 1.2.

RECAP QUESTIONS from tutorial letter 103 that will be made available later for revision and assessment preparation purposes:

- Ice Castle part a (i); (ii) and (iii)

- Famous Fishing part (l)

- Honeysmooth (Part A) (a, b, c, d, e)

Enrichment activity

Follow the link and watch the "How it's made" episode about the production of microprocessors:
https://www.youtube.com/watch?v=OjBkc2xKAhE

Note that a highly mechanised and computerised production process will result in a high proportion of overhead costs and therefore need an absorption costing system to determine the cost of each microprocessor.

8. Summary

In this learning unit, we covered the calculation of an appropriate fixed overhead rate and the preparation of the Statement of Profit or Loss and Other Comprehensive Income using the absorption and variable costing methods.

LEARNING UNIT 1.3   Activity-based costing (ABC)

> ## LEARNING UNIT 1.3   LEARNING OUTCOMES
>
> After studying this topic, you should be able to do the following:
>
> 1.3.   Apply an activity-based costing approach to costing information in a scenario.
> 1.3.   Advise management on which type of costing system is appropriate and how the systems differ.

Prior learning

This course assume students have already mastered the work equivalent to that presented in Unisa's preceding undergraduate degree. Please ensure that you are up to date with the prior learning for the topic of activity-based costing. If not, please refer to your **undergraduate study material** and revise the textbook (Drury) using the page numbers below:

Prior learning	Drury SA 1st edition	Drury 10th edition
Before studying this topic, you should be able to: • Describe the differences between activity-based and traditional costing systems. • Identify environments that are favourable for the implementation of an ABC system. • Explain why traditional costing systems can provide misleading information for decision-making. • Identify and explain each of the four stages involved in designing ABC systems. • Apply an activity-based costing approach to costing information. • Determine cost hierarchies in an activity-based costing system. • Apply product profitability analysis using activity-based costing hierarchies. • Discuss the use of activity-based costing in service organisations and its other management applications. • Describe activity-based budgeting (ABB). • Describe activity-based management (ABM).	**Applicable references:** **Drury: Chapter 5:** Activity-based costing. Pages 114 – 149. **Drury: Chapter 4:** Illustration of the two-stage process for an ABC system. Pages 87-94. **Drury: Chapter 16:** Activity-based budgeting. Pages 476 – 479. **Drury: Chapter 23:** Activity-based management. Pages 739–743	**Applicable references:** **Drury: Chapter 11:** Activity-based costing. Pages 255–267 and 270-277 **Drury: Chapter 3:** Illustration of the two-stage process for an ABC system. Pages 51–60 **Drury: Chapter 15:** Activity-based budgeting. Pages 386–388 **Drury: Chapter 22:** Activity-based management. Pages 598–602

1. Introduction

Even though activity-based costing (ABC) is presented as a separate topic in management accounting, it is in reality an extension of the previous topic: 'absorption costing'. The reason is that ABC is quite simply a different absorption costing method for the allocation of fixed manufacturing overheads to products. The only difference between ABC and the traditional methods is that ABC uses different activities as its allocation base, whereas the traditional methods only use volume-related bases, such as machine or labour hours, to allocate overheads to products.

> **Do not confuse ABC and Absorption costing, even though ABC is an extension of Absorption costing it is not the same term.**
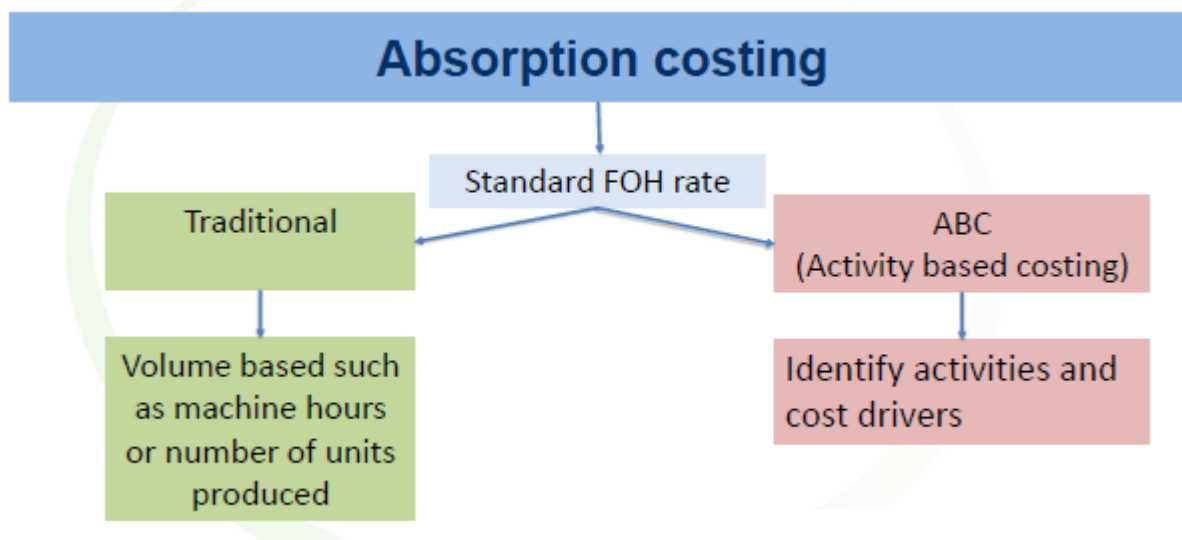
2. Critical topics:

- Activity-based costing and cost drivers
- ABC profitability analysis
- Activity-based budgeting and activity-based management (resource consumption models)

3. Activity-based costing (ABC)

a) Why do we use ABC?

ABC is used as it may lead to more accurate pricing of products, which will therefore influence all decision-making with regard to those products, e.g. whether or not to withdraw a product, or what price to charge for it.
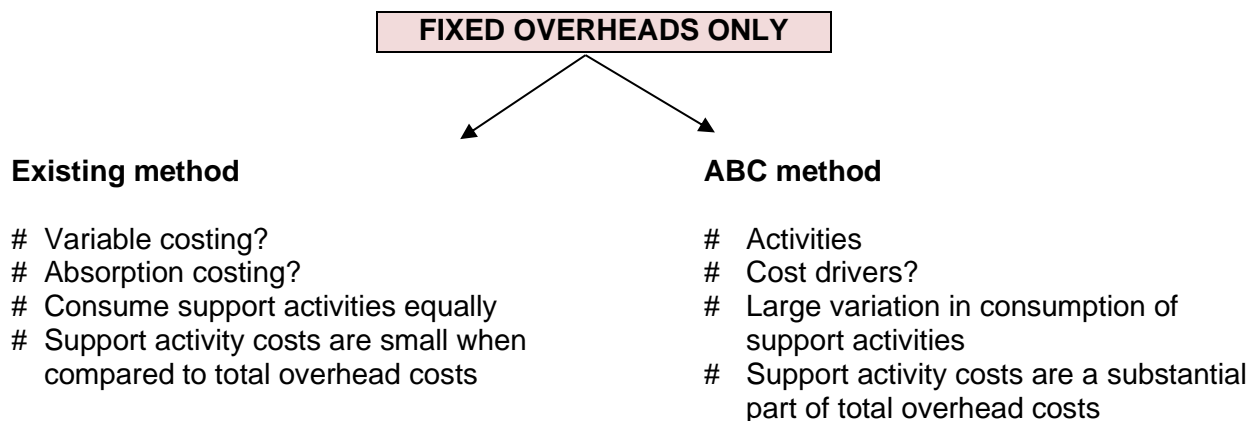
Traditionally, overhead costs were either **small** in comparison to directly measurable and traceable costs, such as material costs or the fixed overhead costs were **largely volume-driven** (i.e. machine or labour hours). The method of allocating overhead costs to products was historically largely unimportant. However, in the advanced manufacturing environment that companies are currently trading in, fixed overhead costs have escalated dramatically, and now make up a substantial portion of the cost of a product. It is becoming increasingly important to allocate the cost of the overheads correctly to the products involved, to ensure a firm's continued success and competitiveness.

ABC is also useful in the costing of cost objects separate from products. When ABC is applied to support activity hierarchies, costs for diverse cost objects such as a whole product line, a production plant, a customer, customer groups (geographic area) etc. can be computed. This is important for analyses of profitability of the diverse cost objects in support of management's decisions regarding allocation (or withdrawing) of resources. ABC and its related concepts are therefore a very handy arrangement tool in **optimising an entity's fixed production and other support activity infrastructure**.

b) How to attempt an ABC question

What information should you be looking for?

- STEP 1: Existing method – for example, the company could use a traditional absorption costing method or direct/variable costing. You have to ascertain the existing costing method as this will be the first calculation. Every question is different because every company is different.

- STEP 2: ABC *calculation* questions often require a student to compare an ABC system with an existing product costing method. You should thus separate the information for the existing product costing method and the ABC method.

- STEP 3: ABC – **Identify the activities** and their relevant **cost drivers** and decide which cost driver **matches** a specific overhead cost. Calculate the cost per activity using the cost drivers and then allocate costs to products/cost objects based on their usage of the activity.

- Always remember that the difference between all the costing methods i.e. variable costing, absorption costing and ABC costing lies in the treatment of the **fixed manufacturing overheads.**

<div align="center">

FIXED OVERHEADS ONLY

</div>

Existing method

- # Variable costing?
- # Absorption costing?
- # Consume support activities equally
- # Support activity costs are small when compared to total overhead costs

ABC method

- # Activities
- # Cost drivers?
- # Large variation in consumption of support activities
- # Support activity costs are a substantial part of total overhead costs

Activity 1.3.1 – Comparative overhead rates

Company A manufactures 100 000 reams of paper, consisting of 70 000 reams of white paper, 20 000 reams of blue paper and 10 000 reams of green paper. Manufacturing is arranged in such a way that it only requires one set-up per type of ream (i.e. white, blue and green) regardless of the volume produced. Each set-up activity costs R50 000. Overhead cost is allocated on a per unit basis.

Use the above information to calculate and compare the set-up cost per ream per type of paper using traditional absorption costing and ABC analysis.

Feedback 1.3.1

Traditional absorption costing

In a traditional costing system, the total cost of the set-up activities, i.e. R150 000 (R50 000 x 3 set-ups) will be allocated on a volume-based measure (units) to the different products.
The calculation will be:
R150 000 set-up cost / 100 000 reams manufactured = R1,50 per ream (irrespective of type)

ABC analysis

ABC realises that each type of paper leads to a **set-up activity** being incurred and allocates the cost of that activity to the product that **caused** the cost.

The allocation will therefore be done as follows:

White paper: Set-up cost R50 000 / 70 000 reams manufactured = R0,71 per ream
Blue paper: Set-up cost R50 000 / 20 000 reams manufactured = R2,50 per ream
Green paper: Set-up cost R50 000 / 10 000 reams manufactured = R5,00 per ream

Comment
Traditional absorption costing methods **over-cost fixed overhead cost of high-volume** products. The manufacturing of white paper gives rise to the same cost as the manufacturing of green paper, but many more reams of white paper are produced for the activity (and cost) than are incurred in comparison to green paper. In order for the company to remain competitively priced, it is important to ensure that the high-volume products are **not** subsidising the costs of the lower-volume products.

Activity 1.3.2

FHM has recently introduced an ABC system. It manufactures 3 products, details of which are set out below:

Product	F	H	M
Budgeted annual production (units)	300 000	300 000	150 000
Batch size (units)	300	150	75
Machine set-ups per batch	9	12	18
Number of component-sets per order placed*	1 200	750	600
Processing time per unit (minutes)	6	9	9

* Note: Each unit of each product needs one set of components.

Three costs pools have been identified, with budgeted costs for the year ending 28 February 20x8 as follows:

Machine set-up costs	R450 000
Purchasing of materials	R210 000
Processing	R80 000

REQUIRED

What is the total budgeted overhead cost per unit for each product?

Feedback 1.3.2
STEP 1: The batch size and annual production are given.

	F	H	M
Budgeted annual production	300 000	300 000	150 000
Batch size	300	150	75
Number of batches	1 000	2 000	2 000

STEP 2:   Use the number of batches to calculate the number of machine set-ups and orders

	F	H	M
Machine set-ups per batch x number of batches	9 x 1 000 = 9 000	12 x 2 000 24 000	18 x 2 000 36 000
Number of **purchase orders** for annual production	300 000 ÷ 1 200 = 250 given	300 000 ÷ 750 400 given	150 000 ÷ 600 250 given

STEP 3: Calculate the total minutes per unit.

Number of units x minutes per unit   6 x 300 000   9 x 300 000   9 x 150 000
                                                      = 1 800 000   2 700 000   1 350 000

STEP 4: Allocate to costs.

Purchase orders = 250 + 400 + 250 = 900
                                 R
F = 250 / 900 x R210 000   58 333   ⎫   This is a shortcut method. The theoretically pure
H = 400 / 900 x R210 =   93 334   ⎬   Approach is to calculate the cost/activity and then multiply
M = 250 / 900 x R210 000 = 58 333   ⎭   it with the activity usage of each product – See note 1.

Total setups = 9 000 + 24 000 + 36 000   = 69 000
                                               R
F =   9 000/69 000 x R450 000   = 58 696
H = 24 000/69 000 x R450 000   = 156 522
M = 36 000/69 000 x R450 000   = 234 783

Total processing time = 1 800 000 + 2 700 000 + 1 350 000 = 5 850 000 minutes
                                               R
F = 1 800/5 850 x R80 000   = 24 615
H = 2 700/5 850 x R80 000   = 36 923
M = 1 350/5 850 x R80 000   = 18 462

Note 1:   The cost can be expressed per activity, e.g. for purchase orders, this will be
                R210 000 ÷ 900   = R233,33.

Note 2:   The full (100%) of overhead cost should be addressed. Where the given activities recover
                less than 100%, the missing portion or percentage should be allocated using the traditional
                basis.

Note 3:   The total costs remain unchanged, but the allocation to the three products is now different.

Total costs:	F	H	M
Purchases	58 333	93 334	58 333
Set ups	58 696	156 522	234 783
Processing	24 615	36 923	18 462
TOTAL	**141 644**	**286 779**	**311 578**
Number of units	300 000	300 000	150 000
Overhead cost per unit	0,4721	0,9559	2,0772

Note:

Do you see that the low-volume product **M** consumes **disproportionally more** support activities and carries a higher overhead per unit cost?

Under the traditional allocation method, all three (3) products would have carried the same overhead cost per unit (if the number of units were used as the allocation base).

4. Activity-based budgeting (ABB)

Study the following sections in *Management and Cost Accounting* (Drury):

SA 1st ed. pages	10th ed. pages	Section
CH16: 476 – 479	CH15: 386–388	Activity-based budgeting

Activity-based budgeting is a logical progression from activity-based costing and management. The following are the approaches to or benefits gained by using activity-based budgeting compared to conventional budgeting:

1. ABB focuses on the appropriate value chain necessary for the organisation to meet its strategic needs.

2. The forecast workload is specifically determined from a customer's perspective rather than from an organisational constraint perspective.

3. Conventional budgeting normally follows the convention of budgeting for cost elements (expense items) within cost centres or departments and "rolling" these up (or consolidating them) into organisational budgets. ABB questions the existence of each process and each activity in requiring it to be classified as *value-adding* or not. The ABB may be the trigger to start business process redesign.

4. Conventional budgets classify costs primarily between fixed and variable costs. The classification of cost into the activity levels of unit, batch, product, process or facility variable costs provides a new insight into cost behaviour.

5. ABB requires the same detailed level of understanding of the process and product structures that a proper ABC & Management system would require. Conventional budgets usually do not require this type of detailed analysis.

6. ABB specifically focuses on the customer, marketing and distribution channels as cost objects.

7. ABB focuses on those elements of a business that may give it a competitive advantage. Benchmarking is normally an integral part of ABB.

8. ABB specifically focuses on support costs and their relationships to primary activities.

9. One of the strongest advantages of a conventional ABC system is its preoccupation with non-financial information, whereas ABB focuses primarily on the requisite activities to operate an effective organisation.

10. When an ABB system is linked to a quality management system, a specific focus on **wastage** can be incorporated into the budgeting process.

5. Activity-based management (ABM)

Study the following sections in *Management and Cost Accounting* (Drury):

SA 1ˢᵗ ed. pages	10ᵗʰ ed. pages	Section
CH23: 739–743	CH22: 598–602	Activity-based management

Activity 1.3.3 – Comparative methods and product profitability

Benco Limited manufactures two types of Twizzles; standard and deluxe. Details of the two products are given below.

	Standard	Deluxe
Annual sales – units	12 000	12 000
Selling price per unit	R65	R87
Batch size – units	1 000	50
Labour time per unit – hours	2	2,5
Labour rate per hour	R8	R8
Material costs per unit	R22	R32
Special parts per unit	1	4
Set-ups per batch	1	3
Number of sales invoices issued per year	50	240

In recent months, Benco Limited has been trying to persuade customers who buy the standard type to purchase the deluxe version instead. An analysis of overhead costs for Benco Limited has provided the following information.

Overhead analysis	R	Cost driver
Set-up costs	73 200	number of set-ups
Special part handling costs	60 000	number of special parts
Customer invoicing costs	29 000	number of invoices
Material handling costs	63 000	number of batches
Other overheads	108 000	labour hours

	REQUIRED	Marks
(a)	Calculate the profit per unit and the return on sales for standard and deluxe Twizzles using:	
	(i) traditional labour-based absorption of overheads	10
	(ii) activity-based costing methods	
(b)	Write a brief report to the management of Benco that	
	(i) recommend managerial action in the light of the information calculated in (a) above, secondly briefly advise on two possible strategies to make Deluxe as profitable as Standard.	10
	(ii) explain how activity-based techniques can be used to improve performance	

Note:

Both manufacturing overhead and sales overhead are incorporated into this activity.

Feedback 1.3.3

(a)   (i) *Labour based rate – used as given in required section*

Overhead cost   R333 200
Number of hours   54 000 (12 000 x 2 + 12 000 x 2,5) as above
Overhead rate   R333 200 / 54 000
                       R6,17 per labour hour [Remember: combined overhead]   (2)

Profit calculation

	Standard	Deluxe	
Materials	22,00	32,00	
Labour	16,00	20,00	
Overheads at R6,17	12,34	15,43	(1)
Total cost	**50,34**	**67,43**	(1)
Selling price	65,00	87,00	
Profit per unit	14,66	19,57	(1)
Return on sales	22,55%	22,50%	
Contribution	27	35	

(ii) **Calculation of labour-based costs and activity-based costs**

Overheads	R	Drivers	Total Driver Volume	Driver Rate R	Std volume	Deluxe volume	R for Std	R for Deluxe
Set-up	73 200	Set-ups	732	100	12	720	1 200	72 000
Special part handling	60 000	Special parts	60 000	1	12 000	48 000	12 000	48 000
Customer invoices	29 000	Invoices	290	100	50	240	5 000	24 000
Material handling	63 000	Batches	252	250	12	240	3 000	60 000
Other overheads	108 000	Hours	54 000	2	24 000	30 000	48 000	60 000
Total cost	333 200						69 200	264 000
Unit cost (÷ 12 000 units)							**5,77**	**22,00**

The **driver volume** is obtained by taking the **annual sales units** and dividing or multiplying that by the **activity**. Eg. for Delux set-ups: (12 000 ÷ 50) x 3 = 720; STD set-up (2 000 ÷ 1 000) x 1 = 12. The total volume is then 720 + 12 = 732.

The **driver rate** is obtained by dividing the total cost by the **total driver volume.** Eg. for set-ups: R73 200 ÷ 732 = 100. This value is then multiplied by the usage for the particular product: 720 times for the Delux, thus R72 000.

(ii)   *Activity-based costing rate*

	Standard	**Deluxe**	
Materials	22,00	32,00	
Labour	16,00	20,00	
Set-up	0,10	6,00	
Special part handling	1,00	4,00	
Customer invoices	0,42 R5,77	2,00	
Material handling	0,25	5,00	
Other overheads	4,00	5,00	(3)
Total cost	**43,77**	**74,00**	(1)
Sale price	65,00	87,00	
Profit per unit	21,23	13,00	(1)
Return on sales	33%	15%	

> These are calculated from the costs and individual costs, in the table in (a), divided by 12 000 units (the volume) or it can be done per total.

> Where a discussion is required, it will often be more time-efficient to show the overhead cost per activity and use that information in the discussion.

(b)   **Report to management**

A formal report (not produced here) is required and marks will be allocated for the report header.   (1)

(i)   *Recommendations in light of calculations made in (a) above*

In the report to the management of Benco the following points can be made:

Using the **traditional basis**, the return on sales is the same for both versions. With a higher absolute (per unit) **margin** for Deluxe, it is sensible to attempt to sell Deluxe at the expense of Standard. This decision should be based on the contribution (as fixed costs are already committed), subject to market constraints, and production capacity!   (1)

ABC indicates that the return per unit on Standard is higher and the return on sales is double that of Deluxe. It Appears that the wrong marketing strategy is being advanced because the contribution on Standard is still higher!   (1)

Managerial action to make Deluxe as profitable as Standard, one or combination of two strategies are required:

Increase price - success will depend on market and **price elasticity**. However, for a return on sales similar to Standard a price of around R112 (R74/0.66) will be needed for Deluxe. This is unlikely to allow increased sales, unless marketing can persuade customers that price indicates quality, etc.   (1)

Improve cost management/ cost efficiencies - the activity analysis indicates where overhead cost is being expended. Thus **cost-cutting** will require changes in production **efficiencies**. Set-ups are expensive for Deluxe, as are the special part handling costs, and general handling costs. Could the production process be improved to reduce set-ups?   (1)

ABC unit costs imply long-run variability only (fixed in short-term) and thus costs may not change quickly or without positive management decisions.   (1)

(ii)   *How activity-based techniques can be used to improve performance*

Activity-based techniques can be used to improve performance in the following ways:

Comparing prices with the cost of resources used to produce goods and services, management will usually wish to earn a profit in excess of the activity-based costs, but there are exceptional circumstances where this will not apply.   (1)

Firms usually benefit from ABC when they have a range of products with varying degrees of complexity, particularly in their consumption of differing firm resources as ABC costs often reveal the degree of cross-subsidy that occurs. Refer to labour hours vs the difference in driver volumes.   (1)

Products with very different production volumes produce different costs under ABC.   (1)

Benefit only arises if the ABC information can be used to change practices, either by changing prices and/or cutting costs. Resources should only be supplied to the extent that it is required.   (1)

Activity-based analysis can be used to identify where excessive costs are being incurred, and lead to changes that will reduce these costs.   (1)

ABM can be used to examine the overhead cost base and identify areas for cost reduction, by eliminating activities that are not needed (non-value adding).   (1)

Problems arise from: availability of data, particularly cost driver data, cost of implementation and whether it exceeds the benefit.   (1)

Implementation problems may result in none or less of the potential benefit being achieved.   (1)
                                                              Maximum   10

Activity 1.3.4

Attempt three questions below: (Drury **Student Manual**)
1: SA 1st ed: Question 5.1 pages 21, solution p 233 to 234
10th ed: Question 11.1 page 73, solution p 274 to 275

2: SA 1st ed: Question 5.3 pages 22–23, solution p 234 to 235
10th ed: Question 11.3 pages 74–75, solution p 274 to 275

3: SA 1st ed: Question 5.4 page 23-24, solution p 233 to 237
10th ed: Question 11.4 page 75-76, solution p 276 to 277

Feedback 1.3.4

Question 5.3 (SA 1st ed) or Question 11.3 (10th ed)

REFLECTION 1:

What type of business is this?

This is a healthcare company specializing in surgical procedures (hip, knee and shoulder replacement operations).

What has been given in the scenario?

Current method and ABC method

You are required to calculate the profit per procedure on the current method and then on ABC method.

*Tip: use 2 different colours pens or highlighters to underline which part of the given information relates to the current information and which relates to the additional information given for ABC. If you sort this out during the **reading time** it will limit confusion when you are writing out your solution.*

Note the way in which the total number of cost drivers has been calculated for each activity.

Video

Watch the videos about a brief ABC screencast and video; absorption costing; traditional fixed manufacturing overhead allocation method fixed manufacturing overhead allocation method available on *My*Unisa refer to lesson 1.3.

RECAP QUESTIONS from tutorial letter 103 that will be made available later for revision and assessment preparation purposes:

- Hero part g;
- Water-Counts part a (i),(ii) and (iii);
- Tholakele (Part A) part b (i) and (ii);
- Famous fishing part k;
- FAB Coms part e and f;
- Lovely lights (Part B) d.

6. Summary

In this learning unit we focussed on the application of activity-based costing and related concepts in terms of fixed overhead allocation, reduction and product pricing.

7. Self-assessment activity

Before you move on to the next learning unit please ensure that you have grasped the following concepts: **Topic** 1. An activity 2. Cost driver 3. Cost driver rate 4. Activity (resource) demand 5. Activity hierarchies 6. Profitability analyses using ABC 7. Activity-based budgeting (ABB) and activity-based management (ABM)	**Yes/No**

PART 1, LEARNING UNIT 2 – PRODUCT COSTING SYSTEMS

LEARNING OUTCOMES

After studying this topic, you should be able to do the following in a case study/scenario:

2.1	Value purchased and manufactured inventory using the FIFO or weighted average cost methods.
2.1	Apply backflush accounting in a JIT environment.
2.1	Record and account for material, labour and overhead costs in the general ledger.
2.1	Cost specific jobs (manufacturing or service).
2.2	Correctly account for the treatment of normal and abnormal losses.
2.1	Value work-in-process in a process costing system involving more than one process.
2.3	Determine whether separate products should be processed further after split-off point.
2.3	Consider the allocation of joint costs and treatment of by-products and their proceeds.

THIS LEARNING UNIT CONSISTS OF THE FOLLOWING SUB LEARNING UNITS:

LEARNING UNIT	TITLE
LEARNING UNIT 2.1	Job costing
LEARNING UNIT 2.2	Process costing
LEARNING UNIT 2.3	Joint and by-products

Introduction

This topic deals with the recording and allocation of costs **using job, process and joint costing systems** to value products manufactured or services rendered. It will largely follow a revision route with closer focus on areas where students' past assessments indicated shortcomings in knowledge.

LEARNING UNIT 2.1   Job costing

LEARNING OUTCOMES
After studying this topic, you should be able to do the following in a case study/scenario: 2.1   Value purchased and manufactured inventory using the FIFO or weighted average cost methods. 2.1   Apply backflush accounting in a JIT environment. 2.1   Record and account for material, labour and overhead costs in the general ledger.

Prior learning

This course assumes students have already mastered the work equivalent to that presented in Unisa's preceding undergraduate degree. Please ensure that you are up to date with the prior learning for job costing. If not, please refer to your **undergraduate study material** and revise the textbook (Drury) using the page numbers below:

Prior learning	Drury SA 1st edition	Drury 10th edition
Before studying this topic, you should be able to do the following: • Identify when a job costing system is appropriate. • Account for the acquisition of material, labour and overheads (manufacturing and non-manufacturing) • Appropriately allocate these costs to cost objects. • Value inventory on the first-in-first-out (FIFO) basis and the weighted average method. • Distinguish between the different types of remuneration. • Calculate gross and net pay. • Describe accounting procedures for jobs completed and products sold. • Calculate the profit or loss per job.	**Applicable references:** **Drury: Chapter 6:** Accounting entries for a job costing system. Pages 150– 174.	**Applicable references:** **Drury: Chapter 4:** Accounting entries for a job costing system: Pages 82– 94

1. Introduction

The bulk of this chapter in Drury focuses on the **accounting entries** for the **acquisition of materials, labour and various overhead expenditures** in the general ledger. These initial accounting entries are common to most entities regardless of their costing system. The valuation of raw materials and other inventory items is also common to all. You should already be familiar with these concepts.

The next step is allocating these costs to cost objects; at this point, the costing system used by an entity will make a difference.

In this Learning unit, we look at **job costing,** which is used when an entity produces products or services where **each unit or batch of output is unique or customised** and the cost of each unit needs to be calculated **separately**:

For example: building contracts, book publishing, audit engagement, or servicing of a car where the required parts and the time spent is booked to the car's job card and then invoiced.

Costs are classified as direct or indirect costs. Indirect costs are recorded in an overhead account. The indirect costs will include the costs of service departments, which may be apportioned to different cost centres or products. Production overhead is then absorbed into production, based on the allocation rate.

The most common way of absorbing overhead into products in a traditional costing system was covered in Learning unit 1.1. In Learning unit 1.2 the overhead was absorbed on the basis of a cost per activity based on an activity-based costing system.

> **Process costing** is used when entities continuously produce large quantities of **homogeneous** or similar products or services and assigning costs to each unit produced is unnecessary. Process costing is discussed in the next Learning unit.

2. Job costing

Continuing with our example of a car service, the basic recording process in the costing system:

Direct parts	➜	Goes directly to WIP (work-in-progress – Job 123 GP (from inventory – parts section)
Direct labour	➜	Goes directly to WIP (work-in-progress from time spent/clocked)
Overheads	➜	Absorbed into WIP (using absorption basis where traditional absorption costing or activity-based costing)
On completion	➜	Job cost for 123 GP transferred to Completed Jobs and invoiced. In a manufacturing set-up the cost would be transferred to finished goods, ready for sale/delivery.

Note:

The invoice that the customer sees contains only parts and labour AFTER the appropriate mark-up has been applied to each to cover the overheads and profit margin!

Study the following sections in *Management and Cost Accounting* (Drury):

SA 1st ed. pages	10th ed. pages	Section
CH6: 168 - 169	CH4: 96 – 98	Summary (job costing)

Activity 2.1.1 – Revision

Attempt question: (**Drury Textbook**)
SA 1st ed: Question 6.17, page 171-172
10th ed: Question 4.18, pages 100-101

This question will revise what you have already learned about integrated accounting as in undergraduate.

This exercise is done to revise the flow of accounting entries in an integrated accounting system.

What is an integrated accounting system? Refer to page 169 (SA 1st ed.) or page 97 (10th ed.).

Study figure 4.1 and refer to it whilst doing the question to better illustrate the flow of accounting entries.

Activity 2.1.2

Attempt question: (Drury **Student Manual**)
SA 1st ed: Question 6.8 page 35, solution 250 – 251.
10th ed: Question 4.8, page 19-20, solution 207-208.

Feedback 2.1.2

Question 6.8 (SA 1ˢᵗ ed) or Question 4.8 (10th ed)

What is given?

- Two (2) products – A and B
- Selling price per unit
- Opening inventory of raw materials and finished goods
- Information on raw materials, labour and overheads for the year
- Non-production overheads

What is required?

- *Prepare raw material inventory account, production overheads, and finished goods inventory account.*
- Tip: Draw up the 3 T-accounts and fill in the opening balances and purchases/amount charged for the year for each account. Then, start doing your calculations.
- *Prepare a profit and loss account.*
- Tip: You need to show the profit; therefore, you will put in sales, cost of sales (this should be calculated in part A), and expenses. It's like a Statement of Profit or Loss and Other Comprehensive Income.
- *Calculate and explain the difference between profit and loss if marginal costing method is employed.*
- What is marginal/direct costing? How would your Statement of Profit or Loss and Other Comprehensive Income be prepared if it was done on this basis? Please also note that the question asks for a calculation **AND** an explanation. Many students lose marks unnecessarily because they don't do both. Read the required carefully and underline "and" if it occurs.

Where do I start?

Part A

*Note: the SA1ˢᵗ ed is in Rand and the 10ᵗʰ ed is in UK£. For simplicity, the figures are **x10** for the SA 1ˢᵗ ed.*

Labour is charged at R80 *(£8¹⁰ᵗʰ ᵉᵈ)* per hour. Overtime is 1.25 times.
Therefore Labour = R80 *(£8¹⁰ᵗʰ ᵉᵈ)* x 1,25 = R100 *(£10¹⁰ᵗʰ ᵉᵈ)*.

The question states that the overtime <u>premiums</u> are treated as an indirect production cost. Therefore, this must be included in the overhead control account. So, the premium portion must be included in the overhead account. The overtime rate
R100 (£10¹⁰ᵗʰ ᵉᵈ) – normal rate R80 (£8¹⁰ᵗʰ ᵉᵈ) = R20 (£2¹⁰ᵗʰ ᵉᵈ) per hour.

What should be debited to the overhead control account?
Indirect labour charged to production overhead:
SA 1ˢᵗ ed: 3,250 overtime premium hours at R20 per hour = R65 000 + R1 8464 700 = R1 929 700

10th ed:

Debit: Overhead premium 3 250 hours £2 =   £   6 500 ⎤
Other indirect labour costs – given   £186 470 ⎬   £192 970 (10th ed)
Production overhead costs – given   £549 630 ⎦

This question states that overheads are absorbed at a rate of R100 *(£10[10th ed])* per hour. This was calculated for you.

How many hours does it take to produce Product A? 1 hour
How many hours does it take to produce Product B? 1.2 hours

Therefore R100 (£10[10th ed]) x 1 hr = R100 (£10[10th ed]) per unit A – 41 000 units of A were produced,
41 000 x R100 (£10[10th ed]) = R4 100 000 (£410 000[10th ed]).
R100 (£10[10th ed]) x 1.2 hours = R120 (£12[10th ed]) per unit B – 27 000 units of B were produced, 27 000 x
R120 (£12[10th ed])   = R324 000 (£324 000[10th ed])

Units:

	Product A	Product B
Opening inventory	3 200	3 100
+ Production	41 000	27 000
- Sales	(38 000)	(28 000)
Closing inventory	**6 200**	**2 100**

Part B

Calculations

Sales:

Product A: 38 000 units x R350 (£35[10th ed])   = R13 300 000 (£1 330 000[10th ed])
Product B: 28 000 units x R390 (£39[10th ed])   = R10 920 000 (£1 092 000[10th ed])

Cost of sales:

This was calculated as follows in part A:

Product A: 38 000 units x (£7.20 materials + £8 labour + £10 overheads)
             = 38 000 x R252.00 (£25.20 [10th ed])
             = R9 576 000 (£957 600[10th ed])
Product B: 28 000 units x (£11.60 materials + £9.60 labour + £12 overheads)
              = 28 000 x R332.00 (£33.20[10th ed])
             = R9 296 000 (£929 600[10th ed])

Part B
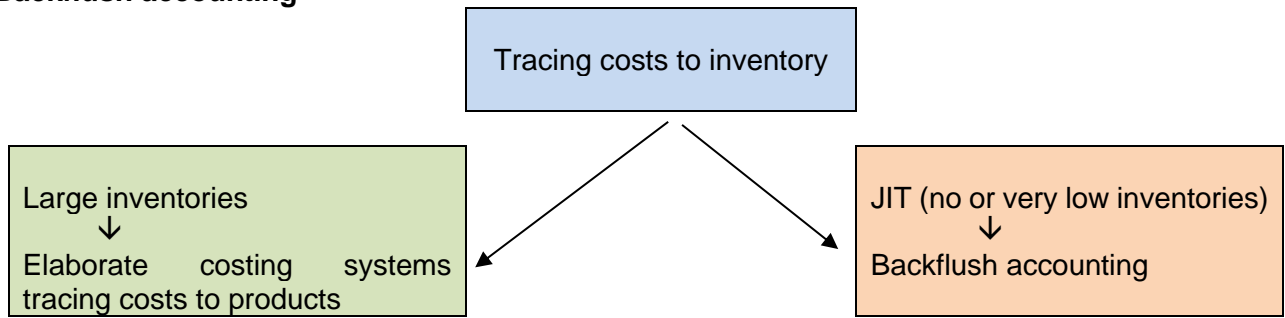Calculation
Product B fixed overhead per unit = R86 (£6,80[10th ed]) per hour x 1,2 hour per unit = R81,60 (£8.16[10th ed]).

Specifically, note the **valuation of the closing inventory** and the treatment of the **over/under absorbed** overhead. This variance forms part of the production costs. This is a good integration question, combining accounting entries and different costing bases.

3. Backflush accounting

```
                         ┌──────────────────────────┐
                         │ Tracing costs to inventory│
                         └──────────────────────────┘
                           ↙                      ↘
┌──────────────────────────────┐        ┌──────────────────────────────┐
│ Large inventories            │        │ JIT (no or very low inventories)│
│        ↓                     │        │        ↓                     │
│ Elaborate    costing  systems│        │ Backflush accounting         │
│ tracing costs to products    │        │                              │
└──────────────────────────────┘        └──────────────────────────────┘
```

Study the following sections in *Management and Cost Accounting* (Drury):

SA 1st ed. pages	10th ed. pages	Section
CH6: 165 - 167	CH4: 94–96	Accounting entries for a JIT manufacturing system

Note the following from the studied information:

- Backflush costing is used in a JIT manufacturing system.
- Aims to eliminate detailed accounting transactions.
- Accounting for completed units is triggered by
  - the manufacture of finished goods – the most simple method
  - the purchase of raw materials and components

4. Summary

In this learning unit, we reviewed the recording process in general and how it would apply in a job costing system. The circumstances for applying Backflush Accounting were also described.

Enrichment activity

Follow the link and watch the "How it's made" episode about the production of carved wood sculptures:

https://youtu.be/PAdn7fostQw

Note the many manual and specialised steps in the process to manufacture each unique batch of wood sculptures. Reflect on the varying amounts of variable and overhead costs that will result and the need to accumulate the costs of each batch separately in a job costing system.

LEARNING UNIT 2.2   Process costing

LEARNING OUTCOMES

After studying this topic, you should be able to do the following in a case study/scenario:

2.1 Cost-specific jobs (manufacturing or service).
2.2 Correctly account for the treatment of normal and abnormal losses.
2.1 Value work-in-process in a process costing system involving more than one process.

Prior learning

This course assumes students have already mastered the work equivalent to that presented in Unisa's preceding undergraduate degree. Please ensure that you are up to date with the prior learning for process costing. If not, please refer to your **undergraduate study material** and revise the textbook (Drury) using the page numbers below:

Prior learning	Drury SA 1st edition	Drury 10th edition
Before studying this topic, you should be able to do the following:	**Applicable references:**	**Applicable references:**
• Explain when process costing systems are appropriate. • Calculate unit costs in a system with a single manufacturing process and in a system with two or more consecutive manufacturing processes (all units completed). • Calculate completed units and the equivalent units for WIP. • Explain the accounting treatment of normal and abnormal losses. • Prepare a quantity statement, production cost statement and cost allocation statement (all of which include losses) based on the weighted average method and on the first-in-first-out (FIFO) method of inventory valuation. • Prepare process, normal loss, abnormal loss and abnormal gain accounts. • Allocate the proceeds from the sales of normal and abnormal scrap to the correct accounts. • Discuss the suitability of process costing in a service organisation. • Describe the principles of batch (operation) costing.	**Drury: Chapter 9:** Process Costing. Pages 221 – 251.	**Drury: Chapter 5:** Process Costing. Pages 104–125

NOTE: Proces costing knowledge is required as base knowledge for other areas (and will not be specifically examined). Emphasis will be on the principles such as equivalent units and the impact of spoilage and production costs.

1. Introduction

In the previous Learning unit, we looked at job costing, a costing system used when the cost of each unique unit produced needs to be calculated separately.
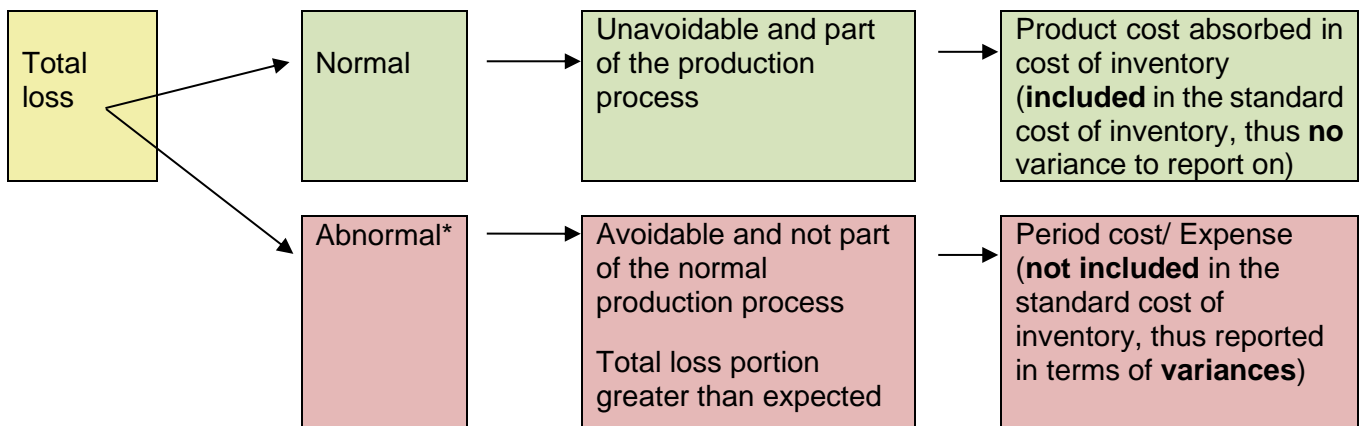
On the other end of the scale are entities that continuously produce large quantities of **homogeneous or similar products or services**, making it **unnecessary to assign costs to each unit** produced.

Process costing systems are therefore used to calculate the **average cost** per unit by dividing the total costs for a specific process for a period by the number of units **passing through the process** for that period, e.g. oil refineries, breweries and paper manufacturers.

A process costing system's measurement takes place through **equivalent and completed units**.
Work-in-progress must be converted to the 'equivalent' of fully completed units to do this.
The Learning unit will be dealt with by way of revision.

2. Process costing

Treatment of Losses in Process Costing

Total loss			
	Normal	Unavoidable and part of the production process	Product cost absorbed in cost of inventory (**included** in the standard cost of inventory, thus **no** variance to report on)
	Abnormal*	Avoidable and not part of the normal production process Total loss portion greater than expected	Period cost/ Expense (**not included** in the standard cost of inventory, thus reported in terms of **variances**)

*   In real life manufacturing, there is no abnormal gain. If in a particular period more units are produced than anticipated, the difference is treated and explained as a positive variance in respect of the normal loss anticipated.

The following activities will be annotated with comments/notes highlighting critical information and issues.

Activity 2.2.1 – Basic revision

Edible Oils Ltd manufactures sunflower cake, a product used as live inventory feed. The sunflower cake is manufactured in two different consecutive processes.

The output of process 1 is used in process 2 and the output from process 2, which is the final product, (C1) is sent to the packaging department.

The following information related to the week ended 5 October 2022 with regard to process 1 (C2):

Input:

Sunflower seed	60 000 kg at R8 per kg
Ingredient X	20 000 kg at R3 per kg
Labour	1 840 hours at R25 per hour
Normal loss	5% of input, considered to be scrap
Selling price of scrap	R2,80 per kg
Output	77 500kg

> C1: 2 processes. Completed output of process 1 goes into process 2. Completed output of process 2 is packaged and sold.
>
> C 2: Make a note that this information is for 1 week.
>
> C 3: No equivalent units.
>
> C 4: Total labour hours required.
>
> C5: This income must be recorded.

During this week there was neither opening nor closing work-in-progress in process 1 (C3).

Total overheads charged to process 1 and 2 amounts to R280 000 for the week and were absorbed on the basis of labour hours. The labour hours worked in process 2 were 1 660 hours (C4).

All scrap was sold for cash on the last day of the week (C5).

REQUIRED

(a)   Prepare, using only the information provided above, the following accounts for the week ended 5 October 2022.

1.   Process 1 account
2.   Abnormal loss/gain account
3.   Scrap proceeds account   (14)

(b)   Briefly explain how to distinguish a by-product from a joint product (learning unit 2.3).   (4)

(Source: AGA)

Feedback 2.2.1
(a)

1. Process 1 Account

	Kg	R		Kg	R
Seed	60 000	480 000			
Ingredient X	20 000	60 000	Proceeds (scrap)	4 000	11 200
Labour		46 000	Process 2	77 500	736 250
Overheads		147 200			
Abnormal gain	1 500	14 250			
	81 500	747 450		81 500	747 450

2. Abnormal gain account

	Kg	R		Kg	R
Scrap proceeds (@2,80)#	1 500	4 200	Process 1 (@R9,50) (when cleared)	1 500	14 250
Income		10 050			
	1 500	14 250		1 500	14 250

3. Scrap proceeds account

	Kg	R		Kg	R
Process 1 (@R2,80)	4 000	11 200	Abnormal gain#	1 500	4 200
			Bank (2 500 x 2,80)	2 500	7 000
	4 000	11 200		4 000	11 200

Note: We adjust the proceeds for the "notional" units that do not physically exist (the abnormal gain units), as you can't sell something that does not exist. This "loss" of income is debited to the Abnormal gain account.

Workings and notes

1.   Normal loss = 5% x (60 000 + 20 000) kg = 4 000 kg. As there was no opening or closing inventory, ALL units put into the system in this period passed the wastage point.
2.   The abnormal loss or gain is the balancing figure between the input (80 000 kg) and the output (77 500 + 4 000).
      $\therefore$ 4 000 + 77 500 – 80 000 = 1 500 (positive = gain). An abnormal gain means we did not in fact, lose/scrap as many PHYSICAL kg as expected. In this case, we anticipated scrapping 4 000 kg (the normal loss), but it was only 2 500 (4 000 – 1 500) kg. It is this physical quantity of 2 500 kg that can be sold.

3.   Because ALL production passed the wastage point in this period, we can apply the "short" method for spreading the normal loss to all other outputs. No separate allocation is required.

4.   Expected scrap proceeds

      4 000 kg x R2,80 = R11 200

      Note the word "expected". This is based on the anticipated normal loss. As there was an abnormal gain of 1 500 kg, only 2 500 scrapped kg were sold.

5.   Without further information, you may assume that the proceeds on the sale of scrapped units are offset against material costs.

6.   Remember that proceeds from the sale of abnormal LOSS units are NEVER credited to production costs but only offset against the value of the abnormal loss.

7.   Overhead calculation: Labour hours process 1 plus labour hours process 2
      = 1 840 + 1 660 = 3 500 total labour hours
      Total overheads of R280 000/ 3 500 labour hours
      = R80 per labour hour
      Thus overheads calculated to process 1 = R80 x 1 840
      = R147 200.

Even though this question does **not** require the calculation of equivalent units it is provided below for explanatory purposes (C3)

QUANTITY STATEMENT TEMPLATE – First-in-first-out (FIFO) & Weighted average method (WAM)

Quantity Statement for 5 October 2022 (weighted average method) – Process 1

Physical units		Output	Equivalent units			
Input			Raw material		Conversion cost	
kg	Detail	kg	kg	%	kg	%
80 000	Opening work-in-process Put into production					
	Completed and transferred	77 500	77 500	100%	77 500	100%
	Normal loss	4 000	-		-	
	Abnormal gain	(1 500)	(1 500)	100%	(1 500)	100%
80 000O		80 000O	76 000		76 000	

Production Cost Statement for 5 October 2022 – WAM – Process 1

	Total R	Material	Conversion cost
Sunflower seed		480 000	
Ingredient		60 000	
Labour			46 000
Overheads			147 200
Proceeds Net loss		(11 200)	
Total	722 000	528 800	193 200
Cost per unit (Total ÷ 76 000 kg)	9,50	= 6,958	+ 2,542

Cost allocation statement – Process 1

Completed goods	736 250 (77 500 x R9,50)
Abnormal gain	(14 250) (1 500 x R9,50)
	722 000

(c) Where more than one product is the output from a production process, there may be either joint or by-products or both produced. The distinction between a joint and a by-product is usually made by a comparison of their respective sales values. A *joint* product would be one with a *relatively high* sales value. On the other hand, a by-product would have a relatively low sales value compared to the main product or products. Joint products are essential to the commercial viability of the process, whereas by-products are incidental. [Learning note: apply to learning unit 2.3]

Activity 2.2.2
Attempt question: (**Drury Textbook**)
SA 1st ed : Question 9.20 page 248, Solution p 849
10th ed: Question 5.20 page 127, Solution p 746

Feedback 2.2.2
There is no abnormal loss. The scrap sales proceeds from the normal loss are set off against the materials cost, as that was the link provided.

Activity 2.2.3
Attempt question: (**Drury Textbook**)
SA 1st ed : Question 9.22 page 248, solution page p 850-581
10th ed: Question 5.22 page 128, Solution p 747

Activity 2.2.4
Attempt question: (Drury **Student Manual**)
SA 1st ed : Question 9.7 page 54, solution page 274
10th ed : Question 5.7 page 23, solution page 212

Feedback 2.2.4
In this question, you were required to determine:
- Number of equivalent units.
- Cost per equivalent units.
- Process cost account

3. Summary
In this learning unit, we revisited the determination of cost per completed and equivalent unit in a process costing system.

4. Self-assessment activity
Before you move on to the next learning unit, please ensure that you have grasped the following concepts:

Topic	Yes/No
1. The difference between a job costing system and a process costing system *2.* Equivalent units 3. Normal loss 4. Abnormal loss or gain 5. The FIFO and weighted average methods of inventory valuation 6. Allocation of normal loss – when to use "short" or absorption costing method and when to use the "long" or allocation method 7. Value output from the process 8. Treatment of proceeds from the sale of normal and abnormal units scrapped or "off-cuts" or by-products	

Enrichment activity
Follow the link and watch the "How it's made" episode about the production of cupcakes or muffins:

https://www.youtube.com/watch?v=YuevcEEChww or
https://www.youtube.com/watch?v=xFW5hJItkyQ
Note the large volume of similar cupcakes continuously being produced. Reflect on the identical amount of direct costs and overheads that are needed to produce each cupcake. This makes it unnecessary to assign production costs to each cupcake. Process costing is appropriate.

LEARNING UNIT 2.3   Joint and by-products

Prior learning
This course assume students have already mastered the work equivalent to that presented in Unisa's preceding undergraduate degree. Please ensure that you are up to date with the prior learning for joint and by-products. If not, please refer to your **undergraduate study material** and revise the textbook (Drury) using the page numbers below:

Prior learning	Drury SA 1st edition	Drury 10th edition
Before studying this topic, you should be able to do the following:	**Applicable references:**	**Applicable references:**
• Distinguish between joint and by-products. • Explain and apply the alternative methods of allocating joint costs to products. • Describe and apply the accounting treatment of by-products. • Calculate the value of joint and by-product inventory. • Calculate profits from the sale of joint products. • Decide whether to process a joint or by-product further, or whether to sell it at the split-off point.	**Drury: Chapter 8:** Joint and by-product costing. Pages 200 – 21.	**Drury: Chapter 6:** Joint and by-product costing. Pages 132–142

1. Introduction

Joint and by-product costing is applied to products **that initially share costs** in a joint process and are **only separated at a later stage**.

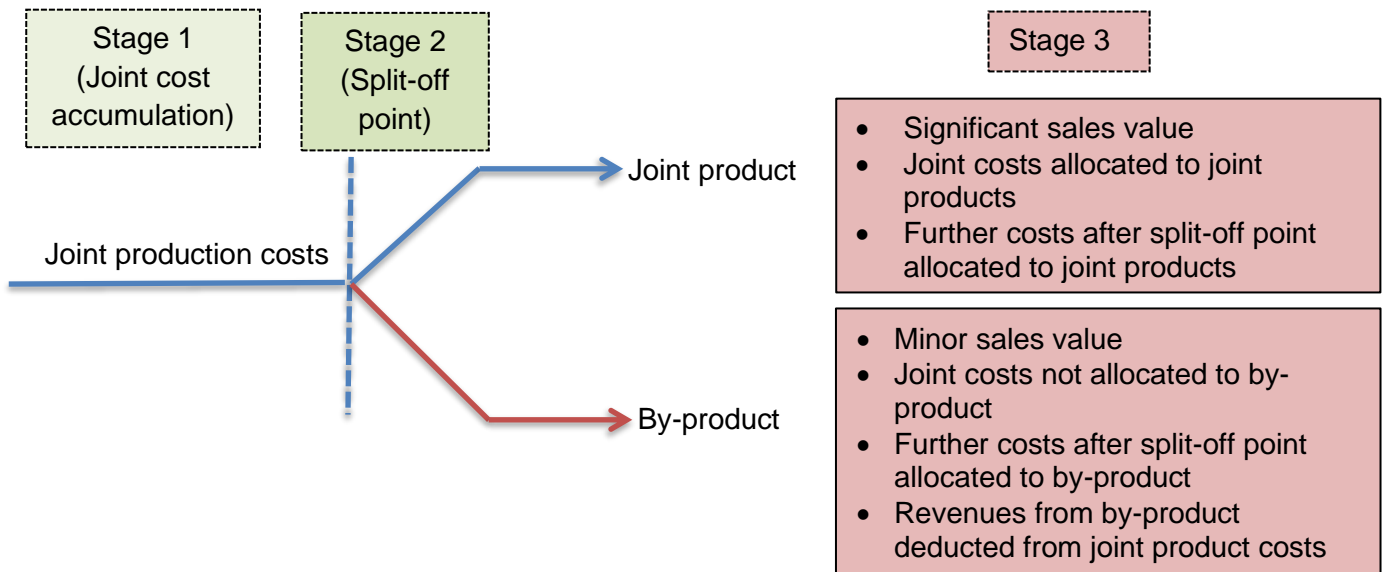Four important stages need to be considered:

1. Firstly, the initial inseparable stage, which results in **joint costs**;
2. Secondly, the **split-off point,** which requires that the joint costs of the first stage are allocated to each joint product and
3. Thirdly, **further processing** costs (after the split-off point) are allocated to the respective joint products and by-products.
4. Fourthly, allocate the net sales value of the by-product (calculated as by-product sales less further processing costs of the by-product) to the joint costs.

In some production processes, e.g. ore refinery, there is an unavoidable result that certain additional **products are produced unintentionally, called by-products**. In the platinum refining process, palladium and gold may, for example, be recovered as by-products.

Total sales values play a defining role in deciding on joint and by-products. The two main measures of allocating cost to joint products are by physical measure and by relative total sales value.

This Learning unit will again follow the revision and amplification route.

2. Joint and by-product costing

| Stage 1 (Joint cost accumulation) | Stage 2 (Split-off point) | | Stage 3 |

Stage 3 – Joint product:
- Significant sales value
- Joint costs allocated to joint products
- Further costs after split-off point allocated to joint products

Stage 3 – By-product:
- Minor sales value
- Joint costs not allocated to by-product
- Further costs after split-off point allocated to by-product
- Revenues from by-product deducted from joint product costs

Activity 2.3.1 – Joint and by-product costing

Bundu Lodge is amongst others a game farming and hunting concern. The farm also hosts nature lovers, bird watchers and offers conference facilities throughout the year. Game like kudu and eland are made available to trophy hunters who pay a trophy fee to hunt the specific game. Taxidermy (Taxidermy is the act of mounting or reproducing dead animals or parts of animals for display – Wikipedia) and slaughtering facilities are available on the farm and the trophy is processed and mounted for the hunter. Curios in the form of coasters are made out of skins and sold to the general public. The meat is not utilised by the hunter but is processed on the farm and sold to retail butchers in the form of biltong and game steaks. (C1 and C2)

The following information in respect of the two months June and July 2021 (the main hunting season) was recorded:

Income (C3)   **R**

Daily fees and accommodation income from trophy hunters and other visitors	130 000
Trophy fees received	200 000
Curio sales	20 000
Processed meat sales (R82,50 per kg)	82 500

Costs (C4)

Food – dependent on number of lodge visitors and support staff	25 000
Wages – permanent cleaning personnel of the lodge	15 000
Lodge repairs and maintenance (ongoing)	10 000
Additional fodder and lick allocated to game hunted	10 000

C 1: This paragraph explains:
What types of service the lodge offers iro hunting:

1. Accommodation and meals
2. Conference facilities
3. Hunting game
4. Taxidermy and slaughtering
5. Curios
6. Biltong and game steaks sold to butchers.

C2: Distinguish which costs relate to accommodation, trophies, meat and curios and which costs are joint costs.

C3: Can be used to identify joint and by-products: sales values and required. (a) assist where specific information not given.

C4: Distinguish between fixed and variable costs.

Salaries and wages	113 000
Trackers and drivers – permanent employees used for all activities	10 000
Hunting guides – paid per hunt	10 000
Slaughtering personnel – local butcher staff paid per animal	15 000
Trophy mounting personnel – paid per animal requisitioned by hunters	55 000
Curio manufacturing personnel – paid for period – (fixed amount)	8 000
Meat processing and packing personnel – as for slaughtering	15 000

Fuel for hunting vehicles	7 500
Salt, spices, and vinegar for the meat processing	3 500
Formalin, artificial eyes and clay for trophy mountings	9 000
Curio manufacturing costs – other ad hoc costs	7 000

Maintenance of game fence – annual expenditure	50 000
Salary of farm manager – proportionate to the hunting period for this permanent employee	50 000

Only one type of curio, namely coasters, is manufactured and sold.

Details for curios are as follows:

Inventory on hand was as follows:

- Inventory - 31 May 2021   5 000 units @ 50c per unit
- Inventory - 31 July 2021 (C5) 9 000 units

Sales price per unit: R1 (C6)

Management gave you the following additional information:

- Inventory is valued on the first-in-first-out basis. (C7)
- Apart from coasters, no other inventory was on hand at the beginning or end of the period.

> C5: Closing inventory requires a value. Production quantity the missing number.
>
> C6: Use to calculate sales quantity.
> What is the accounting treatment for by-products?
>
> C7: Basis of valuation.

REQUIRED

Calculate the contribution (C) (C8.1) for the following sources (C9) of income:

Daily fees and accommodation
Trophy income
Processed meat

An offer has been received to supply a local hotel with all the processed meat at R100 per kg (C10). This would, however, require the trimming of meat fat which is estimated to be 10% of the current slaughtered yield (C11) and with an additional cost per kilogram required for the trimming process, as follows:

Total Fixed Cost   R5 250
Variable   R7,50

Should this offer be accepted?

(c)   Discuss the process when both curio manufacturing and meat processing are by-products.

> C8: Sales – variable cost is required.
>
> C8.1 Allocation of variable costs depend on classification as a separate or joint process.
>
> C9: Keep the 3 types separate. A combined income statement is not required.
>
> C10: The higher price and additional cost indicate an incremental approach. The fixed cost is not dealt with as the required deals with the marginal cost.
>
> C11: This is important. The kg of meat will decrease by 10% if the fat is extracted. How many kg currently?

Feedback 2.3.1

The joint process comprises:

•   hunting and slaughtering the animal
•   mounting the trophy – joint product
•   making of a curio – by-product
•   and processing of meat – joint product

Based on the relative sales values and when sections (a) and (c) of the required are read together.

Workings:

1.   **Cost allocation**

	Joint cost	Separate cost		
		Trophies	**Processed meat**	**Curios**
Additional fodder and licks	10 000			
Hunting guides	10 000			
Slaughtering personnel	15 000			
Trophy mounting		55 000		
Curio manufacturing				8 000
Meat processing			15 000	
Petrol – Hunting vehicles	7 500			
Salt, spices for meat processing			3 500	
Trophy mountings		9 000		
Curio manufacturing				7 000
	42 500	**64 000**	**18 500**	**15 000**

2.   **Relative sales value**

	Trophies	Processed meat
Sales	200 000	82 500
Less: Separate costs	(64 000)	(18 500)
Net realisable value	**136 000**	**64 000**

**Total net realisable value (136 000 + 64 000)
= 200 000**

Then, relative values:	136 000/200 000	64 000/200 000
	68%	32%

> Refer to Drury pages CH8: 203–208 (SA 1st ed) or pages 134–138 (10th ed) for additional examples of methods of allocating joint costs.

3.   **Number of curios produced**

	Units
Opening inventory	(5 000)
Closing inventory	9 000
Sales (R20 000/1)	20 000
Production	24 000

NB:

The normal expression of the above is 5 000 + 24 000 – 9 000 = sales of 20 000. Ensure that you do not use the numbers in the incorrect sequence, as this will have an impact right through.

4.   Cost per curio item = R15 000 ÷ 24 000 = R0,625 per item   [depending on decision re R8 000 being fixed or not]

5.   **Income from the by-product**

	R
Sales 20 000 x 1	20 000
Less: Cost of sales	(11 875)

Opening inventory (5 000 x 0,50)	2 500
Separate cost (Calculated per 1)	15 000
Closing inventory (9 000 x 0,625)	(5 625)

Net income	8 125

6.   **Joint cost allocated to trophies and meat**

R42 500 – R8 125 = R34 375

The net income from the by-product is set off against the joint cost before making the product allocation.
Trophy: R34 375 x 68% = R23 375
Meat: R34 375 x 32% = R11 000
Apply the percentages per calc 2.

7.   **Direct (variable) accommodation costs**

Food	25 000	
Repairs – fixed	-	Does not change with the number of visitors
Wages – fixed	-	Does not change with the number of visitors
	25 000	

SOLUTION	Accommo-dation	Trophy	Meat
(a) **Contribution income per income source**			
Sales/Income	130 000	200 000	82 500
Less: Variable cost	25 000	87 375	29 500
Separate	25 000	64 000	18 500
Joint	-	23 375	11 000
Net income	105 000	112 625	53 000

Note: The question required calculation of contribution. Therefore all fixed costs are ignored.

(b)   **New offer**   **R**

Sales value after further processing (900 kg x R) (see calc.)	90 000
Less: Current sales of processed meat	(82 500)
Incremental sales offered	7 500
Less: Additional Fixed cost R5 250 and Variable cost 1 000 X 7,50	(12 750)
Net loss	(5 250)

Calculation:

Current kg sold = R82 500 ÷ R82,50 = 1 000 kg
10% is lost through trimming of fat ⇨ 900 kg lean meat sold
The offer should thus **not be accepted** because no additional income would be earned.
Note – the additional cost is based on the input quantity, whilst sales are the output quantity:
         normal loss in process costing.

(c)   **Two by-products**

The net income from the two by-products will be set off against the 'joint' cost, which becomes a cost only for the trophy mounting process.

Activity 2.3.2

Attempt question: (**Drury Textbook**)
SA 1st ed: Question 8.16 p 215 (Solution p 567)
10th ed: Question 6.16 p 144 (Solution p 748)

Feedback 2.3.2

Joint costs, similar to fixed costs, must be judged from an overall perspective and not in isolation. The process often does not allow a decrease in cost when one of the joint products is discontinued.

Activity 2.3.3

Attempt question: (Drury **Student Manual**)
SA 1st ed: Question 8.12 p 50-51, solution p 268-271
10th ed: Question 6.12 p 36 228-231

Feedback 2.3.3

Note the following:

- The processes, mixing and distilling, yield the same output.
- Carefully work through the profit and cost calculation.
- The mixing process yields a saleable residue.
- Distilling causes an evaporating loss.
- Parts of the distillation are used for further processing.

RECAP QUESTIONS from tutorial letter 103 that will be made available later for revision and assessment preparation purposes:

- Water-Counts part (j)

3. Summary

In this learning unit, we focused on the determination of joint and by-products, the allocation of joint costs, and the accounting treatment of by-products.

PART 2 – PLANNING AND CONTROL

PART 2 – PURPOSE

The purpose of part 2 is to enable students to have a critical and informed understanding of the key terms, concepts and established principles of planning and control techniques and application of the following:

• appropriate planning and control measures within an enterprise
• appropriate performance measures within an enterprise
• various transfer-pricing methods between divisions

PART 2 CONSISTS OF THE FOLLOWING LEARNING UNITS:

LEARNING UNIT	TITLE
LEARNING UNIT 3	PLANNING, BUDGETING AND CONTROL
LEARNING UNIT 4	STANDARD COSTING
LEARNING UNIT 5	PERFORMANCE MEASUREMENT

PART 2, LEARNING UNIT 3 – PLANNING, BUDGETING AND CONTROL

LEARNING OUTCOMES

After studying this topic, you should be able to do the following:

4.1   Design and compile fixed and flexible budgets.
4.2   Explain how costs are controlled using various management tools.
4.3   Calculate and interpret the break-even point and margin of safety of a business under
        different scenarios and advise management based on your calculations.

THIS LEARNING UNIT CONSISTS OF THE FOLLOWING SUB LEARNING UNITS:

LEARNING UNIT	TITLE
LEARNING UNIT 3.1	Budgeting and management control systems
LEARNING UNIT 3.2	Other cost management techniques / principles
LEARNING UNIT 3.3	Cost-volume-profit analysis

LEARNING UNIT 3.1 Budgeting and management control systems

LEARNING OUTCOMES

After studying this topic, you should be able to do the following:

3.1   Design and compile fixed and flexible budgets.

Prior learning

This course assume students have already mastered the work equivalent to that presented in Unisa's preceding undergraduate degree. Please ensure that you are up to date with the prior learning for the topic of budgeting and management control systems. If not, please refer to your **undergraduate study material** and revise the textbook (Drury) using the page numbers below:

Prior learning	Drury SA 1st edition	Drury 10th edition
Before studying this topic, you should be able to do the following:	**Applicable references:**	**Applicable references:**
• Discuss the multiple, and sometimes conflicting, functions of a budget and the administration thereof. • Compile different sub-budgets and master budgets derived from strategic organisational targets. • Define the different types of responsibility centres. • Differentiate between controllable and uncontrollable costs. • Define and compile a flexible budget. • List the advantages and disadvantages of budgeting. • Appreciate the role of computerised budgeting and use spreadsheet software to compile sub-budgets. • Discuss the behavioural implications of the budgeted targets.	**Drury: Chapter 16:** The budgeting process. Pages 452-488. **Drury: Chapter 17:** Management accounting control systems. Pages 498-521. **Drury: Chapter 16:** Criticisms of budgeting. Pages 483-485.	**Drury: Chapter 15:** The budgeting process. Pages 368-395. **Drury: Chapter 16:** Management accounting control systems. Pages 408-417. **Drury: Chapter 15:** Criticisms of budgeting. Pages 391-393.

1. Introduction

In your prior learning, you looked at the *long-term planning* aspect of the planning and control process. In this Learning unit we will study **budgeting** (*short-term planning*).

A basic revision activity dealing with **flexible budgeting** will be followed with sections to be studied, highlighted core issues and further activities. We will then look at criticisms against budgeting and alternative ways to determine budgeted figures. Lastly, we will cover **other management control** systems (apart from the budget). The organisation's long-term planning drives budgets. A budget is defined as a formal plan to co-ordinate the use of different resources to achieve a pre-set and desired goal whilst taking company strategy into account.

In using budgets as a controlling mechanism, management should always be aware of the impact of the **controllability** principle. We will now investigate controllability.

2. Costing terms and concepts

The controllability principle
An important aspect of responsibility accounting is the principle of holding the responsibility centre manager **accountable** only for the items that are **significantly influenced (controllable)** by the respective manager.

There are various methods for dealing with the distorting effects of uncontrollable factors, including the use of **flexible budgets** and *ex-post* **budget** adjustments.

Flexible budgeting helps to obtain meaningful results by **removing the uncontrollable** impact of volume changes on expenses. The originally budgeted variable and semi-variable costs must be flexed to the **actual level** of activity achieved during the period under review. Fixed expenses are **not flexed**. Flexible budgets are also a very important aspect of standard costing which is discussed in Learning unit 4.

Forecasting errors may arise due to the environmental and economic conditions not realising as anticipated. *Ex-post* **budget** adjustments can be made to remove the effect of **forecasting errors** (*uncontrollable factors*) from the manager's performance reports. *Ex-post* variance analysis will also be discussed further in Learning unit 4, i.e. standard costing.

Study the following sections in *Management and Cost Accounting* (Drury):

SA 1st ed. pages	10th ed. pages	Section
CH 17: 508–512	CH 16: 413–416	The controllability principle

Note the following from the studied information:

- the meaning of the controllability principle
- dealing with the effects of uncontrollable factors before and after the measurement period
- guidelines for applying the controllability principle

You will notice that flexing the budget is one way of acknowledging factors that influence volume which are outside the control of the manager or entity. We will now do a revision activity to compile a flexed budget.

Activity 3.1.1 – Basic revision example

Siyahlala Lodges is a grouping of guest houses in Khayelitsha and Langa townships that are very popular with overseas tourists. Mama Khuzwayo is the owner of the guest houses. The facilities offer clean and highly competitive budget accommodation. There is a standard charge per room per night with each room accommodating up to two guests. For each guest house, there is a restaurant facility that specialises in indigenous South African foods, which all guests support. You have been assigned to assist Mama Khuzwayo with the introduction of a budgetary control system.

You establish that sometime in early 20x2, Mama Khuzwayo's niece had attempted to assist with the implementation of a budgetary control system but did not complete the exercise as she had to return to her university studies in Canada. You establish the following from her notes:

Operating Statement of Siyahlala Guest Houses for week 4 of 20x2:

	Budget 75% R	Budget 100% R	Actual 90% R
Room occupancy			
Sales:			
Accommodation sales	22 500	30 000	27 500
Restaurant sales	7 200	9 600	5 800
Total sales	**29 700**	**39 600**	**33 300**
Accommodation costs:			
Laundry	1 125	1 500	1 375
Cleaning	2 400	3 100	3 400
Wages	2 600	2 600	2 500
Total accommodation costs	**6 125**	**7 200**	**7 275**
Restaurant costs:			
Food and beverages	3 600	4 800	4 700
Wages	1 900	1 900	1 975
Total restaurant costs	**5 500**	**6 700**	**6 675**
Common costs:			
Building maintenance	1 700	1 700	1 650
Management salaries	1 300	1 300	1 300
Total common costs	**3 000**	**3 000**	**2 950**
Operating profit	**15 075**	**22 700**	**16 400**

Additional operating information:

1. Together the guest houses have 100 rooms in total, all charged the same rate per night. Occupancy is expressed as a percentage of full capacity.

2. The guest houses and restaurants open for 7 nights a week and for 52 weeks per year.

3. Budgeted restaurant sales are assumed to be a fixed percentage of accommodation sales.

4. All staff are permanent employees.

	REQUIRED	Marks
(a)	Calculate the number of room nights sold per week for 100%, 90% and 75% occupancy levels.	(3)
(b)	Using the budgeted figures prepared by Mama Khuzwayo's niece as a basis, calculate:	
	(i) the variable cost per room-night for cleaning	(3)
	(ii) the fixed cost per week for cleaning	(1)
(c)	Prepare a flexed budgeted operating statement for the guest houses for week 4 at an occupancy level of 90% showing the following: ● the budgeted contribution for each profit centre ● the budgeted **attributable profit** for each profit centre ● the budgeted profit for the guest houses in total	(16)
(d)	Based on your flexed budget in (c) above and any other information you deem necessary, calculate the budgeted break-even sales value for the accommodation profit centre.	(2)
(e)	Calculate, for the restaurants only, the total variances between the actual results for week 4 and the flexed budget figures you have calculated in part (c). Comment on the performance of the restaurants.	(9)

Feedback 3.1.1 – Basic flexed budget revision example

(a)   Calculate the number of room nights sold per week for 100%, 90% and 75% occupancy levels.

Room occupancy	**75%**	**100%**	**90%**	
Room nights	100 rooms x 7 nights x 75%	100 rooms x 7 nights x 100%	100 rooms x 7 nights x 90%	
	= 525 room nights per week	**= 700 room nights per week**	**= 630 room nights per week**	(3)

The hospitality industry, amongst others, uses occupancy levels to indicate their capacity usage. Full capacity is expressed as room nights, 700 as calculated above. This level is seldom reached as (some) rooms may require maintenance or refurbishment. Refer to Tsogo Sun or Sun International financial statements for more detail.

(b)   Using the budgeted figures prepared by Mama Khuzwayo's niece as a basis, calculate: (i)   the variable cost per room-night for cleaning

Variable cost per unit	$\dfrac{R3\ 100 - 2\ 400}{700 - 525}$	**= R4 per room night**	(3)

Number of the same grouping: in this case the specified budgeted figures, should be used for the high-low exercise.

(ii) **the fixed cost per week for cleaning**

Total cost	=	Fixed cost + variable cost
Fixed cost	=	Total cost - variable cost
Fixed cost	=	R3 100 - (700 x R4 per room night)
Fixed cost	**=**	**R300** (1)

(c) Prepare a flexed budgeted operating statement for the guest houses for week 4 at an occupancy level of 90% showing the following:

- the budgeted contribution for each profit centre
- the budgeted attributable profit for each profit centre
- the budgeted profit for the guest houses in total

The level of 90% impacts on the variable cost, therefore is the flexing exercise. 90% is implied by the actual results being 90% of the budget. Fixed costs remain unchanged.

	Accommo-dation	Restaurant	Total	
	R	R	R	
Sales (Notes 1 and 2)	27 000	8 640	35 640	(3)
Variable costs:				
Laundry (Note 3)	1 350		1 350	(2)
Cleaning (Note 4)	2 520		2 520	(2)
Food and beverages (Note 5)		4 320	4 320	(2)
Contribution	**23 130**	**4 320**	**27 450**	(3)
Attributable fixed costs:				
Cleaning	300		300	
Staff wages	2 600	1 900	4 500	
Attributable profit	**20 230**	**2 420**	**22 650**	(3)
Common costs:				
Building maintenance			1 700	
Management salaries			1 300	
Operating profit			**19 650**	(1)

Note 1	Accommodation sales	
	Sales at 100%	30 000
	Sales at 90% (90% of R30 000)	**27 000**
Note 2	Restaurant sales	
	Sales at 100%	9 600
	Sales at 90% (90% of R9 600)	**8 640**
Note 3	Laundry variable costs	
	Costs at 100%	1 500
	Costs at 90% (90% of R1 500)	**1 350**

Note 4   Cleaning variable costs
               Costs at 90% (630 room nights x R4)   2 520

Note 5   Food and beverages variable costs
               Costs at 100%   4 800
               Costs at 90% (90% of R4 800)   **4 320**

(d)   Based on your **flexed budget** in (c) above and any other information you deem necessary, calculate the **budgeted break-even sales value** for the **accommodation profit centre:**

	Alt.	R	
Sales		27 000	
Contribution		23 130	
Contribution ratio		0,86	(1)
Fixed costs		2 900	
Break-even sales value (2900/0,86)		**3 372**	(1)
	R 3 385		

(e)   Calculate, for the restaurants only, the variances between the actual results for week 4 and the flexed budget figures you have calculated in part (c).
Comment on the performance of the restaurants.

Variances based on a flexed budget are the first step towards the analysis of standard cost variances. The orientation must be clearly indicated.

	Budget	Actual	Variance	Orientation	
Occupancy level	90%	90%			
	R	R	R		
Restaurant sales	8 640	5 800	(2 840)	Adverse	(1)
Restaurant costs:					
Food and beverages	(4 320)	(4 700)	(380)	Adverse	(1)
Wages	(1 900)	(1 975)	(75)	Adverse	(1)
Operating profit	2 420	(875)	3 295	Adverse	(1)

Comment:

- There is a significant **adverse variance** in restaurant sales. Either the budgeted quantity of meals is not being achieved (**volume**), or the actual **prices** of meals are below that budgeted.

- With regard to **volume**, overseas tourists may not be fully acquainted with the meals and hence opting to eat out.   (3)

- With regard to **prices,** there could be **competition** from nearby food outlets. In either case, there may be a need to review menus or to offer breakfast only and let the residents have lunch and supper elsewhere.

- There is an 8,7% variance in food and beverage costs. This could be a result of **inefficiencies** in preparing dishes – **excessive spoilage**, **poor management** of recipes, etc. This finding contradicts the volume or mix argument, as we would have expected large savings here.   (1)

- A small adverse variance of 3,95% was recorded in wages. If this is a once-off occurrence due to under-budgeting for payroll on costs such as UIF, etc., a correction will be needed the next time. If this, however, is a result of overpayment of wage costs in say overtime entitlements – **corrective** action is needed.   (1)

Activity 3.1.2 – Advanced

Attempt question: (Drury Student Manual)
SA 1st ed: Question 17.3 pages 120–121
10th ed: Question 4.14 pages 116–117

Feedback 3.1.2

The controllable variable costs are all flexed to the actual output, rendering different variances to those initially presented. The comments deal with circumstances common to this activity.

Note: When commenting on variances, pay special attention to the scenario sketched in the question to determine what part of the variance was controllable and by which manager. There are usually 3 aspects to every variance:

- quantity
- quality (may include mix)
- price

Refer again to the guidelines in the textbook on page 512 of Drury SA 1st ed (page 415 of Drury 10th ed).

Activity 3.1.3 - Advanced

Attempt question: (Drury Student Manual)
SA 1st ed: Question 16.8 pages 110-111
10th ed: Question 16.16 pages 117–118

Feedback 3.1.3

Question 16.16 (10th ed.) – Rivermede Ltd
Section A
Remember that if you are asked for a variable cost and the question is not clear whether it is in total or per unit, then give the variable cost <u>per unit</u>.

	Original Budget 24 000 units [A]		**Revised 20 000 units [C]**	**Difference 4 000 units**
Material Per unit	£216 000 [B] = [B]/[A] = 216 000/24 000 = £9/unit	OR	£180 000 [D] = [C]/[D] = 180 000/20 000 = £9/unit	£36 000
Labour Per unit	£288 000 [E] = [E]/[A] = 288 000/24 000 = £12/unit	OR	£240 000 [F] = [F]/[A] = 240 000/20 000 = £12/unit	£48 000

Semi-variable costs - *"High-low method"*

Pounds: 31 000 – 27 000 = 4 000 **[G]**
Units: 24 000 – 20 000 = 4 000 **[H]**
Variable cost per unit = [G] / [H] = 4 000/ 4 000 = £1 per unit
Total variable costs =1 x 24 000 units = 24 000
Fixed cost = £31 000 – £24 000 = £7 000

3. The budgeting process in non-profit-making organisations

The budgeting process in a non-profit organisation typically focuses on determining the costs of maintaining current activities and adding the costs of planned expansions.

Study the following sections in *Management and Cost Accounting* (Drury):

SA 1st ed. pages	10th ed. pages	Section
CH16: 479–480	CH15: 388–389	The budgeting process in non-profit-making organisations

Note the following from the studied information:

- the difference between budgeting in non-profit organisations and profit organisations
- the use of line-item budgets in non-profit organisations

4. Zero-based budgeting (ZBB)

Zero-based budgeting is a process where budgets are drawn up from scratch each year. The process is time-consuming and costly to implement and is therefore frequently carried out on a three- to five-year interval rather than annually.

Study the following sections in *Management and Cost Accounting* (Drury):

SA 1st ed. pages	10th ed. pages	Section
CH 16: 480–482	CH 15: 389–391	Zero-based budgeting

Note the following from the studied information:

- the difference between zero-based budgeting and incremental budgeting
- the implementation of zero-based budgeting
- the advantages and disadvantages of zero-based budgeting

Activity 3.1.4

Attempt question: (Drury Textbook)
SA 1st ed: Question 16.26 page 492 (Solution p 878)
10th ed: Question 15.27 page 400 (Solution p 781-782)

Feedback 3.1.4

Take note of the benefits and problems with the implementation of ZBB.

5. Criticisms of budgeting

Critics have in recent years called for the abandonment of traditional budgeting and suggested that organisations should move "beyond budgeting".

Study the following sections in *Management and Cost Accounting* (Drury):

SA 1st ed. pages	10th ed. pages	Section
CH 16: 483–485	CH 15: 391–393	Criticisms of budgeting

Note the following from the studied information:

- the main criticisms of the traditional annual budgeting process
- the use of rolling forecasts as the main alternative to annual budgeting

Activity 3.1.5

Attempt question: (Drury Student Manual)
SA 1st ed: Question 16.11 pages 113-114
10th ed: Question 15.13, page 108

6. Summary

In this learning unit, we focussed on further aspects related to budgeting other than those covered at the undergraduate level. We studied the controllability principle, budgeting in non-profit organisations, zero-based budgeting and criticisms of budgeting.

7. Self-assessment activity

Attempt question: (Drury Student Manual)
SA 1st ed: Question 17.2 page 119
10th ed: Question 16.13 page 115

Feedback (Self-assessment activity)

What information have you been given?

A variance has been calculated between the budgeted and actual figures.

What is the problem with this calculation? The budget is based on 6 400 units, and the actual is based on 7 140 units. You are not comparing apples with apples. To properly compare the actual figures, you must convert your budget into a budget based on 7 140 units (since the actual units are 7 140). In other words, "flex" your budget. The **fixed costs will remain the same** in the flexed budget, but the variable costs will have to be restated. You must determine the fixed and variable costs.

Assembly labour hours	5 000	7 500	10 000
Overhead costs	R54 500	R76 500	R90 000

The change contains R9 000 of fixed overheads.

Step-fixed overheads change after 7 000 units. Therefore, the stepped fixed cost included in the overhead cost for 5 000 hours is different from that included in the overhead cost for 7 500 and 10 000 hours. The stepped fixed cost included for 7 500 and 10 000 hours is the same and therefore, they can be used for the high-low method to split the variable and fixed costs.

High low

R	units
90 000	10 000
76 500	7 500
13 500	2 500

Variable cost per unit	= R13 500/2 500 units
	= R5,40 per unit
Fixed costs	= 76 500 – (5.40 x 7 500)
	= R76 500 – $40 500
	= R36 000
Less:	(R9 000) (included in the R36 000 is this fixed cost amount)
	R27 000 Stepped fixed cost

Variable overheads flexed budget = 7 140 x 5,40 = R38 556

Original budget – 6 400 units

Assembly labour   = R51 970 (given) – R2 050 (manager)
                      = R 49 920 variable cost
Per unit = R49 920/6400 units = R7,80 per unit
Total overheads given in scenario   R62 060
Variable overheads (R5,40 x 6 400 units)   (R34 560)
Fixed costs (central headquarters)   (R9 000)
Stepped fixed cost   R18 500

Flexed budget – 7 140 units
Assembly labour   = R49 920/6 400
                      = R7,80 per unit x 7 140
                      = R55 692
Furniture packs   = R224 000/ 6 400
                      = R35 per unit x 7 140 units
                      = R249 900
Other materials   = R23 040/6 400
                      = R3,60 per unit x 7 140
                      = R25 704
Variable overheads = R5,40 x 7 140
                       = R38 556

Budgeted stepped fixed cost = R27 000 = actual stepped fixed cost, because the question states that
the actual fixed costs for April = budgeted fixed costs.

RECAP QUESTIONS from tutorial letter 103 that will be made available later for
revision and assessment preparation purposes:

- Ice Castle part b;
- SuperBev part a;
- Kwini part a;

LEARNING UNIT 3.2 Other cost management techniques/principles

> **LEARNING OUTCOMES**
>
> After studying this topic, you should be able to do the following:
>
> 3.1 Explain how costs are controlled using various management tools.

1. Introduction

In the previous Learning unit, we learned about the **budgeting process** (including reporting on variances to the budget) and other management controls as tools to ensure that objectives are achieved. However, these controls will not necessarily lead to improvements in sales and reduction in costs on their own. Improvements will require understanding some of the Changes and developments in the business environment as well as understanding and implementing **Management control systems**, **Cost management techniques**, **Benchmarking** and **Strategic management accounting (SMA)**.

2. Changes and developments in the business environment

The modern business environment exposes organisations to increased **competition**, **shorter product life cycles**, **greater customer demands** and the increased use of **information technology**. As part of these developments, management accounting practices are converging internationally.

Study the following sections in *Management and Cost Accounting* (Drury):

SA 1st ed.		10th ed.		Section
Chapter	Pages	Chapter	Pages	
1	12–13	1	10	Global competition
1	18	1	13	Deregulation and privatisation
1	13–14	1	10–11	Changing product life cycles
1	19–21	1	14–15	Focus on customer satisfaction and new management approaches
1	17-18	1	12–13	Pressure to adopt higher standards of ethical behaviour
24	785–787	23	633–634	Focus on ethical behaviour
1	15 – 16	1	11	
24	787- 793	23	634–636	The impact of information technology
1	16–17	1	11–12	
24	779–785	23	636–637	Environmental and sustainability issues
24	778–779	23	636–637	Globalisation and management accounting practices
24	795–796	23	638–639	Integrated reporting

Note the following from the studied information:

- The changes experienced by manufacturing companies are due to **international competition** and **imports** competing with their products in terms of *innovation, variety, quality, cost and customer service.*
- The **increased competition** experienced by service organisations due to privatisation and deregulation led to more focus on cost management and information needs.
- There has been a dramatic decrease in product life cycles due to global competition, technological innovation, *and increased customer demands and requirements.*
- The key success factors that affect customer satisfaction are **cost efficiency, quality, time and innovation.**
- **New management approaches** to customer satisfaction include *continuous improvement, employee empowerment, social responsibility and corporate ethics.*
- The impact of **information technology** on *custome*rs and on the way that companies produce and sell products and services and record business information.
- International differences are found in management accounting practices at the macro and micro levels.

3. Management control systems

Control is a process aimed at ensuring that an organisation follows its planned activities and meets its objectives. Management accounting control systems (including the budget) are only one of the various control mechanisms companies use in the overall control process. We shall first look at different types of controls used by companies in the overall control process.

Study the following sections in *Management and Cost Accounting* (Drury):

SA 1st ed. pages	10th ed. pages	Section
CH 17: 500–502	CH 16: 404–406	Different types of controls
CH 17: 502	CH 16: 406	Feedback and feed-forward controls
CH 17: 503–504	CH 16: 407–408	Harmful side-effects of controls
CH 17: 512–515	CH 16: 416–417	Setting performance targets and determining how challenging they should be
CH 17: 515–516	CH 16: 417–418	Determining how much influence managers should have in setting targets
CH 17: 516–517	CH 16: 418–419	Different approaches that managers use to evaluate budgetees' performance
CH 17: 518	CH 16: 420	Alternative uses of management accounting information

Note the following from the studied information:
- the three categories of controls included in the management control process:
  1. action controls,
  2. personnel and cultural controls and
  3. results (output) controls
- the difference between **feedback and feed-forward** controls
- the **harmful side-effects** of controls
- the **advantages and disadvantages** of the different categories of control

Note that performance evaluation is studied further in Learning unit 5.1 – Divisional financial performance measures.

Activity 3.2.1

Attempt question: (Drury Textbook)
SA 1st ed: Question 17.32 page 526 (Solution pages 883–884)
10th ed: Question 16.28 page 427 (Solution pages 785-786)

Feedback 3.2.1

The focus is on negative behavioural consequences, as employees should be 'incentivised' to counter these. Link the issues to the budgeting process in your organisation.

4. Cost management techniques

Cost management is synonymous with **cost reduction** and focuses on continuous improvement and change. **Cost management** tends to be used on an **ad hoc basis** when the opportunity for cost reduction arises and often does **not involve** the use of accounting techniques.

In contrast, **traditional cost control systems** are applied on a **continuous basis** and **rely heavily** on accounting techniques. The emphasis is on cost containment and tends to preserve the status quo **without questioning the way existing activities** are performed. A typical example is the comparison of actual results against the budget.

Ideally **cost management** should **reduce costs** but *not* at the expense of *customer satisfaction*.

Study the following sections in *Management and Cost Accounting* (Drury):

SA 1st ed.		10th ed.		
Chapter	**Pages**	**Chapter**	**Pages**	**Section**
23	727–730	22	613–615	Cost management and the value chain
23	730–732	22	591–592	Life-cycle costing
23	732–738	22	592–597	Target costing
23	738	22	597-598	Kaizen costing
23		22	598–602	Activity-based management (see also learning unit 1.3)
23	744–745	22	603	Business process re-engineering
23	745–751	22	603–608	Just-in-time systems
23	751–756	22	608–612	Quality cost management
24	779–784	23	628–632	Environmental cost management

Note the following from the studied information:

> - **Life-cycle costing** determines the costs and revenues over a product's entire life-cycle, including the **pre-manufacturing** stage (i.e. research and development and design) and the **post-manufacturing** stage (i.e. post-sales service, abandonment and disposal costs).
> - Target costing is used as a cost management tool in addition to a mechanism for determining selling prices.
> - The difference between **target costing and kaizen costing**.
> - Activity-based management is used to manage activities and thus manage costs in the long term.
> - The goals and main features of **just-in-time (JIT)** production methods.
> - The use of **backflush costing** to do the accounting entries for a JIT manufacturing system.
> - The use of a **cost of quality report** as well as an **environmental cost** report. Notice the similarities in the type of costs as well as layout.
> - The use of **value chain analysis** to increase *customer satisfaction* and *manage costs more effectively*.

Activity 3.2.2

Attempt question: (Drury Student Manual)
SA 1st ed: Question 23.1 page 173
10th ed: Question 22.1 page 158

Attempt question: (Drury Student Manual)
SA 1st ed: Question 23.3 page 174
10th ed: Question 22.3 page 159

5. Benchmarking

External and internal benchmarking can be used to compare key activities or processes in order to improve them.

Study the following sections in *Management and Cost Accounting* (Drury):

SA 1st ed.		10th ed.		
Chapter	Pages	Chapter	Pages	Section
23	743–744	22	602	Benchmarking

Note the following from the studied information:

- The advantages and disadvantages of benchmarking

Activity 3.2.3

Attempt question: (Drury Student Manual)
SA 1st ed: Question 23.2 page 173
10th ed: Question 22.2, page 158

6. Strategic management accounting (SMA)

Simmonds was the first to define Strategic Management Accounting in 1981. It was defined as "the provision and analysis of management accounting data about a business and its competitors, for use in developing and monitoring business strategy". Subsequently, the definition has been refined and revised.

CIMA defines strategic management accounting as "a form of management accounting in which emphasis is placed on information which relates to factors external to the entity, as well as non-financial information and internally generated information."

Study the following sections in *Management and Cost Accounting* (Drury):

SA 1st ed.		10th ed.		
Chapter	Pages	Chapter	Pages	Section
22	687–691	21	560–563	The performance management framework Strategy and strategic positioning Performance management and performance measurement systems Alternative performance management frameworks

Also, refer to the learning unit regarding strategy in Finance Tutorial Letter 104.

7. Summary

In this learning unit, we looked at changes in the business environment and developments in cost management techniques and philosophies. We also investigated other management control systems and their influence on employee behaviour. The use of benchmarking was also explained.

8. Self-assessment activity

Ensure that you can describe the following concepts briefly in a paragraph:

1   Action or behavioural controls
2   Personnel, cultural and social controls
3   Results or output controls
4   Feedback and feed-forward controls
5   Life-cycle costing
6   Target costing
7   Kaizen costing
8   Activity-based management
9   Benchmarking
10   Business process re-engineering
11   Just-in-time systems
12   Quality cost management
13   Environmental cost management
14   Cost management and the value chain
15   Strategic management accounting

Enrichment activity
Google the following concepts and read about a company that employs them, for example:

• Life-cycle costing:
https://youtu.be/4y5HFrwaxT4

• Kaizen costing
https://youtu.be/xNcO21FwMnk

• Just-in-time systems
https://youtu.be/zCTmN17ZDek

LEARNING UNIT 3.3   Cost-volume-profit analysis

LEARNING OUTCOMES

After studying this topic, you should be able to do the following:

3.1 Calculate and interpret the break-even point and margin of safety of a business under different scenarios and advise management based on your calculations.

Prior learning

This course assumes students have already mastered the work equivalent to that presented in Unisa's preceding undergraduate degree. Please ensure that you are up to date with the prior learning for cost-volume-profit analysis. If not, please refer to your **undergraduate study material** and revise the textbook (Drury) using the page numbers below:

Prior learning	Drury SA 1st edition	Drury 10th edition
Before studying this topic, you should be able to do the following: • Calculate a break-even point and margin of safety. • Apply CVP analysis in a multi-product setting. • Identify and explain the assumptions on which CVP analysis is based. • Calculate sensitivities for changes in any variables in the CVP model. • Use CVP analysis to determine the expected effect of decisions and events on profit or the variables that influence profitability. • Make suitable recommendations based on the above calculations. • By using appropriate techniques, determine what actions or decisions are required to achieve a predetermined outcome in different scenarios. • Explain the meaning and describe the role of operating leverage in measuring risk and the way in which it influences profits. • Evaluate the operating leverage of different organisations.	**Applicable references:** **Chapter 10:** Cost-Volume-Profit analysis. Pages 255–277	**Applicable references:** **Chapter 8:** Cost-Volume-Profit analysis. Pages 172–190

1. Introduction

We will use **cost-volume-profit (CVP)** analysis to inform and assist management with decision-making. CVP is especially valuable during **planning and budgeting** as it broadly indicates expected outcomes at different levels for different **variables** in the CVP model. The **breakeven analysis** and **margin of safety** are also very useful tools in measuring the riskiness of various plans or scenarios in the budget. For this, you will need to distinguish between fixed and variable costs, as you learned in Learning unit

1: Nature, Classification and Allocation of costs.

Cost-volume-profit analysis formulas:
Break-even point in **units** = $\dfrac{\text{Total fixed costs}}{\text{Weighted average contribution } \textbf{per unit}}$
Break-even sales **revenue** = $\dfrac{\text{Total fixed costs}}{\text{Weighted average contribution margin } \textbf{\%}}$
% Margin of safety = $\dfrac{\text{Expected sales – Break-even sales}}{\text{Expected sales}}$
Contribution margin % = $\dfrac{\text{Total contribution (Rand)}}{\text{Total sales (Rand)}}$ x 100

2. Cost-volume-profit (CVP) analysis – single product

a) Why does a business have to calculate a break-even point?

- When you **start a business,** you want to determine what sales level is required for it to survive.

- For a typical start-up business, ensuring that ongoing operating costs are covered by sales revenue in the short to medium term is critical.

- In the **long term,** the business can focus on making a profit. Once again, the breakeven point and margin of safety will indicate the riskiness or sensitivities of various plans or strategies.

b) Application of CVP

- Please note that **ALL** variable costs and **ALL** fixed costs (manufacturing **AND** non-manufacturing costs) are included in the break-even calculation.
- Contribution per unit equals the sales price per unit less **ALL** variable costs per unit. The contribution margin ratio is the contribution expressed as a percentage of sales.
- The net profit figure in a break-even calculation is ALWAYS **BEFORE** TAX. Therefore, if you are told in a question that you are trying to achieve a net profit AFTER tax of R50 000, you must first convert the R50 000 to a BEFORE tax amount before you use it in the break-even calculation.
- Remember that a break-even point (in units) should always be **ROUNDED UP** as one less unit sold will lead to a loss.
- Unit information usually indicates a break-even in **units** and value/monetary information (eg Rand or a ratio based on Rand) a **break-even in rand.**
- The net profit is derived from the units sold in excess of the break-even point, i.e. the contribution from the margin of safety sales.
- The **margin of safety %** indicates how much percentage of sales volume can decline before the entity makes NIL profit.
- Sensitivity % for other variables in the model indicates how big a change (Δ) can be absorbed before the entity makes no profit.
  - Δ in selling price/unit
  - Δ in variable cost/unit
  - Δ in total fixed costs

c) Impact of factors

All other factors remaining the same:

- An increase in selling price per unit will increase the contribution per unit and decrease the break-even sales required.
- An increase in variable cost per unit will decrease the contribution per unit and increase the break-even sales required.
- An increase in total fixed cost will increase the sales required to break even.

> Generally, you will first have to determine the nature of the costs before proceeding with the break-even calculation.

Activity 3.3.1 – Basic revision principles

Work through example in Drury textbook

SA 1st ed: Example 10.1 page 259

10th ed: Example 8.1 page 176

Feedback 3.3.1 (Drury SA 1st ed)

The contribution is: per unit R400 - R100 = R300 and therefore a contribution margin of 75% (R300/R400).

The break-even: **(units)** then $\dfrac{R2\ 100\ 000}{R300}$ = 7 000 tickets

The break-even: **(revenue)** then $\dfrac{R2\ 100\ 000}{0,75}$ = R 2 800 000

      Or 7 000 tickets at R400 each

To make a profit of R1 000 000, the profit is treated as a 'given' and becomes equivalent to a fixed cost for that event (or period).

The equation now becomes (in units) $\dfrac{(R2\ 100\ 000 + R1\ 000\ 000)}{R300}$ = 10 333,333

Rounded up to 10 334 tickets

A sale of 8 000 tickets will yield a profit of: 8 000 x R300 (contribution/unit) – R2 100 000 = **R300 000 (profit).**

The required selling price for 8 000 tickets with a required profit of R1 000 000 becomes:

8 000 *x* SP   = R5 500 000 (calculated as = R2 100 000 + R2 400 000 + R1 000 000)

        SP = R5 500 000 ÷ 8 000
        SP = R687,50

Feedback 3.3.1 (Drury 10ᵗʰ ed)

The contribution is: per unit £20 - £10 = £10 or on a value basis £10/£20 = 50%

The break-even: (units) then $\dfrac{£60\ 000}{£10}$ = 6 000 tickets

The break-even: (revenue) then $\dfrac{£60\ 000}{0,5}$ = £ 120 000
Or 6 000 tickets at £20 each

To make a profit of £30 000, the profit is treated as a 'given' and becomes equivalent to a fixed cost for that event (or period).

The equation now becomes (in units) $\dfrac{(£60\ 000 + £30\ 000)}{£10}$ = 9 000 tickets

A sale of 8 000 tickets will tickets will yield a profit of: 8 000 x £10 (contribution pu) – £60 000 = £20 000 (profit)

The required selling price for 8 000 tickets with a required profit of £30 000 becomes:

8 000 *x* SP   = £170 000 (calculated as = £60 000 + £80 000 + £30 000)

    SP   = £170 000 ÷ 8 000
            = £21,25

NB: Note that you were presented with the variable and fixed costs in this example. Generally, you will first have to determine the nature of the costs before proceeding with the break-even calculation.

Activity 3.3.2 – Basic application

The founder and majority stakeholder of Tekkie Town explained in a 2011 press interview that he started the business by buying 12 000 pairs of tekkies and boots at R100 per pair. He sold 80% of this inventory at double the cost price from selected venues and special events to keep the fixed cost as low as possible. Assume the fixed cost to be R240 000 for these events. The inventory balance could not be sold and was donated to various charities.

REQUIRED

Calculate the break-even in rand and the margin of safety for this event.

Feedback 3.3.2

1.   Calculate the contribution %.

	Per unit R	Or	Total R	
Selling price (R100 x 2)	200	(80% x 12 000 x R200)	1 920 000	(9 600 units)
Cost price (R100 ÷ 0,8)	125	(12 000 x R100)	1 200 000	
Contribution	R75		720 000	

- Contribution MR (%)   37,5%
  (75/200 or 720/1 920)

NB: You should note that more than one approach is feasible in cost accounting, and especially where decision-making is concerned. It is important that you follow those more logical approaches to yourself, which you will be comfortable with in identifying a more complex scenario.

2.   Calculate the **break-even – rand,**

$$BEP = \frac{240\ 000}{0,375} = \textbf{R640 000}$$

3.   Calculate the **margin of safety (MoS)**

$$MoS = \frac{1\ 920\ 000 - 640\ 000}{1\ 920\ 000} = \textbf{66,7\%}$$

In units, this represents: 9 600 – 3 200 = **6 400 pairs.**

> **Note** that for any organisation with relatively low fixed costs, there will be less concern about the margin of safety; in other words, it will be easier to break even.

Activity 3.3.3

Question   **22 marks** (C1)

ABC Ltd manufactures product A, which is sold directly to retailers. The company is experiencing strong competition and the management report for the last trading year indicated that the company produced the lowest profit in five years. The forecast for the next year indicates that the present deterioration in profits is likely to continue. The company considers that a profit of R90 000 should be achieved to provide an adequate return on capital (C2).

C1: Note mark allocation and calculate how long it should take you to answer this question.
22 marks x 1.5 = 33 minutes

C2: Target profit to be added to FC.

The financial director is of the opinion that a change in the present pricing and marketing policies will have the necessary effect. He has two proposals (C3) for improving the profit situation.

C3: Different proposals. Calculate the effect of both.

Proposal 1

Market research indicates that a 10% reduction in selling price would increase demand by 40% (C4).

C4: Make a note of this. You will have to adjust selling price per unit and units sold.

Proposal 2

Sell 55 000 units of product A annually to XYZ for resale in Namibia. XYZ will transport these products from ABC Ltd to their own warehouse (C5).

C5: Quantity and own transport, some saving.

While ABC Ltd would not pay any sales commission, the company will provide special packaging at a cost of 40c per unit. (C6) ABC Ltd would also contribute R66 000 per annum towards the marketing campaign (C7) of the product in Namibia.

C8: Use given quantity and price and consider the constraint.

The marketing director is of the opinion that in 20x2 the sales from existing business would remain unchanged at 120 000 units, based on a selling price of R10 if this special order is undertaken.

C6: Do commission and then additional variable cost.
C7: Consider the impact of this on the fixed cost.

ABC Ltd has a maximum production capacity of 180 000 units (C8).

ABC LTD		
MANAGEMENT STATEMENT OF PROFIT OR LOSS AND OTHER COMPREHENSIVE INCOME 31 DECEMBER 20x1		
	R	R
Sales revenue: (120 000 units)		**1 200 000**
Factory cost of goods sold		**(878 000)**
Direct materials	144 000	
Direct labour	420 000	
Variable factory overheads	64 000	
Fixed factory overheads	250 000	
Gross profit		**322 000**
Administration overheads		(168 000)
Selling and distribution overheads		(132 000)
Sales commission (2% of sales)	24 000	
Delivery cost (variable per unit sold)	60 000	
Fixed costs	48 000	
Net profit (C9)		**22 000**

C9: Read through the information in the income statement carefully. Separate fixed and variable costs.

	REQUIRED	Marks
(a)	Calculate the break-even sales value (C10) based on the statement of profit or loss and other comprehensive income for 20x1.	(4)
(b)	Do a financial evaluation of proposal 1 and calculate the number of units that ABC has to sell at the new price to achieve the target profit of R90 000 (C11).	(10)
(c)	Assuming that proposal 2 is implemented, calculate the minimum price (C12) that XYZ Ltd has to pay for the product -	(4)
	(i) To ensure that ABC Ltd would break even (C13) on the special contract; and	(4)
	(ii) If the target profit (C14) for ABC Ltd must be achieved.	(4)
	(iii) How would your answer in (c)(i) differ if the special order was for 65 000 units.	(4)

C11: Make note of the following: Proposal 1 and the answer has to be in units. Time saving. Note target profit of R90 000. You are not calculating break even sales units where profit = R0

C12: A minimum of fixed and variable costs must be covered.

C13: Profit = R0.

C14: Target profit, therefore profit = R90 000.

For Costing, you usually need to **Round figures** off to **two decimals.**

Feedback 3.3.3

(a)

Break-even sales value		Fixed costs
	=	Contribution margin ratio

= R 466 000/0,4067

= R 1 145 808

Calculations

Fixed costs

The mark allocation is as follows: 2 marks for fixed costs (numerator) and 2 marks for contribution ratio (denominator)

	R
Fixed factory overheads	250 000
Administration overheads	168 000
Fixed selling and distribution overhead	48 000
Fixed costs	466 000

Directly from income statement

Contribution

Contribution = Sales – variable costs

		R
Sales		1 200 000
Less: Variable costs		(712 000)
Direct materials	144 000	
Direct labour	420 000	
Variable factory overheads	64 000	
Sales commission	24 000	
Delivery costs	60 000	
Contribution		**488 000**
Contribution margin ratio		**40,67%**

Directly from income statement

(b)   Proposal 1: units to achieve target profit

Revised selling price		9,00	(1)
Less: Variable costs		(5,91)	(2)
Direct materials	1,20		
Direct labour	3,50		
Variable overhead	0,53		
Delivery expenses	0,50		
Sales commission (2% x R9)	0,18		
Contribution per unit		3,09	
Number of units sold (1,40 x 120 000)		168 000	(1)
Total contribution (R'000)		519 120	(1)
(168 000 x R3,09)			
Fixed costs		466 000	(1)
Profit from Proposal 1		**53 120**	

Make note of the following:

1.   Decrease in selling price to R9 i.e. 10% reduction in selling price.

2. Calculation of sales commission-based on R9.

3. Increase in demand of 40% to 168 000 units.

Contribution p/u (R488 ÷ 120 000)	R4,0667
Reduction in SP 10% x R10	(1,0000)
Saving in commission 2% x R1	0,02
New contribution p/u	**3,0867** round off R3,09

Evaluation

The profit of R53 120 is still less than the R90 000 needed to provide an adequate return on capital. Therefore, although it increased the net profit situation, it is not an adequate solution for ABC Ltd's financial problems.   (1)

Required units to be sold in order to earn target profit

Desired contribution (R90 000 + R466 000)	R556 000	(1)

> Calculated in part (a).

Contribution per unit for proposal 1	R3,09	
Therefore, required units to be sold = R556 000 ÷ R3.09		
= 179 935,27 units	**179 936 units**	(1)

> Always **round UP**. If you sell 179 935 units you will not make target because according to the calculation you are required to sell 0,27 more than 179 935 to make target profit.

The profit will not be achieved as the market can only absorb 168 000 units at the higher price and not the 180 000 required!

(c)(i) Variable costs (∆) when selling to XYZ Ltd

Direct material		1,20
Direct labour		3,50
Variable overhead		0,53
Delivery expenses	(0,50)	-
Sales commission	(0,20)	-
Additional packaging cost	0,40	0,40
Variable cost per unit	**5,63**	**5,63**

> Please note that delivery expenses and sales commission won't be paid anymore if you take the decision to sell to XYZ Ltd.

Required contribution to break even

=	Fixed costs/ units sold		
=	R66 000/ 55 000 units		
=	**R1,20 / unit**		(2)

> The contribution to XYZ Ltd is treated as a fixed cost.

Thus, selling price to break even

=	R1,20 + R5,63 = **R6,83**	(2)

(ii) Normal profit from 120 000 units sold

Normal profit from 120 000 units sold	22 000	
Target profit	90 000	
Profit to be earned from special order	**68 000**	(1)

> See part (a):
>
> R488 000 – R466 000

To earn R68 000, a contribution of R134 000 (R68 000 + R66 000) is needed.
That is R2,44 (R134 000/55 000) per unit.

Thus, selling price for special order:
R2,44 + R5,63 = R8,07

(iii) Production capacity is limited to 180 000 units
120 000 + 65 000 = 185 000 units
Thus **5 000 units from existing sales would have to be sacrificed.**

	R	
Opportunity cost to be covered 5 000 x R4,07 = R20 350		
Spread over 65 000 units (R20 350 ÷ 65 000)	0,31	(1)
Other variable costs	5,63	(1)
Fixed costs R66 000/65 000	1,02	(1)
Selling price for special order	**6,96**	(1)

3. Cost-volume-profit (CVP) analysis – multi-product (Two or more products)

Study the following sections in *Management and Cost Accounting* (Drury):

SA 1st ed. pages	10th ed. pages	Section
CH 10: 268-271	CH 8: 182-184	Multi-product Cost-Volume-Profit analysis

Remember the following basic rules for calculating the break-even quantities for two or more products:

1. Calculate **one total fixed cost** figure. Remember to **include all fixed costs, including fixed selling and admin** costs.
2. Calculate the **contribution per unit** for each product. Remember to deduct all variable costs (including variable selling and admin costs). Remember that fixed overhead costs must **not** be deducted when calculating the contribution amount.
3. Calculate a **weighted average contribution per unit** using sales units (**not** production units). **Don't** just add the two contributions per unit together or add them together and divide by 2.
4. Do **one break-even calculation:** [Total fixed costs ÷ weighted average contribution per unit]. Remember to round the break-even quantity **up**. NB: Show that you have **rounded up**.
5. **Split** the total break-even quantity between the products using the sales mix ratio applied when calculating the weighted average contribution (**not** production units). Remember to round the break-even quantities **up**. NB: Show that you have **rounded up**.

Many students still make the following fundamental **mistakes**:

INCORRECT:	CORRECT:
X **Split the total common fixed cost** between the products and do **two break-even calculations.**	✓ Do only **one break-even calculation** and then split the break-even quantity between the products (using the sales mix ratio).
X Add the contribution per unit amounts of the products involved.	✓ Calculate a **weighted average** contribution per unit (using the sales mix ratio).
X Use **production units/revenue** to determine the sales mix ratio needed to calculate the weighted average contribution per unit.	✓ Use **sales units** to determine the **sales mix ratio** needed to calculate the weighted average contribution per unit.

Activity 3.3.4 – Basic principle

Bubbles Ltd sells two products, namely product X and product Y.

| | C1:
Budgeted =
50:50 |

The <u>budgeted sales are divided equally</u> (C1) between these two products and the budgeted contribution is R10 per unit of product X and R6 per unit of product Y.

| | C2: Actual =
75:25 |

The <u>actual sales for the period consisted of 75% for product Y and 25%</u> (C2) for <u>product X</u>. The annual fixed costs are R560 000.
<u>Actual costs and selling prices are identical to the budget</u>.(C3)

| | C3: No
change to
contribution
or FC |

REQUIRED	
(a)	Calculate the unit break-even points (in units) for budgeted and actual sales.
(b)	Analyse your results.

Feedback 3.3.4

(a)   Budgeted average contribution

C1: Average base used, based on 50:50 split.

= (50% x R10) + (50% x R6)
= R5 + R3
= R8,00

Budgeted break-even point

= Fixed costs / Budgeted average unit contribution
= R560 000 / R8,00
= 70 000 units

Actual average unit contribution

= (25% x R10) + (75% x R6)
= R2,50+ R4,50
= R7,00

C2: New split lowers average as more with low contribution sold.

Actual break-even point

C3: No need to round as units are already rounded.

= Fixed costs / Actual average unit contribution
= R560 000 / R7,00
= 80 000 units

NOTE: Must use **BUDGETED or STANDARD sales volume to determine sales mix ratio**
(NOT actual unless specified like in this question)

(b)   The break-even point varies depending on the composition of the sales mix.

The actual sales mix is different from the budgeted sales mix (see note above) and therefore the actual average unit contribution is different from that used in the budgeted break-even calculation.

Activity 3.3.5 – Break-even (Super Beverages (Pty) Ltd)
SuperBev has the following **budgeted** information planned for the next financial year ending
31 May 2020:

	Superade	Green Soda	Total
Sales	310 000 cases	855 000 cases	1 165 000 cases
Production of finished goods	280 000 cases	809 000 cases	1 089 000 cases
Machine hours	58 900 hours	129 500 hours	188 400 hours
Selling price per case	R180,00 / case	R110,00 / case	
Ingredients and packaging	R48,30 per case	R29,00 per case	
Variable overheads	R8,50 per case	R6,50 per case	
Variable selling and admin costs	R11,20 per case	R9,50 per case	
Fixed production overheads			R37 800 000
Fixed selling and admin costs			R23 100 000

Required:
The sales manager is preparing a presentation and has asked you to calculate the following for
Superade and Green Soda for the year ended 31 May **2020**:
i.   **budgeted** fixed production cost per case and
ii.   **budgeted** break-even number of cases

Feedback 3.3.5

i)	Calculate the **budgeted** fixed production cost per case

Step 1: Budgeted total overhead rate

=   R 37 800 000
      188 400 hrs

=   R200,64/hour

Step 2: Budgeted machine hours per case

	Superade	Green Soda
= Machine hours	58 900	129 500
Cases produced	280 000	809 000
	= **0,21** hours	= **0,16** hours

Step 3: Budgeted fixed production cost per case

	Superade R	Green Soda R
Superade: R200,64/hr x 0,21 hr/unit	**42,13**	
Green Soda: R200,64/hr x 0,16 hr/unit		**32,10**

ii) Calculate Budgeted break-even number of cases
Step 1: Total Fixed costs

Fixed costs	R
Fixed production overheads – given	37 800 000
Fixed selling & admin costs – given	23 100 000
Total	**60 900 000**

Step 2: Contribution per case

Contribution per case	Superade (R)	Green Soda (R)
Selling price – given	180,00	110,00
Less Variable costs (48,30 + 8,50 + 11,20; 29 + 6,50 + 9,50)	(68,00)	(45,00)
Contribution	**112,00**	**65,00**

Step 3: Weighted average contribution per case:

= (R112 x 310 000 / 1 165 000) + (R65 x 855 000 / 1 165 000)

= (R112 x **26,6%**) + (R65 x **73,4%**)

Must use **BUDGETED sales volume to determine sales mix**

= R29,80 + R47,71

= R77,51 per case

Step 4: Break-even – total number of cases

Break-even = Fixed cost / **Weighted** average contribution per case

= R60 900 000/ R77,51

= 785 705,1

= 785 706 cases in total

Step 5: Break-even number of cases per product:

Superade   = 785 706 x 310 000 / 1 165 000

                = 209 071,98

                = **209 072** cases

Always show rounding! **MUST round UP**

Green Soda   = 785 706 x 855 000 / 1 165 000

                = 576 633,02

                = 576 634 cases

Video

Watch the videos about a brief CVP analysis screencast and video available on *My*Unisa refer to lesson 3.3.

RECAP QUESTIONS from tutorial letter 103 that will be made available later for revision and assessment preparation purposes:

- Hero part a and f;
- Tholakele (Part A) part c and (Part B) part c;
- SuperBev part c;
- FAB Coms part b;
- HoneySmooth part f, g and h.

Enrichment activities

- Lovelylights part f;
- NH-Agri part a

3. Summary

In this Learning unit, we focused on the calculation of the **break-even** point, the **margin of safety** and the impact of changes in calculation components on **profit**.

END OF CONTENT FOR TEST 1

PART 2, LEARNING UNIT 4 – STANDARD COSTING

LEARNING UNIT 4   LEARNING OUTCOMES

After studying this topic, you should be able to do the following:

- Calculate and analyse variances.
- Provide suitable explanations for variances found.
- Reconcile budgeted income and expenses to actual income and expenses.
- Decide on the appropriate accounting treatment of material variances.

THIS LEARNING UNIT CONSISTS OF THE FOLLOWING SUB LEARNING UNITS:

LEARNING UNIT	TITLE
LEARNING UNIT 4.1	Variance analysis
LEARNING UNIT 4.2	Reconciliation of budget to actual
LEARNING UNIT 4.3	Variance analysis for control purposes
LEARNING UNIT 4.4	Pro-rating of variances and compliance with the relevant accounting standard

LEARNING UNIT 4.1 -   Variance analysis

Prior Learning

This course assume students have already mastered the work equivalent to that presented in Unisa's preceding undergraduate degree. Please ensure that you are up to date with the prior learning for variance analysis. If not, please refer to your **undergraduate study material** and revise the textbook (Drury) using the page numbers below:

Prior learning	Drury SA 1st edition	Drury 10th edition
Before studying this topic, you should be able to: • Understand and describe the characteristics, aims and operation of an efficient standard costing system. • Differentiate between budget and standard data • Establish cost standards and compile a standard cost card. • Perform a detailed variance analysis for both variable and absorption costing systems. • Identify the causes of the variances that arose within the context of one another and the scenario presented. • Prepare a set of accounts with appropriate journal entries for a standard costing system. • Reconcile the actual profit with the budgeted profit. • Determine when to investigate a variance further.	**Applicable references:** Chapter 18, pages 532–566 Chapter 19, pages 576–597 Chapter 7, pages 192–194	**Applicable references:** Chapter 17, pages 432–460 Chapter 18, pages 469–485 Chapter 7, pages 158–160

1. Introduction

Standard costing is a financial control system that analyses deviations from budget in detail to control future costs and forms part of the process of management by exception. Standards are <u>predetermined</u> target costs and selling prices which represent a benchmark that should be achieved under normal conditions. Standard costs are the expected or budgeted costs for producing a single product or service unit. Quantity standards and cost (price) standards are set for the materials, labour and overheads consumed in producing a unit of the product. In order to apply standard costing, standardised tasks or repetitive operations must be involved, for which a standard time, quantity, or cost can be determined.

2. Variance analysis

Initial revision activities will be supplemented by notes and complementing examples and activities to highlight problem areas and broaden your scope of this topic.

Activity 4.1.1 – Basic revision example (single product)

Harari Ltd uses a standard absorption costing system to control the manufacturing costs of its single product. The following standards have been set:

		R per unit
Direct material	2 kgs at R6 per kg	12
Direct labour	1 hour at R7 per hour	7
Fixed overheads	1 hour at R9 per hour	9
Total production cost		28

The fixed overhead standard cost per unit is based on a normal budgeted monthly production of 4 000 units. Actual results for the most recent month were:

Production	4 300 units
Direct material	Cost R56 000 for 9 000 kgs
Direct labour	Cost R32 800 for 4 600 hours paid and worked.
Fixed overheads	R35 000

No direct material inventory is held. All products produced are currently sold at R40 per unit with sales commission of 5% payable on the sales price.

	REQUIRED
(a)	Calculate the following variances:
	(i) Direct material price
	(ii) Direct material usage
	(iii) Direct labour rate
	(iv) Direct labour efficiency
	(v) Fixed overhead expenditure
	(vi) Fixed overhead volume
(b)	Explain the meaning and suggest one potential cause of the direct labour rate variance.

Feedback 4.1.1 – Basic revision example

(a)   Calculate the following variances:

(i)   *Direct material price*

Formula	$(SP - AP) \times AQ$
Variance	$(R6{,}00 - R6{,}22) \times 9\ 000kg$
	R2 000 Adverse

> Actual price/kg (AP)   = R56 000 ÷ 9 000 kg
>   = R6,22/kg (or R6,2222/kg)

Comment: We paid R0,22/kg more than anticipated, therefore the variance is adverse/unfavourable.

(ii)   *Direct material usage*

Formula	$(SQ - AQ) \times SP$
Variance	$(8\ 600kg - 9\ 000kg) \times R6{,}00$
Alt: (0,093 kg x R6 x 4 300)	**R2 400 Adverse**

Standard quantity (SQ) is the *input* quantity expected for the actual output. Also referred to as the flexed input quantity of the produced 4 300 units x 2 kg standard per unit.
Alt: Actual quantity/unit   = 9 000 kg ÷ 4 300 units   = 2,093 / unit

Comment: We used 0,093 kg/unit more than anticipated therefore, the variance is adverse.

(iii)   *Direct labour rate*

Formula   (SR – AR) x AH
Variance   (R7,00 – R7,13) x 4 600 hrs
                                                                                  R600 Adverse

Actual rate/hour (AR)   = R32 800 ÷ 4 600 hours   = R7,13 (or R7,1304)

Comment: We paid R0,13/hr more than anticipated therefore, the variance is adverse.

(iv)   *Direct labour efficiency*

Formula   (SHA – AHW) x SR
Variance   (4 300 hrs – 4 600 hrs) x R7,00
Alt: (0,068 x R7 x 4 300)   **R2 100 Adverse**

Again **SHA (standard hours allowed** – OUTPUT driven) is the flexed hours of 4 300 units produced x 1 hour standard per unit.

(v)   *Fixed overhead expenditure*

Formula   Budget – Actual
Variance   R36 000 – R35 000
                                                                        R1 000 Favourable

Budget = 4 000 units x R9 = R36 000

Spent less than budgeted, thus favourable.

(vi)   *Fixed overhead volume*

Formula   (AO – BO) x SR
Variance   (4 300 units – 4 000 units) x R9,00
                                                                        R2 700 Favourable

Refer to Learning Unit 1.2. 4 300 units were actually manufactured. As the budget was for 4 000 units, the volume of units manufactured exceeded by 300 units, a positive variance.

(b) **Explain the meaning and suggest one potential cause of the direct labour rate variance.**

- This measures the effect of paying actual labour hours at a different rate from standard.

- In this case the variance is R600 adverse and could be due to **overtime** working at premium rates, or possibly as a result of a **recent wage settlement**.

Focus note:
There is a difference between HOW a variance arose and WHY it arose. The HOW in (b)(i) was that the actual rate paid was more than the budgeted rate. The WHY refers to more expensive labourers used etc. The WHY refers to the underlying CAUSE of the variance. You will **NOT** earn marks for merely stating that the variance arose because Actual was higher than Budget.

Study the following sections in *Management and Cost Accounting* (Drury):

SA 1st ed.	10th ed.	Section
Chapter 18 Pages 532–566	Chapter 17 Pages 432–460	Operation of a standard costing system Establishing cost standards Purposes of standard costing Variance analysis (material, labour, variable overhead, fixed overhead (*excluding* volume efficiency variance and volume capacity variance), sales) Reconciling budgeted profit and actual profit Standard absorption costing
Chapter 19 Pages 583–591	Chapter 18 Pages 474–480	Direct materials mix and yield variances Sales mix and sales quantity variances (*excluding* Learning note 18.1 – market size and market share variance) Distinguishing between planning and operating variances

Note the following from the studied information:

- The methods for calculating the various material, labour and variable overhead variances include the principle of flexible ("flexed") budgeting as well as the meaning of the variances.
- The differences in the calculation methods applied for sales and fixed overhead variances under absorption vs. variable costing systems.
- The calculation of variances using an ex-post variance analysis approach (distinguishing between planning and operational variances).

3. The standard cost card

Drawing up a standard cost card will enable you to have a clear understanding of the costing method being used – Absorption vs Variable Costing.
It will also enable you to understand the resources being used in terms of standard quantities and costs.

Variances differ based on the method in use (Absorption vs Variable). Differences occur in *sales* and *fixed overhead*-related variances. All other variances are similar, irrespective of the costing method used.

Variable Costing Standard Cost Card		
Components	**Input Resources**	**Per Unit R**
Selling Price		500
Less: Variable Costs		
Direct Materials:		
Material A	3 Kg @ R10/Kg	(30)
Material B	6 Kg @ R15/Kg	(90)
Direct Labour:		
Grade 1	8 Hrs @ R10/Hr	(80)
Grade 2	12 Hrs @ R5/Hr	(60)
Variable Production Overheads	8 Hrs @ R5/Hr	(40)
Variable Selling & Admin Overheads	R10/Unit	(10)
CONTRIBUTION		**190**

Calculation of budgeted profit		R
Total contribution	5 000 Units x R190/Unit	950 000
Less: Budgeted Fixed Costs		
Budgeted Fixed Production Overheads		(300 000)
Budgeted Fixed Selling & Admin Overheads		(100 000)
Budgeted Operating Profit		**550 000**

Full Absorption Costing Standard Cost Card		
Components	**Input Resources**	**Per Unit R**
Selling Price		500
Less: Full cost of sales		
Direct Materials:		
Material A	3 Kg @ R10/Kg	(30)
Material B	6 Kg @ R15/Kg	(90)
Direct Labour:		
Grade 1	8 Hrs @ R10/Hr	(80)
Grade 2	12 Hrs @ R5/Hr	(60)
Variable Production Overheads	8 Hrs @ R5/Hr	(40)
Fixed Production Overheads	8 Hrs x R7,50/Unit	(60)
GROSS MARGIN		**140**

Calculation of budgeted profit		R
Total gross profit	5 000 Units x R140/Unit	700 000
Less: Selling & Admin Expenses		
Fixed Selling & Admin Expenses		(100 000)
Variable Selling & Admin Overheads	5 000 Units x R10/Unit	(50 000)
Budgeted Operating Profit		**550 000**

4. Calculating fixed overhead variances

Carefully study example 18.1 in the Drury SA 1ˢᵗ ed textbook (or example 17.1 in the Drury 10ᵗʰ edition textbook), which details the calculation of material, labour, overhead and sales variances. The calculation and eventual interpretation of fixed overhead variances often present students with major challenges. These are explained again below:

The level of detail of fixed overhead analysis will depend on the costing method system used i.e. a variable (direct) or absorption costing method. If the question does not tell you specifically what type of costing method is being used, take a look at the cost per unit for the product (standard cost card) that the company produces. If it includes fixed production overheads, an absorption costing system is in place.

1.   **Variable/Direct costing system**

If a *direct (variable) costing system* is used, only an expenditure variance is noted as the total fixed cost is deducted in full in the income statement and not allocated in any way to the products that are manufactured.

Variance	<u>Variable</u> **costing method**	<u>Absorption</u> **costing method**
Fixed overhead variances	Expenditure variance **ONLY**	Expenditure **and** volume variance

The variance is therefore calculated as follows in activity 4.1.2:

Activity 4.1.2 – Fixed overhead variance in a variable / direct costing system

Scampi (Pty) Ltd budgets for fixed production overhead cost of R75 000. The actual cost for the year was R80 000. Calculate the expenditure variance

Feedback 4.1.2

Fixed Overhead Expenditure Variance = Budget – Actual = R75 000 – R80 000 = R5 000 A

2.   **Absorption costing system**

If an *absorption costing system* is used, then two variances may be calculated as the fixed production overheads are allocated to products based on a fixed overhead recovery rate. The two basic variances for an absorption costing system are the **fixed overhead expenditure** and the **fixed overhead volume variance**. The latter can then **be analysed further** into the **fixed overhead efficiency** and the **fixed overhead capacity** variances. These two further variances are not part of this module's syllabus.

Activity 4.1.3 – Fixed overhead variances in an absorption costing system

Scampi (Pty) Ltd budgets for annual fixed production overhead cost of R75 000, 20 000 machine hours and 2 000 units to be produced. Actual machine hours for this year were 18 000 at a cost of R4,00 per machine hour and 1 850 units were produced. Fixed production overheads are allocated based on average long-run capacity utilisation of 20 000 machine hours. Calculate the fixed production expenditure and volume variances for the period if actual fixed production overheads amounted to R72 000.

Feedback 4.1.3

Fixed overhead expenditure variance	= Budget – Actual = R75 000 – R72 000 = R3 000 F
Fixed production overhead allocation rate	= R75 000 ÷ 20 000 hrs = R3,75 per hour
Unit fixed production overheads	= R3,75 x (20 000 hrs ÷ 2 000 units) = R37,50
SHA per unit	= 20 000 hours ÷ 2 000 units = 10 hours
SHA for actual output	= 1 850 units x 10 hours = 18 500 hrs

Fixed manufacturing overhead volume variance   = (BH - SHA) x SR
                                                 = (20 000 hrs – 18 500 hr) x R3,75
                                                 = R5 625 A

> FOHR is the budgeted cost of R75 000 divided by the budgeted machine hours, as this is the base for allocation. The adverse variance is part of the fixed overhead total variance.

5. Sales/revenue variances

Sales variances can be used to analyse the performance of the marketing and sales function on broadly similar terms to those for manufacturing costs. The objectives in calculating the sales variances are to determine whether budgeted volumes and budgeted prices were achieved.

Two variances may be calculated, namely a price and a volume variance. When a company manufactures more than one product, a mix variance (calculated using the same principle as the mix variance for raw materials) is also possible.

5.1. Sales volume variance

The sales volume variance is calculated in terms of the standard profit **or** contribution margin rather than sales value or price, depending on the product costing method used.

Variance	**Variable** costing method	**Absorption** costing method
Sales volume variances	**Contribution** margins[1] are used	**Operating profit (or gross profit)**[2] margins are used

Note
[1]: selling price less total unit **variable** manufacturing cost.
[2]: selling price less total unit manufacturing (including **fixed and variable**) costs.

The sales volume variance is calculated based on the input quantities and prices in the **original budget**. That is why the budget reconciliation will always first take the volume variance into account to flex the budgeted profit to the actual activity level before considering all the cost variances.

5.2. Sales price variance

The sales price variance accounts for the difference in the **actual price** achieved and the budgeted or **standard price** for each product sold based on the **actual activity**.

6. Mix and yield variances

Mix and yield variances are calculated for sales, direct materials and direct labour and the following should be noted:

- In the case of direct materials, the material mix and yield variances explain the materials usage variance in situations where more than one material class is used in the manufacturing process of a product.

- In the case of direct labour, the labour mix and yield variances explain the labour efficiency variance in situations where more than one class of direct labour is used in the manufacturing process. Class is, for instance, defined by skill level (i.e. skilled or unskilled)

- In the case of sales, the sales mix and yield variances explain the sales volume variance in situations where more than one product with varying unit contributions or profits is sold.

Focus notes: Material mix and yield variances

- The materials must be used in a mixture and manipulating the input qualities of one would result in more or less being used of the other inputs (there can be substitutions among and between materials). An example would be where more milk is used and less cooking oil in a dough mixture. On the other hand, it cannot be used in a motor assembly plant, e.g. a car cannot be fitted with only one tail light but instead have two bumpers at the back!
The fact that a product requires more than one material or component as input does not automatically lead to a mixture. Please read the scenarios presented to you carefully.

- If more than one product is sold, you can always calculate mixture variances between the products.

- A change in input mixture could be driven by changes in the price of one or more of the required inputs, or it is pure wastefulness. Make the connection if enough information is provided to support it.

- A change in input mixture could lead to changes in the quality of the final output, and the resulting "good" output. Make the connection if enough information is provided to support it.

Sales mix and quantity (yield) variances
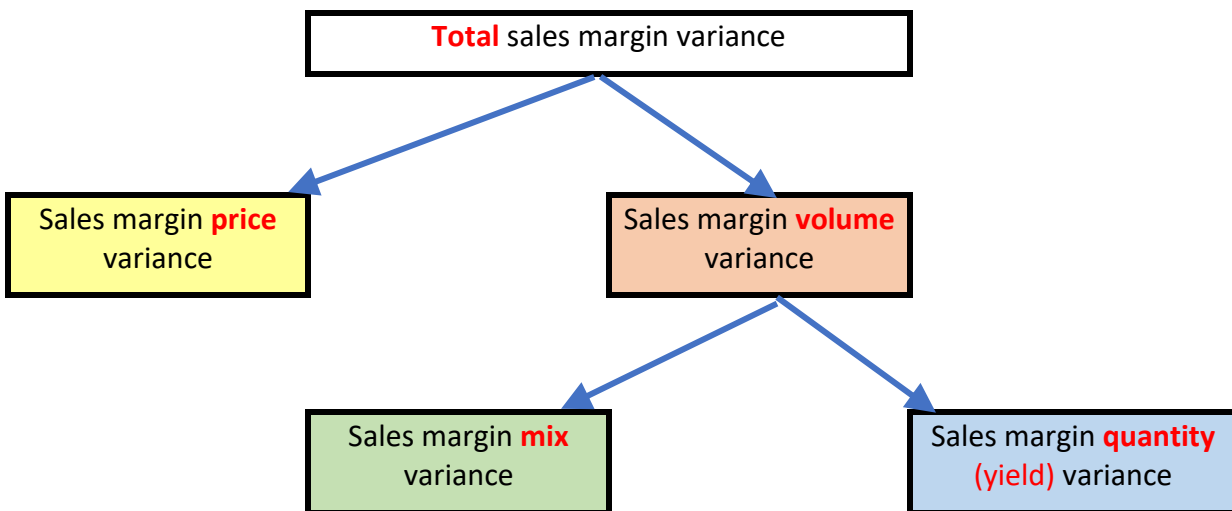
Activity 4.1.4 – Sales variances

A company has the following budget data and reported results for period 1 in the year 20x8:

Product	Budgeted Sales in Units	Budgeted Unit Selling Price	Budgeted Unit Contribution	Total Contribution
T	2 000	R20	R10	R20 000
S	2 000	R10	R 5	R10 000
Total	4 000			R30 000

The actual results were as follows:

Product	Actual Sales in Units	Actual Unit Selling Price	Actual Unit Contribution	Total Contribution
T	1 000	R18	R 8	R 8 000
S	2 500	R12	R 7	R 17 500
Total	3 500			R 25 500

REQUIRED	
(a)	Calculate the sales price variance.
(b)	Calculate the sales contribution volume variance.
(c)	Calculate the sales contribution mix variance.
(d)	Calculate the sales contribution yield or quantity variance.
(e)	Comment on how the sales contribution mix and yield variances arise.
(f)	Reconcile the total sales variances.

Feedback 4.1.4

It is imperative to indicate **Adverse (unfavourable) or Favourable** variances!

(a) **Calculate the sales price variance**

Product	Budgeted price	Actual price	Difference in price	Actual sold	Sales price variance
T	R20	R18	(R2)	1 000	R2 000 **Adverse**
S	R10	R12	(R2)	2 500	R5 000 **Favourable**
					R3 000 **Favourable**

(b) **Calculate the sales contribution volume variance**

The sales contribution volume variance = (budgeted sales units for each product – actual sales units for each product) x standard contribution per unit for each product.

Product	Budgeted Sales in units	Actual sales in units	Variance in Quantity	Standard contribution per unit	Sales contribution volume variance
T	2 000	1 000	-1 000	R10	R10 000 **Adverse**
S	2 000	2 500	+500	R5	R 2 500 **Favourable**
Total	4 000	3 500	-500		R 7 500 **Adverse**

(c) **Calculate the sales contribution mix variance**

The sales contribution mix variance = (actual sales quantity – actual sales quantity in budget proportions) x standard contribution margin per unit.

Product	Actual Sales in units	Actual sales in budget proportions	Variance in Quantity	Standard contribution per unit	Sales contribution Mix variance
T	1 000	1 750 (50%)	-750	R10	R7 500 Adverse
S	2 500	1 750 (50%)	+750	R5	R3 750 Favourable
Total	3 500	3 500	0		R3 750 Adverse

> The above relates to the change in mix: fewer units of T with a higher contribution per unit sold.

(d) **Calculate the sales contribution quantity or yield variance**

The sales contribution quantity (yield) variance = (actual sales quantity in budget proportions – budgeted sales quantity) x standard contribution margin per unit.

Product	Actual sales in budget proportions	Budgeted Sales	Variance in Quantity	Standard contribution per unit	Sales contribution Quantity (Yield) variance
T	1 750 (50%)	2 000	-250	R10	R2 500 Adverse
S	1 750 (50%)	2 000	-250	R5	R1 250 Adverse
Total	3 500	4 000	-500		R3 750 Adverse

> The above relates to the difference between actual and budgeted sales. Note that the mix is now the same, based on the budgeted proportions.

Check: Sales contribution mix variance (R3 750A) + sales contribution quantity (yield) variance (R3 750A) = **sales contribution volume variance (R7 500A).**

(e) **Comment on how the sales contribution mix and quantity (yield) variances arise:**
The sales contribution mix variance arises when the actual sales mix differs from the predetermined mix included in the budget or standard. If the actual mix is varied so that a larger than standard proportion of more profitable products are sold, then there will be a favourable mix variance. In this instance, more units of the less profitable product S were sold in larger proportions than projected, hence the adverse mix variance. However, the quantitative aspects of the variance do not reveal the qualitative dimensions. Limiting factors not disclosed in the question, for instance could have contributed to more of S being sold than T.

The sales contribution yield (quantity) variance arises when the actual sales quantity (holding the mix constant) differs from the budget. Again, academics argue whether or not sales mix and yield variances are necessary, especially in an imperfectly competitive market structure where prices and volume are closely related. The argument is that given price elasticity, the logical consequence of lower/higher selling prices is higher/lower volumes.

(f) **Reconcile the total sales variances.**

	R
Sales price variance	3 000 Favourable
Volume variance	7 500 Adverse
Sales contribution mix variance	3 750 Adverse
Sales contribution quantity (yield) variance	3 750 Adverse
Actual contribution R25 500 less budget control R30 000 =	**4 500 Adverse**

Activity 4.1.5 – Sales variance (Famous Fishing (Pty) Ltd – Adapted)

The FFWC subsidiary of Famous Fishing sells canned pilchards that are obtained from the following three sources:

- Pilchards caught by their own fishing vessels and canned at their factory
- Imported canned pilchards that are labelled at their factory
- Imported frozen pilchards that are canned at their factory

The **BUDGETED** sales quantity and production costs per ton for each type of pilchard canned for the year ended 31 August 2018 were as follows:

Source of pilchards	Sales quantity	Production cost per ton
Own catch	3 600 tons	R14 260
Imported cans	3 500 tons	R17 200
Imported frozen pilchards	2 700 tons	R16 000
	9 800 tons	

The **budgeted** average selling price for the year was R11,40 per 400g can of pilchards.

FFWC uses a standard absorption costing system.
The budget was based on the **standard** revenues and costs.

The **ACTUAL** results for the year ended 31 August 2018 were as follows:

Source of pilchards	Sales quantity	Production cost per ton
Own catch	1 100 tons	R13 900
Imported cans	3 400 tons	R17 550
Imported frozen pilchards	4 800 tons	R16 200
	9 300 tons	

The **actual** average selling price for the year was R11,68 per 400g can of pilchards.
According to Stats SA, the compound annual growth rate in the retail price of canned pilchards since 2008 has been 6%, which is more or less in line with inflation.

FFWC does not keep any inventory of pilchards at the beginning or end of the financial year (budget and actual).

REQUIRED		Marks	
		Sub-total	**Total**
(a)	Calculate the following variances for FFWC's canned pilchards for the year ended 31 August 2018:		
		4	
	(i) Sales price variance	6	
	(ii) Sales margin mix variance	4	
	(iii) Sales yield variance		
	Communication skills – layout and structure	*1*	15

Feedback 4.1.5

(i)   SALES PRICE VARIANCE per (ton)

	Selling price Actual vs budget R/ton (28 500-29 200)	Actual tons sold	Sales Price change x Actual Q and F/U	
Own catch	700	1 100	770 000 F	Must show Favourable or Unfavourable
Imported cans	700	3 400	2 380 000 F	
Imported frozen pilchards	700	4 800	3 360 000 F	
	700	9 300	6 510 000 F	

1 ton = 1 000 000g
(1 x 1 000kg per ton x 1 000g per kg)
Therefore 1 000 000g / 400g = 2 500 cans per ton
*Budgeted = R11,40 x 2 500 cans = **R28 500** per ton*
*Actual   = R11,68 x 2 500 cans = **R29 200** per ton*

Actual sales price more than standard = √
Favourable

ALTERNATIVE: SALES PRICE VARIANCE (per can)

	Selling price Actual vs budget R/can (11.68-11.40)	Actual cans sold (Tons x 1 000 / 0,4)	Sales Price change x Actual Q	
Own catch	0,28	2 750 000	770 000 F	Must show **Favourable or Unfavourable**
Imported cans	0,28	8 500 000	2 380 000 F	
Imported frozen pilchards	0,28	3 360 000	3 360 000 F	
	0,28	23 250 000	6 510 000 F	

	ACTUAL Sales quantity in cans
Own catch	1 100 tons x1000 / 0.4kg
Imported cans	3 400 tons x1000 / 0.4kg
Imported frozen pilchards	4 800 tonsx1000 / 0.4kg

(ii) Sales margin <u>mix</u> variance per ton

Standard (budgeted) profit margins per ton (NOT given – therefore must calculate first)

	Selling price R/ton	Production cost R/ton	Profit margin R/ton
Own catch	28 500	14 260	**14 240**
Imported cans	28 500	17 200	**11 300**
Imported frozen pilchards	28 500	16 000	**12 500**

Actual tons sold (9 300 tons) in budgeted sales (9 800 tons) proportions:

Own catch	**3 600 / 9 800**	=	**36,73%**	x 9 300	=	3 416
Imported cans	**3 500 / 9 800**	=	**35,71%**	x 9 300	=	3 321
Imported frozen	**2 700 / 9 800**	=	**27,55%**	x 9 300	=	2 562
	9 800		100,00%			9 300

	Actual sales qty (Ton)	Actual in budget prop. (Ton)**	Difference Ton	Standard margin R	Variance R
Own catch	1 100	3 416	*-2 316*	14 240	**-32 984 490 A**
Imported cans	3 400	3 321	79	11 300	**887 857 F**
Imported frozen pilchards	4 800	2 562	*2 238*	12 500	**27 971 939 F**
	9 300	9 300			-4 124 694 A

ALTERNATIVE: Sales margin <u>mix</u> variance per can

Standard (budgeted) profit margins per can (NOT given – therefore must calculate first)

	Selling price R/can	Production cost R/can	<u>Profit margin</u> <u>R per can:</u>
Own catch	11,40	5,70*	**5,696**
Imported cans	11,40	6,88^	**4,52**
Imported frozen pilchards	11,40	6,40#	**5,00**

* R14 260/ton ÷ 1000kg x 0,4kg = R5,70
^ R17 200/ton ÷ 1000kg x 0,4kg = R6,88
# R16 000/ton ÷ 1000kg x 0,4kg = R6,40

Actual cans sold in budgeted sales proportions (thousands of cans):

	'000			**'000**		**'000**
Own catch	9 000 / 24 500	=	36,73%	x 23 250	=	8 540
Imported cans	8 750 / 24 500	=	35,71%	x 23 250	=	8 303
Imported frozen	6 750 / 24 500	=	27,55%	x 23 250	=	6 405
	24 500		100,00%			23 250

	Actual sales quantity (Cans '000)	**Actual in budget prop. (Cans '000)**	**Difference (Cans '000)**	**Standard margin R**	**Variance R**
Own catch	2 750	8 540	*-5 790*	5,696	**-32 979 840 A**
Imported cans	8 500	8 303	197	4,52	**890 440 F**
Imported frozen pilchards	12 000	6 405	5 595	5,00	**27 975 000 F**
	23 250	23 250			-4 114 400 A

(iii) SALES QUANTITY (YIELD) VARIANCE per ton

	Actual in budget prop. (Ton)	**Budgeted sales qty (Ton)**	*Diff. Ton*	**Std margin R**	**Variance R**
Own catch	3 416	3 600	*-184*	14 240	**-2 615 510 A**
Imported cans	3 321	3 500	*-179*	11 300	**-2 017 857 A**
Imported frozen pilchards	2 562	2 700	*-138*	12 500	**-1 721 939A**
	9 300	9 800	*-500*		-6 355 306 A

ALTERNATIVE: SALES QUANTITY (YIELD) VARIANCE per can

	Actual in budget prop. (Cans '000)	*Budgeted sales qty (Cans '000)*	*Diff. (Cans '000)*	*Std margin R*	*Variance R*
Own catch	*8 540*	*9 000*	*-460*	*5,696*	***-2 620 160 A***
Imported cans	*8 303*	*8 750*	*-447*	*4,52*	***-2 020 440 A***
Imported frozen pilchards	*6 405*	*6 750*	*-345*	*5,00*	***-1 725 000 A***
	23 250	*24 500*			*-6 365 600 A*

Activity 4.1.6 – Fixed overhead variance

Overhead is absorbed on a machine-hour basis:

	Hours	R
Budget	11 250	258 750
Actual	10 980	254 692

Required: Calculate the expenditure variance and volume variance.

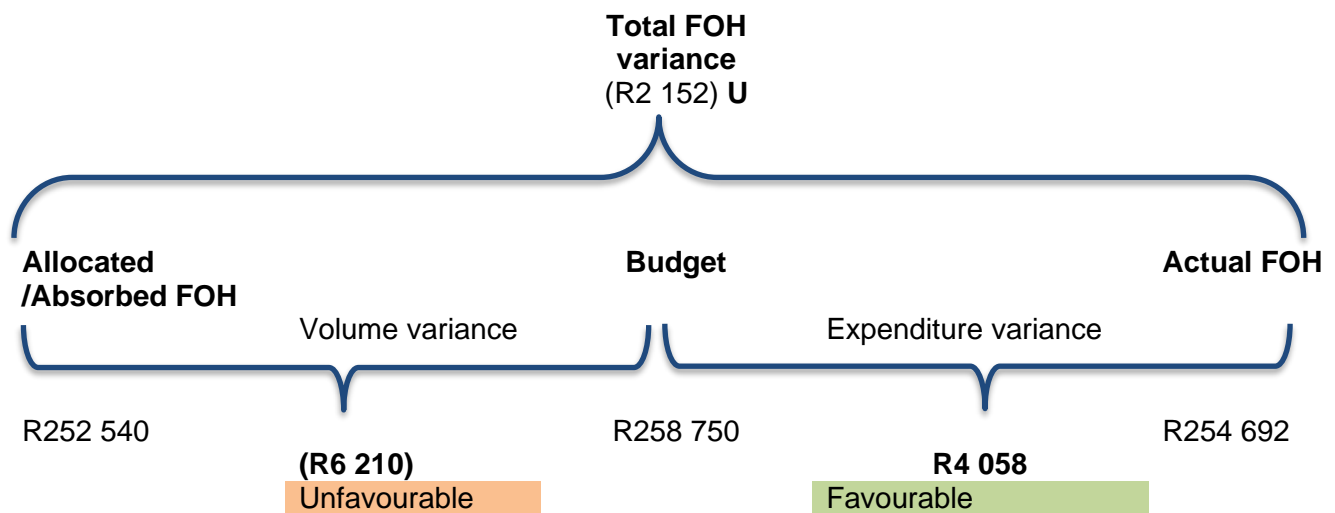**Feedback 4.1.6**

Determine a rate: $\dfrac{R258\ 750}{11\ 250\ hours}$ = R23 per machine hour

Expenditure variance: R254 692 – R258 750 =   R4 058 F

Absorbed / Applied   R23 x 10 980 hours   =   R252 540

Volume Variance   R258 750 – R252 540 =   (R6 210) U

Total FOH variance (R2 152) U

Allocated /Absorbed FOH	Budget	Actual FOH
Volume variance		Expenditure variance
R252 540	R258 750	R254 692
(R6 210) Unfavourable		**R4 058** Favourable

If all goes according to plan, we would have allocated all fixed production overhead costs to the production account. However, due to the volume variance this does not happen.
The capacity of the plant was under-utilised.
Machine worked only 10 980 hours instead of 11 250 as budgeted

Spent less than budgeted, thus favourable

Assume inventory held @ standard cost unless otherwise indicated

Activity 4.1.7 – Inventory recorded @ Standard cost

Product A requires **2 000 kg** of raw material x **@ R45 per kg** for the budgeted production of the **1 000 units of product A**

During August **2 100 kg's** of X were bought **@ R46 per kg** and **2 010 kg's issued** for **980 units made.**

Feedback 4.1.7

> IAS 2 Inventories
> allows for inventory to be accounted at
> standard cost if standard approximates actual

Inventory @standard cost

Usage per unit = 2 000kg / 1 000 units = 2kg per unit

Material price variance: 2 100kg x (R46 – R45)   = R2 100 U

> Actual <u>purchased</u>

Material quantity variance: [2 010kg - (980 units x 2kg)] x R45   = R2 250 U

> INVENTORY HELD AT
> **STANDARD COST**

> Closing
> inventory:
> 2100kg – 2010kg
> = 90kg
> X R45
> =R4 050

Journal entries
Dt Inventory – Material X (2 100kg @ R45)   R94 500
Dt **Price variance [2100kg x (R46-R45)**   **R2 100**
Cr Supplier   R96 600
   2 100 kg   @ R46 acquired

Dt WIP – A   (980 units x 2kg x R45)   R88 200
Dt **Quantity variance** – Material X
[2 010 kg – (980 units x 2kg)) x R45]   **R2 250**
Cr Inventory – Material X (2 010kg x R45)   R90 450
   2 010kg @ R45 issued

> Actual <u>issued input to
> production</u>
> Vs
> <u>Expected input</u>

Activity 4.1.8 – Inventory recorded @ Actual cost
Use the same information as given in Activity 4.1.4 above.
Inventory is however held at **actual cost.**

> Given that inventory is held at actual cost

Calculate variances.

Feedback 4.1.8
Material price variance: 2 010kg x (R46 – R45)   = R2 010 U

> Actual <u>issued</u>

Material quantity variance: Same as Activity 4.1.4 above
           = [2 010kg - (980 units x 2kg)] x R45 = R2 250 U

> INVENTORY HELD AT
> **ACTUAL COST**

Journal entries
Dt Inventory – Material X (2 100kg @ R46)   R96 600
Cr Supplier / Bank   R96 600
   2 100 kg   @ R46 acquired

Dt WIP (@ std)   (980 units x 2kg x R45)   R88 200
Dt **Price variance – Material X** [2010kg x (R46-R45)   **R2 010**
Dt **Quantity variance** – Material X
[2 010 kg – (980 units x 2kg)) x R45] R   **R2 250**
Cr Inventory – Material X (2 010kg x R46)   R92 460
   2 010kg @ R46 issued

> Closing
> inventory:
> 2100kg – 2010kg
> = 90kg
> X R46
> =R4 140

> Must balance

Activity 4.1.9 – Inventory @ standard cost – mix and yield variances

To produce **1 000 units** of Jolly-Juice requires **1 200kg of raw material (strawberries) @ R50 per kg** and **800kg of raw material (pears) @ R37,50 per kg.** During August **1 250kg** of **strawberries** and **760kg** of material **pears** were issued for the **production of 980 units of Jolly-Juice**. Raw materials are held at standard cost.

Required: Calculate the 1) material mix and 2) yield variances.

Feedback 4.1.9

1. Material Mix variance:

	Strawberries	: Pears
Standard **MIX**	1 200	: 800 [or 3:2 or 60:40]
Apply to <u>actual</u>: 1 250 + 760 = **2 010**	1 206	: 804 [60:40]
Actual used	<u>1 250</u>	: <u>760</u>
Variance	(44) U	44F
at Std price	**R50**	**R37,5**
Mix in Rand	(2 200)**U**	1 650 **F**

= Total mix variance (550) U

Yield variance

1 200 kg of material Strawberries + 800kg of material Pears = 2 000kg ➔ 1 000 units of product Jolly-Juice.

Therefore input : output is 2 : 1

OPTION 1: CONVERT TO OUTPUT:

Total yield (at std R90): R2 250 U

	Units
Expected yield/**output**	1 005
Actual yield/**output**	<u>980</u>
Variance	<u>25U</u>

> 2 010kg (1 250kg + 760kg) issued should yield
> = 1 005 units (2 010/2)

Total yield variance (25 units @ <u>R90</u> per unit) = **R2 250 U**

> S 1 200kg @ R50,00 = R60 000
> P <u>800kg</u> @ R37,50 = <u>R30 000</u>
> **2 000kg/   R90 000**
> **1000 budget**
>   **2kg per unit = R90 per unit**

OPTION 2 (ALTERNATIVE): CONVERT TO INPUT:

Actual	2 010kg	Input
Expected	<u>1 960kg</u>	(980 x 2)
Difference	<u>50kg</u>	

Total yield variance (50kg @ <u>R45</u> per kg) = **R2 250 U**

> 2kg per unit = R90 per unit
> R90 / 2 = R45 per kg

Total usage / quantity variance = mix variance + yield variance
$$= (R550) U + (R2 250) U$$
$$= (R2 800)U$$

Activity 4.1.10

Answer question 18.5 on page 128 of Drury SA Student Manual (question 17.5 on page 121, 10th ed.) and compare your answer to the solution.

Feedback 4.1.10

What has been given?

Single product
Standard cost is given PER UNIT (standard cost card). Actual Cost in TOTAL.
18 000 units – actual production

> **REQUIRED**
> a)   *Standard cost for output for the period*
> b)   *Calculate and list the relevant variances – reconcile the standard cost to the actual cost. No fixed overhead sub-variances required.*
> c)   *Theory: Comment on usefulness of statements to management.*

Section (a)

A standard cost for the given output on a total basis is the starting point, before variances can be determined.

What am I calculating?

What would my cost have been given 18 000 units of output (actual production figure) exactly according to budget?

Direct materials: Standard is 4 kg @ R120 per kg for 1 unit
18 000 x 4 x R120 = R8 640 000

If we had produced exactly according to budget then our expense for direct materials would have been R8 640 000 (flexed budget).

How much did it actually cost you to produce the 18 000 units? R8 360 000
So the **total** variance = R8 640 000 – R8 360 000 = R280 000 F

> *Remember that this is the TOTAL variance. This must be split between a usage and price variance in section (b). You **won't** get marks in the exam if you just give the variance in TOTAL.*

Labour   = 18 000 x 5 hours x R70   = R6 300 000
Variable overheads   = 18 000 x 5 hours x R20   = R1 800 000
Fixed overheads   = 18 000 x 5 hours x R100 = R9 000 000

Section (b)

Take note of the layout of the variance report. The total variance for each component is further split into a price/rate/expenditure and usage variance. You will get marks for the price and quantity variances in the exam. Ensure that you include these in your solution.

Section (c)

Note the usefulness of a variance report for management's control function.

 Video

Watch the videos and screencasts about principles; standard costing; overhead variances sales price and mix; material price and usage variance available on *My*Unisa refer to lesson 4.1.

7. Summary

In this learning Unit, we revisited the calculation and meaning of various standard cost variances for both variable and absorption costing systems. Some issues in calculating mix variances were also highlighted.

8. Self-assessment activity

Answer question 18.8 on page 130 of Drury SA 1st ed. Student Manual (question 17.8 on page 123, 10th ed.) and compare your answer to the solution.

Feedback: Self-assessment activity

Question 18:8

What has been given?

- 2 components – X and Y.
- Material A used in the production of both components.
- Note the time span is 13 weeks.
- Budgeted and actual information is given. Tip: Use 2 different colour highlighters (not pens) the budgeted and actual information to make it easier to read the information when writing out your solution in the exam.
- Note materials purchased (total) and usage (component X) given in actual information.
- Note that the material price (total) and usage (component X) variance have been given to you.

What is required?

Section (a)

Direct labour variance for the period. Note that the material variances were already given to you in the scenario, so don't waste time calculating them again.

Section (b)

- Standard purchase price for Material A, and
- Standard usage of material A per unit for component X. Note that the mark allocation is 8 marks. You are required to give 2 answers, therefore 2 calculations. (You were given the variances and actual purchases and usage, so work backwards to calculate standard purchase price and usage.)

Section (c)

- Describe the steps, therefore an explanation is required. Don't just do a calculation. Explain how it is done.

LEARNING UNIT 4.2 – Reconciliation of budget to actual

1. Introduction

The calculation of the various variances was revisited in the previous learning units. In this learning unit, the reconciliation of budgeted profit to actual profit will be recapped.

2. Reconciliation of budget to actual

Study the following sections in *Management and Cost Accounting* (Drury):

SA 1st ed.	10th ed.	Section
Chapter 18 pp 555-556	Chapter 17 p 451	Reconciling budgeted and actual profit – variable costing
Chapter 18 p 560	Chapter 17 p 455	Reconciliation of budgeted and actual profit for a standard absorption costing system

Note the following from the studied information:
- The differences in the reconciliation of budgeted and actual profits for standard variable costing systems and standard absorption costing systems.

Activity 4.2.1
Charlie Ltd manufactures a single product, Delta. The standard cost card for a unit of Delta is as follows:

		R
Direct materials: (in standard mix)	A: 3kg at R10/kg	30
	B: 6kg at R15/kg	90
Direct labour	8 hours at R10/hr	80
Variable overheads	8 hours at R5/hr	40
Fixed production overheads		60
		300

Overheads are allocated to inventory using labour hours as a basis. The overhead rate was determined using a normal average long-run capacity of 40 000 labour hours (5 000 units) per month for a normal month of 21 working days.

Budgeted selling price   R500 per unit
Budgeted sales   5 000 units per month

There were no raw materials, work-in-progress or finished products in inventory on 1 June 20x2. Raw materials are recorded at standard cost.

Actual information for June 20x2 (19 working days):
1.   Actual sales: R2 424 000 (4 800 units)
2.   Units manufactured: 5 100 units
3.   Materials – purchased: A: 18 000kg for R189 000
                                          B: 40 000kg for R560 000
         – issued: A: 14 000kg ⎤ Note: 48 000 kg
                            B: 34 000kg ⎦
4.   Labour cost: R382 200 for 39 000 hours
5.   Variable overheads: R170 000
6.   Fixed overheads: R310 000 paid

REQUIRED
(a)   Reconcile the budgeted, standard and actual profit.
(b)   Present the actual CSI on the absorption basis.

(Univ. of Pretoria adapted)

Feedback 4.2.1

(a)   **Reconciliation of budgeted, standard and actual profit**

	Calc. note	R	Favourable/ Adverse
Budgeted gross profit (5 000 x R200)	1	1 000 000	
Sales margin volume variance ((4 800 – 5 000) x R200)	2	(40 000)	A
Standard gross profit (4 800 x R200)		960 000	
Other variances:			
Sales margin price variance ((R505 – R500) x 4 800)	3	24 000	F
Materials purchase price A: ((18 000kg x R10) – R189 000)		(9 000)	A
OR (R10,50 – R10) x 18 000	4		
B: ((40 000kg x R15) – R560 000)		40 000	F
Materials mix A: ((14 000kg – 16 000kg) x R10)	5	20 000	F
B: ((34 000kg – 32 000kg) x R15)		(30 000)	A
Materials yield A: ((16 000kg – 15 300kg) x R10)	6	(7 000)	A
B: ((32 000kg – 30 600kg) x R15)		(21 000)	A
Labour rate variance ((R10,00 – R9,80) x 39 000 hrs)	7	7 800	F
Labour efficiency variance ((39 000 hrs – 40 800 hrs) x R10)	8	18 000	F
Variable overhead expenditure variance ((39 000hrs x R5) – 170 000) OR (R5 – R4,36) x 39 000	9	25 000	F
Variable overhead efficiency variance (39 000hrs – 40 800hrs) x R5		9 000	F
Fixed overhead expenditure variance (R300 000 – R310 000)	10	(10 000)	A
Fixed overhead volume variance	11	6 000	F
Actual gross profit		**1 032 800**	

Check:

Actual sales		2 424 000
Materials purchased (R189 000 + R560 000)	749 000	
Closing inventory Material A (4 000kg x R10)	(40 000)	
Material B (6 000kg x R15)	(90 000)	
Materials used	619 000	
Labour	382 200	
Variable overheads	170 000	
Fixed overheads	310 000	
Closing inventory (300 x R300: standard cost)	(90 000)	(1 391 200)
Actual gross profit		**1 032 800**

> **Note: When using brackets only, clearly indicate whether this implies an adverse or favourable variance.**

Calculations:

1. Standard gross profit per unit = R500 selling price – R300 standard cost = R200 per unit

2. Charlie Ltd uses an absorption costing method (fixed production overheads part of standard production cost). Sales margin volume variance is therefore based on adjusting gross profit.

3. Actual selling price per unit = R2 424 000 / 4 800 units = R505 per unit

4.   As the raw materials are recorded at standard, the difference between the actual and standard prices is accounted for at the time of purchase. The purchase price variance is therefore based on actual quantities PURCHASED.

5.   Actual material usage in standard proportions:

Total quantity of material actually used   = 14 000kg of A + 34 000kg of B = 48 000kg
Standard per unit = 3kg of A + 6 kg of B   = 9kg in total
In standard proportions: A: 3/9 x 48 000kg = 16 000kg
                            B: 6/9 x 48 000kg = <u>32 000kg</u>
                                                 <u>48 000kg</u>

The mix and yield variance (or usage variance) is ALWAYS based on materials ISSUED to production, never on purchases.

6.   Standard quantity of materials (expected) for actual production:

Material A: 5 100 units x 3kg =   15 300kg
Material B: 5 100 units x 6kg =   <u>30 600kg</u>
                                  <u>45 900kg</u>

7.   Actual rate per labour hour = R382 200 / 39 000 hours = R9,80 per clock hour.

8.   Standard labour hours for actual production   = 5 100 units x 8 clock hours per unit
                                                     = 40 800 hours

9.   Actual variable overhead rate = R170 000 / 39 000 labour hours = R4,3589 ≈ R4,36

10.   Budgeted fixed production overheads = R60 per unit x 5 000 units = R300 000

11.   Volume: Budget vs actual → (5 000 – 5 100) x R60 = R6 000

12.   All the production cost variances are based on the PRODUCTION volumes and the sales variances on the SALES volume.

(b)	Sales		R2 424 000
	Standard cost of sales (4 800 x 300)		1 440 000
	Standard gross profit		**984 000**
	Production variances		48 800
	- materials	(7 000)	
	- labour	25 800	
	- variable overheads	34 000	
	- fixed overheads	(4 000)	
	Actual gross profit		**1 032 800**

Activity 4.2.2

Answer question 18.10 on page 132 of Drury SA 1st ed. Student Manual (question 17.6 on pages 122–123, 10th ed.) and compare your answer to the solution.

Feedback 4.2.2

The question required a budget and actual profit reconciliation for a standard absorption costing system.

Take note of the discussion of the Production Director's decisions and the impact on the variances.

3. Summary

In this learning unit, we studied the reconciliation of budgeted profit to actual profit by means of adding the favourable to and deducting the adverse production and sales variances from the budgeted profit.

4. Self-assessment activity

Attempt questions: (Drury Student Manual)

SA 1st ed: Question 19.8 on page 140 (Solution pages 368–369)
SA 1st ed: Question 19.5 on page 138 (Solution pages 366–367)

10th ed: Question 18.8 on pages 130–131 (Solution pages 339–340)
10th ed: Question 18.5 on pages 128–129 (Solution pages 337–338)

LEARNING UNIT 4.3 – Variance analysis for controlling purposes

1. Introduction

In the prior Learning Unit 4.2 we looked at the reconciliation of budget figures to actual figures. In this learning unit, we will study the factors that should be considered when deciding whether it is worthwhile to investigate variances.

2. Variance analysis for controlling purposes

Study the following sections in *Management and Cost Accounting* (Drury):

SA 1st ed.	10th ed.	Section
Chapter 19 pp. 590–591	Chapter 18 pp. 479–480	Distinguishing between planning and operating variances
Chapter 19 pp. 591–593	Chapter 18 pp. 480–482	The investigation of variances
Chapter 19 pp. 593–595	Chapter 18 pp. 482–483	The role of standard costing when ABC has been implemented

Note the following from the studied information:

- the impact of controllability on variance reporting, i.e. flexing and planning variances
- the causes of variances and the methods used to determine whether an investigation is justified
- the types of costs for which an ABC system variance analysis is appropriate

Activity 4.3.1

Answer question 19.8 on page 140 of Drury Student Manual SA 1st ed. Or question 18.8 on pages 130-131 of Drury Student Manual 10th ed. And compare your answer to the solution.

Feedback 4.3.1

3. Note the discussion of the performance of the business and the sales manager in part ©.
   Summary

In this learning unit, we looked at the reasons for variances and the models used by organisations to ensure that the benefits of investigating variances exceed the costs. The use of standard costing when an ABC system is in use was also investigated.

4. Self-assessment activity

Answer question 19.15 on page 600 (Drury textbook SA 1st ed.) or question 18.17 on pages 488-489 (Drury textbook 10th ed.) and compare your answer to the solution.

LEARNING UNIT 4.4 Pro-rating of variances and accounting standards compliance

1. Introduction

The approach was almost entirely from the management accounting perspective in the previous learning units. The focus now shifts to financial accounting.

2. Pro-rating of variances and compliance with IAS 2

Financial statements prepared in compliance with International Financial Reporting Standards (IFRS) require compliance with IAS 2 (Inventories).

Study the following:

IFRS:	IAS 2 (Inventories)
Richard, Roets, Adams & West	Auditing Notes for South African Students (12th ed): p 12/16–12/18 and 12/24–12/25
Drury textbook	Under- and over-recovery of overheads: • SA 1st ed: Chapter 3: pages 96 – 97 or 10th ed: Chapter 3: pages 62 – 63 Arguments in support of absorption costing; • SA 1st ed: Chapter 7: pages 192–193 or 10th ed: Chapter 7: pages 157–158 Alternative denominator-level measures • SA 1st ed: Chapter 7: pages 179–182 or 10th ed: Chapter 7: pages 158–160

Note the following from the studied information:

• IAS 2 paragraphs 12–13 require the systematic allocation of fixed and variable production overheads to the cost of inventories. Absorption costing (including ABC) systematically allocates fixed production overheads.

• For **manufactured** goods, the allocation of overheads to the cost of manufactured inventory must
  - include only **fixed and variable production** overheads
  - be based on **normal capacity** and must
  - be allocated on a systematic basis which is reasonable

• The different possible denominator activity levels that can be used when calculating overhead rates.

• Where **standard costs** are used, the standard cost can be used for valuation and financial statements, **if it approximates actual costs**. This implies that variances, their materiality and causes should be considered during the valuation process. **Abnormal wastage** should be **excluded**. Over-recoveries should be investigated.

Inventories consist of:

Assets held for sale in the ordinary course of business (finished goods and goods bought for resale).
Assets held in the process of production (work-in-progress).
Materials or supplies to be consumed in the production process (raw materials).
Goods for **resale** and/or goods imported have specific issues that should be considered.

Finally, inventory is valued at the **lower** of cost and net realisable value (NRV). NRV is the estimated selling price in the ordinary course of business less the estimated costs of completion and the estimated costs necessary to make the sale.

Activity 4.4.1

Revise the illustrative example in learning unit 1.2 (Variable and Absorption Costing).

Feedback 4.4.1

Note the application of IAS 2 paragraph 13 in Part (d) of the example regarding the treatment of overheads allocated during periods of abnormally high production.

3. Summary

IAS 2 requires the use of absorption costing to value closing inventory for external reporting purposes. Furthermore, fixed production overheads should be allocated based on normal capacity. Standard costing is allowable for financial statements if the cost approximates the actual cost. Unusual variances should be investigated, and a decision should be made on whether the variance becomes a period cost or whether the standard is adjusted and inventory is re-valued.

4. Self-assessment activity

Before moving on to the next topic, make sure that you have grasped the following:

When a standard costing system can be used to value inventories:

- the accounting treatment of variances that arise between actual costs and standard (or allowed) costs
- the treatment of an unusually high fixed production volume variance

PART 2, LEARNING UNIT 5 – PERFORMANCE MEASUREMENT

LEARNING OUTCOMES

After studying this topic, you should be able to

- have a critical understanding of appropriate performance measures within an enterprise
- distinguish between the managerial and economic performance of a division
- explain the meaning of return on investment (ROI), residual Income (RI) and Economic Value Added (EVA®)
- apply appropriate performance measures within an enterprise

THIS LEARNING UNIT CONSISTS OF THE FOLLOWING SUB-LEARNING UNITS:

LEARNING UNIT	TITLE
LEARNING UNIT 5.1	Divisional financial performance measures
LEARNING UNIT 5.2	Transfer pricing in divisional companies

LEARNING UNIT 5.1   Divisional financial performance measures

Prior learning

This course assume students have already mastered the work equivalent to that presented in Unisa's preceding undergraduate degree. Please ensure that you are up to date with the prior learning for divisional financial performance measures. If not, please refer to your **undergraduate study material** and revise the textbook (Drury) using the page numbers below:

Prior learning	Drury SA 1st edition	Drury 10th edition
Before studying this topic, you should be able to do the following:	**Applicable references:**	**Applicable references:**
• Differentiate between functional and divisional organisational structures and prepare organisational structures (organograms) for both.	Chapter 20: Pages 608–609	Chapter 16: Pages 409–416
• Identify and explain the advantages and disadvantages of divisionalisation and the prerequisites for a successful divisional control structure.	Chapter 20: Pages 609–610 Pages 610–611	Chapter 19: Pages 494–503 Pages 506–513
• Determine appropriate responsibility centres for control purposes at different levels in the organisation.	Chapter 17: Page 499-500	Chapter 22: Page 611
• Describe the controllability principle and its impact on performance measurement.	Page 506-507	
• Distinguish between the economic performance of the division and that of the manager.		
• Compute return on investment (ROI), return on invested capital (ROIC) and residual income (RI) and identify the advantages and disadvantages of each.		
• Identify and compute the impact of factors, such as asset base and depreciation, on the performance of the divisions and/or managers.		
• Compute and explain the effect of performance measurement on capital investment decisions.		
• Identify and explain the approach (excluding balanced scorecard) that can be used to reduce the dysfunctional consequences of short-term financial performance measures (including non-financial measures).		

1. Introduction

Decentralisation may take many forms but relates to any circumstance where part of the management processes are removed from head office and reallocated to divisions of the company. These divisions may be subsidiary companies or different departments within a company and are usually split along product or geographical lines. In this module, we shall discuss the evaluation of divisional performance by employing appropriate performance measures and distinguishing between managerial and economic performance. We shall focus primarily on computing ROI, RI and EVA® and discuss the influence of these measures on capital investment decisions. Economic value added (EVA®) was not studied in the undergraduate module and is introduced in this learning unit. Finally, we shall discuss various approaches that can be employed to overcome the short-term orientation associated with accounting profit-related measures. It is also important to note that the transfer price between departments, divisions or subsidiaries will impact the performance of all involved. Transfer pricing is discussed in the next learning unit, 5.2.

2. Divisional financial performance measures
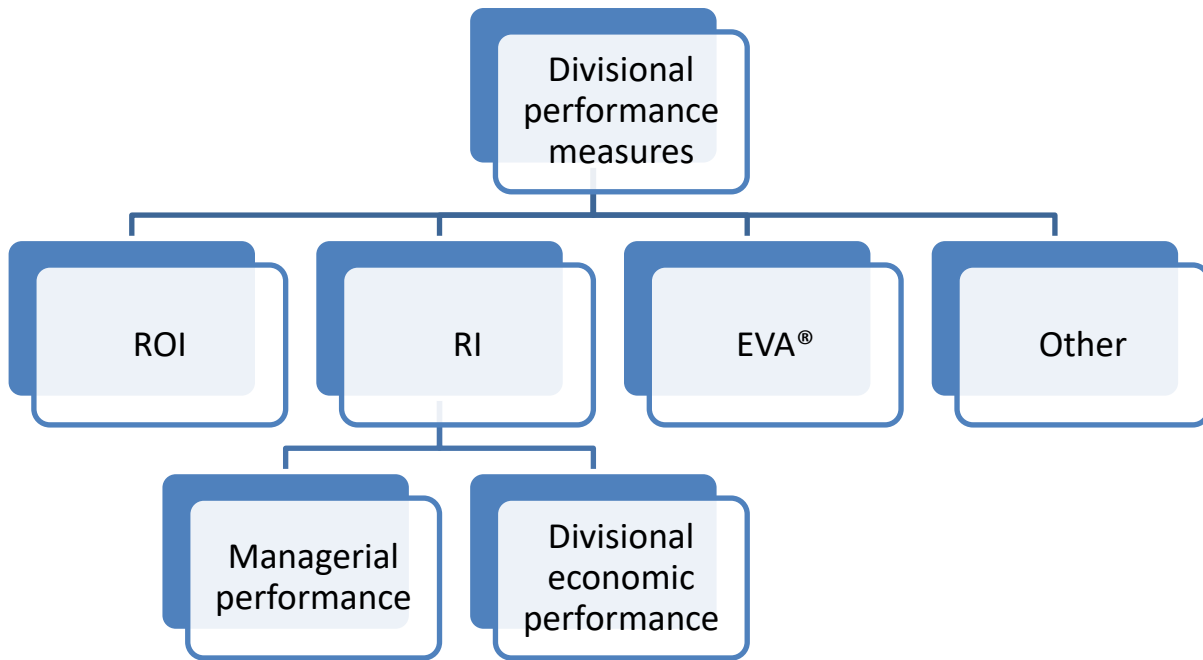
Study the following sections in *Management and Cost Accounting* (Drury):

SA 1st ed.		10ᵗʰ ed.		Section
Chapter	pages	Chapter	pages	
20	608–609	19	495–496	Divisional organisational structures
20	611–612	19	497–498	Distinguishing between the managerial and economic performance of the division
20	612–613	19	498–500	Alternative divisional profit measures
20	614	19	500	Surveys of practice
20	614–615	19	500–501	Return on investment
20	615–616	19	501–502	Residual income
20	617–618	19	502–506	Economic value added (EVA®)
20	621	19	506	Determining which assets should be included in the investment base
20	622–623	19	507–508	The impact of depreciation
20	623–626	19	508–511	The effect of performance measurement on capital investment decisions
20	627–628	19	511–513	Addressing the dysfunctional consequences of short-term financial performance measures
17	499-500	16	404	Control at different organizational levels
17	506-507	16	409–411	Responsibility centres

> **INTEGRATION:** Performance management is an important and integrated topic and can also be seen in the finance section of the syllabus. Performance management incorporates financial and non-financial performance. The Key Performance Indicators (KPI) incorporate **strategy, risk, financial and non-financial performance.**
>
> Please study the following sections from your Managerial finance textbook (**Skae *et al.* 10th** edition):
> - Non-financial performance measures should be studied in conjunction with Finance tutorial letter 104 and Skae *et al.* 10th ed. Chapter 8: Analysis and interpretation of non-financial information).
> - **KPI's and Strategy in Chapter 2:** page 59; page 96 to 99 and revise question 2-5 page 119-120
> - **KPI's and Risk in Chapter 3:** page 134
> - **Financial and non-financial reporting and performance in Chapter 8:** page 343; 346; 351; 357; 361 to 368; 406 to 409; 411 to 412.

Note the following from the studied information:

- Financial performance measures should include only the factors directly controllable by the manager. Therefore, distinguish between managerial and economic performance.
- Non–financial factors (e.g., competitiveness, productivity, quality, etc.) should be incorporated in performance measures to mitigate managers' short–term orientation.
- *EVA®* adjusts for distortions introduced by generally accepted accounting principles into the divisional performance measure to measure economic performance (the starting point is the accounting profit based on historical costs and not future cash flows).
- Refer also to LEARNING UNIT 3.2 earlier in this tutorial letter, which looked at benchmarking.

Utilising RI, ROI and EVA® as departmental financial performance measures can result in discrepancies (inconsistent rankings in terms of the best-performing division).

It is therefore important to determine the different attributes of each performance measure:

EVA® eliminates **accounting distortions**, whereas ROI, ROIC and RI do not.

RI and EVA® are difficult to compare between divisions of **different sizes** due to their absolute **(monetary) value**.

ROI as a percentage ignores the **investment size, whereas EVA® and RI incorporate** the invested capital size.

RI and ROI are based on **historic investment capital,** whereas EVA® is based on **market values**.

EVA® is a **superior performance measuring** method as it determines if shareholder wealth was created or depleted. It also achieves goal congruence.

Return on investment, Residual income and Economic Value Added will now be discussed. Refer to Chapter 8 of Skae *et al.* 2024 for the analysis of financial information by external stakeholders.

Note:
One of the difficulties of financial performance measurement is the inconsistencies encountered between different texts and used in practice by different entities. In practice, ratios are often adjusted to accommodate the entity's specific purpose.

» One such complication is the treatment of **taxation.** It is often argued that taxation forms part of the operational performance of the entity and the entity/ division/ management should seek to minimise the tax liability and **operating profit*** is therefore determined **after deducting taxation.**

Those against it argue that taxation should be excluded from operating profit, especially for entities from different countries under different taxation legislation and **operating profit*** is therefore determined **before deducting taxation**.

» Secondly, investment balances can be based on either historical costs or fair value. Although **fair value** may be subject to certain assumptions, it should be used if calculated accurately as it will provide greater insight.

» In practice, the use of average balances for ROI and Residual Income is recommended. However, for the purpose of this study material, you may use closing balances unless otherwise stated.

In practice, entities often use average Invested capital balances for EVA ®. However, EVA® should theoretically be based on **opening balances** (historic cost with no revaluations) as the investment capital amounts are adjusted and opening balances are used as a starting point.

Therefore, students must read and interpret the information provided carefully to determine controllability, etc. Students should further indicate where assumptions were made.

a) Return on Investment (ROI)

ROI = Operating profit*
       Investment

- ROI measures the profit or loss of an investment relative to investment cost. ROI is used for personal or business investment decisions. It can also be used for divisional performance measurement (internal managerial information).

- ROI is expressed as a percentage (%) and therefore, the investment size is ignored. For example company A invested R1 000 000 and company B invested a R1 000 and both have a ROI of 10%. Thus in terms of ROI they are equal but the size of the investment is ignored.

- It can be used to compare the performance of different investments.

Activity5.1.1:

Review the calculation of ROI, Question 20.22(a) page 634 (Drury textbook SA 1st ed.) or Question 19.17(a) page 516 (Drury textbook 10th ed.)

Feedback 5.1.1

No adjustments were required for the given financial components. Division B yields a slightly higher return.

b) Residual income (RI)

RI is the amount of profits that exceed the required rate of return[1]. Residual income can be used to assess the performance of a manager, or a department, or a business unit.

Residual income = Operating profit* – (Required rate of return[1] x Invested capital)

Note[1]: Specific business determined required rate of return or adjusted Weighted Average Cost of Capital (WACC)

i)   **Managerial performance**

RI (managerial)
= Controllable operating profit – (Required rate of return[1] x Controllable invested capital)

- **Controllable operating profit** refers to the divisional profit before interest, excluding (uncontrollable) allocated head office costs.
- Note the arguments for using divisional net profit (after deducting allocated head office cost) as discussed in the Drury textbook sections "Alternative divisional profit measures" and "Surveys of practice". Always read the test and exam questions for specific guidance.
- **Capital charge = Controllable** investment[2] x required rate of return %
  [2] Controllable investment usually refer to the total of non-current assets plus **net** working capital.
  = Controllable Operating assets – Controllable Operating liabilities
  Property, plant and equipment + controllable current assets – excess   cash – Controllable non-interest bearing current liabilities
- Students should consider whether or not the manager of a division has the power to exercise decisions relating to the purchase or disposal of an item of assets or changes to it - such power indicates **controllability**.

ii)   **Divisional economic performance**

RI (economic)
= Divisional operating profit – (Required rate of return[1] x Divisional invested capital)

- **Divisional operating profit** refers to the divisional profit before interest, excluding ONLY allocated head office costs, which cannot be avoided even if the division closes down.

- **Capital charge = Total investment in division** x required rate of return %

- **Total division investments[2]** usually refers to the sum of non-current assets and net working capital utilised by the division.

> **Note:**   At this stage, the required rate of return or the adjusted WACC will be given. In tests or exams, you can be required to calculate the WACC or adjusted WACC.

iii) Advantages of Residual income
- Suboptimal decisions are discouraged as managers will invest in projects that yield a return higher than the cost of capital.
- Contribution by divisions to group profit is clearly measured.
- Comparability is enhanced as different required rates of return may be used to reflect different risk profiles of the divisions.

iv) Disadvantages of Residual income
- The formula is slightly more complex relative to ROI.
- Managers may be disgruntled about different required rates of return.
- The answer is a rand-amount which makes it difficult to compare different size divisions.
- The short-term view is emphasised.

Activity5.1.2:
Review the calculation of Residual Income (RI), Question 20.22(b-e) page 634 (Drury textbook SA 1st ed.) or Question 19.17(b-e) page 516 (Drury textbook 10th ed.).

Feedback 5.1.2
Division B has a higher residual income than division C.

c) Economic Value Added (EVA®)

EVA® is a financial performance measure and a Stern Stewart & Co registered trademark. It is used to determine if **value was added** (wealth was created) for shareholders. **EVA® is a measure to assess how effectively company assets are utilized to generate income**

EVA® makes **adjustments to eliminate accounting entries,** such as **provision for doubtful** debts **or adding capital value for Research and Development that was** expensed ito IAS38. This is done to achieve the amount that closely represent an **economic profit and values.**

EVA® =   Adjusted NOPAT[2] – (Adjusted Invested capital[1] × WACC)

Note: [1] This represents a business entity's total capital invested through equity or debt.
Note: [2] Net Operating Profit After Tax

The following steps should be followed for calculating EVA®:

STEP 1: Calculate adjusted NOPAT

1.1 NOPAT (Controllable for divisions)		*XXX*
1.2 Adjust for Accounting (IFRS) distortions		
Add back:		
Non-cash expenses:		
Depreciation (accounting)*	Replace accounting depreciation with economic depreciation (holding gains/losses).	*X*
Non-cash expenses Provisions and deferred tax and forex losses or gains	EVA® is measured in cash-flow terms	*X* *X or (x)*
Interest paid net of tax (Assuming a tax rate of 28%: interest payments x 0.72)	Interest has already been taken into account in the WACC.	*X*
Long-term value-creating expenses:		
Advertising and research and development costs** (which did not meet the IAS 38 recognition criteria of an intangible asset and was expensed)	These costs are considered investments in the future, thus creating value in the long term. Add the entire expense back and then deduct the amortisation.	*X*
Goodwill amortisation***	Payments for goodwill create value; therefore, goodwill amortisation is added back as it forms part of intangible assets.	*X*
Operating lease interest cost****	Add back and capitalize the lease if sufficient information is provided in the scenario.	*X*

1.3. Deduct:		
Depreciation (economic)*	*Due to wear and tear or obsolescence, decrease in asset value during the year.*	*(X)*
Amortisation of advertising and research and development costs.***	*These costs are capitalised as assets and should therefore be amortised.*	*(X)*
Goodwill impairment ***	*As goodwill impairment is added back any impairment should be deducted. Ignore if the question is silent.*	*(X)*
Extra ordinary gains		*(X)*
Adjusted NOPAT		***XXX***

STEP 2: Calculate the value of the **adjusted invested capital**

2.1 Calculate the value of the ***controllable* invested capital if divisional performance** is being measured (Drury SA 1st ed: p 621 or 10th ed: p 506). The term **controllable invested capital** refers to the net asset base that divisional managers control. If the purpose is to evaluate the performance of a divisional manager, then only those assets that can be directly attributed to the division and are controllable by the manager should be included in the asset base. This means that only assets that the divisional manager can influence ought to be included in the measure. For instance, if central headquarters administers debtors and cash, they should be **excluded** because a divisional manager cannot influence these items.

Calculate the adjusted invested capital

Depending on the information available and purpose, **invested capital** can be calculated using multiple methods.

A. When looking at **where** the capital has been invested in operations:

Invested capital = operating assets – operating liabilities
 =   Property, plant and equipment + current assets – excess cash + goodwill + intangible assets – non-interest bearing liabilities

B. When looking at **what** capital has been invested in operations:

Invested capital = Debt capital
+ equity capital
            + preference share capital
            – excess cash
            – non-operating assets
            – investments
Which consists of: = Interest bearing debt (short and long-term)
            + equity capital (including reserves and retained earnings)
            + preference share capital
            – excess cash
            – non-operating assets
            – investments

Invested capital[1] (A or B)	**ZZZ**
Plus:	
Capitalised operating lease (net value after amortisation)	Z
Goodwill amortisation	Z
Capitalised advertising and research and development cost (net value after amortisation)	Z
Deferred tax and other provisions	Z
Adjust:	
The net effect of accounting and economic depreciation	Z or (Z)
Non-cash incomes or expenses affect retained earnings	(Z)Or Z
Adjusted Invested Capital[1]	**ZZZZ**

Note[1]: Use **replacement values** where available, else use non-current assets **at market value** plus **net working capital at realisable values plus capitalised expenses at amortised values.**

Step 3: Calculate return value required

Assume 16% for this example- You may be required to calculate WACC

Return value required = Adjusted Invested Capital (ZZZZ) **X WACC or adjusted WACC.**

= ZZZZ X 16%
=0.16ZZZZ

STEP 4: Calculate EVA®

EVA® =   Adjusted NOPAT – (Adjusted Invested capital[1] × WACC)

EVA® = XXX - 0.16ZZZZ

STEP 5: Conclude

If the EVA® > 0, economic value is **created/added.**
If EVA® < 0, capital is **depleted.**

(Source: Skae *et al. 10th ed* – used with permission)

i)   **Advantages of EVA®:**

EVA® adjusts for distortions introduced by generally accepted accounting principles into the divisional performance measure to measure economic performance (the starting point is the accounting profit based on historic costs and not future cash flows).
Managers are encouraged to 'think" in the same way as shareholders: EVA® actively encourages **increasing shareholders' wealth.**

Under-utilised assets are identified by determining replacement/ market values**.**
Emphasises achieving **long-term goals** by focusing on the benefits of research and development expenditure, training, advertising and marketing costs.

ii) Disadvantages of EVA®

The EVA® is based on **historical data** (not future cash flows) and shareholders are interested in future performance.
The EVA® calculation involves making **numerous adjustments** to the profitability and invested capital measures in order to convert the historical accounting data and thereby approximate economic profit and asset values. Not all the information required is readily available.
The use of **assumptions** of economic profit in evaluating performance results in lack of precision and objectivity, such as WACC.
EVA® is an absolute value (R amount), making it difficult to compare amongst divisions of different investment sizes.

Note that measures such as EVA® and lengthening the performance measurement period and incorporating non-financial measures can help address the dysfunctional consequences of short-term financial performance measures.

Activity 5.1.3

Attempt question (Drury textbook)

Drury SA 1st ed: Question 20.25 on page 636 (Solution p 897-898)
10th ed: Question 19.22 on pages 519-520 (Solution p 801)

Feedback 5.1.3

Perform an EVA® principled calculation on the scenario provided.

The revised financial statements underscore the need to adjust the conventional financial accounting divisional profit calculation to approximate economic income.

Integrated activity:

Revise EVA ® in Skae *et al.* 10th ed. Page 393 to 394.

Study the following sections in *Management and Cost Accounting* (Drury):

SA 1st ed. pages	10th ed. pages	Section
CH20: 617-618	CH19: 502–503	Economic Value Added (EVA®)
CH20:618-621	CH19: 503–506	An illustration of the calculation of EVA®

Study the following sections in *Managerial Finance* (Skae *et al.* – 10th ed.):

Chapter	Pages	Section
8	373 - 376	Economic Value Added (EVA®)
8	399 - 400	An illustration of the calculation of EVA®

d) Other performance measures

Revise the following section in *Management and Cost Accounting* (Drury):

SA 1st ed.		10th ed.		Section
Chapter	pages	Chapter	pages	
20	627–628	19	511–513	Addressing the dysfunctional consequences of short-term financial performance measures

Study the following sections in *Managerial Finance* (Skae *et al.* – 10th ed.):

Chapter	Pages	Section
2 8	99 - 100; 409	Performance management including the balanced scorecard (section 2.8.7 and 8.3.4)
8	351362; 402 - 403	Stakeholder relationships
2	59; 95 117-118	KPI's and Strategy Question 2-5
3	131	KPI's and Risk
8	345; 351; 355	Financial and non-financial reporting and performance

Note that measures such as EVA® and lengthening the performance measurement period and incorporating non-financial measures can help address the dysfunctional consequences of short-term financial performance measures.

Other performance measures relate to any other aspect that may be considered in order to evaluate the performance of management (whether of a division or of a company as a whole) and include the following (from the point of view of certain stakeholders):

- **Shareholders/ investors –** Market share price; EPS, dividend per share; Market capitalization
- **Products/production –** Contribution margins; Market share; % new products; R & D; Innovation; Output levels; Pollution levels; Wastage; Environmental impact; Capacity utilisation; Efficiency %
- **Clients/customers –** Satisfaction; Repeat buyers; Guarantee claims; Number of sales returns; Number of complaints; Brand awareness; On-time delivery
- **Employees –** Turnover; Absenteeism; Training levels
- **Managers/directors –** Economic value added; Competitiveness; Achievement of budgetary goals; Comparison of budget to actual; Human relations
- **Environmental, Social and Governance (ESG) –** Carbon footprint; water consumption; community; regulators such as SARS; auditors; etc.
- **Others** such as financiers; creditors; suppliers; etc.

The Balanced Scorecard – provides a balanced view of an organisations financial and non-financial performance and incorporates financial, customer, internal business process, and learning and growth (refer to Part 2: Finance tutorial letter 104 and Skae *et al.* 10th ed. Chapter 8.3.4)

Activity 5.1.4
Part i)
Refer to Skae *et al*. 19th ed: Chapter 8 for an illustration of:
Key Performance Indicators (KPIs) page 361 - 367
Stakeholder relationship number 3 of the 7 guiding principles of the Key stakeholders page 351 - 354

Part ii)
Attempt question: (Drury Student Manual)
SA 1th ed: Question 20.6 page 145
10th ed: Question 19.6 page 135

Feedback 5.1.4

Consider the performance measures and KPIs given and reflect whether these are applicable to your organization and who the key shareholders are.

e) Share-based compensation

In order to motivate employee performance and goal congruence, organisations often implement reward systems consisting of short-term and long-term performance-related remuneration and incentives. One of the long-term incentives often used is employee share option plans.

Share options give employees the right to purchase a predetermined number of shares at a particular exercise price at a specified future date(s). The company may set performance targets and conditions that must be met before vesting, and the options can be exercised. The vesting can occur on a specific date or over a period, e.g. semi-annually or annually. For example, an employee is given the right to purchase 4 000 shares at R20 per share. The options vest equally over four years. After one year, the employee may purchase 1 000 shares at R20 per share (subject to performance conditions being met) regardless of the share price. The thinking behind this kind of remuneration is that employees will be motivated to improve the company's performance and, in so doing, increase the share price. Thus, They will be able to purchase the shares at a below-market price and profit when they sell them. They can also keep the shares for longer in the hope that the share price will increase even more.

Video

Watch the videos about a brief performance measure available on *My*Unisa refer to lesson 5.1.

RECAP QUESTIONS from tutorial letter 103 that will be made available later for revision and assessment preparation purposes:

- Kwini part d;
- Famous fishing part d;

Integrated activity 1:

Read and summarize the following sections from your Managerial finance textbook (Skae *et al.* 10th edition):

➢ **KPI's and Strategy in Chapter 2:** page 59; page 95 and revise question 2-5 page 117-118

➢ **KPI's and Risk in Chapter 3:** page 131

➢ **Financial and non-financial reporting and performance in Chapter 8:** page 345; 351; 355

Integrated activity 2:
Refer to the link below for an example: Netcare Limited: 2022 Remuneration Report:

https://netcare-reports.co.za/2022/pdf/remuneration-overview.pdf

Group balanced scorecard FY2023

Area	Measure	Weighting
Financial results 60%	EBITDA margin	15.0%
	Adjusted HEPS – growth on FY2022	15.0%
	ROIC (measured over two-year period i.e. FY2022 and FY2023)	15.0%
	Cash conversion (measured over two-year period i.e. FY2022 and FY2023)	15.0%
Consistency of care 10%	Patient experience: continued improvement in the nurse compassion score of the patient feedback survey (PFS) for the Hospital Division	5.0%
	Doctor engagement: improved likelihood of doctor recommendation of Netcare as the workplace of choice	2.5%
	Specialists: gross number of new specialists granted admitting privileges in the Hospital Division	2.5%
Digitisation 10%	CareOn EMRs: additional number of beds in the Hospital Division linked to CareOn by September 2023	5.0%
	CareOn adoption by doctors: adoption of e-scripts	2.5%
	CareOn adoption by doctors: adoption of clinical orders	2.5%
Environmental sustainability 10%	Energy efficiency: additional year-on-year tCO_2e avoidance as a result of energy efficiency projects implemented	3.0%
	Renewable energy: additional year-on-year tCO_2e avoided as a result of renewable energy generated	3.0%
	Water savings: reduction in overall water consumption per bed in use in the Hospital Division	2.0%
	General waste: reduction in waste to landfill as % of Hospital Division waste	1.0%
	Healthcare risk waste (HCRW): reduction in HCRW to landfill as % of Hospital Division HCRW	1.0%
Human capital and transformation 10%	Preferential procurement: improved procurement spend on >30% black women-owned enterprises, >51% black-owned enterprises, EMEs[2] and QSEs[3] with overall improvement on procurement rating as % of points available for procurement on the B-BBEE scorecard	5.0%
	Employee retention: reduction in voluntary labour turnover	2.5%
	Management diversity and inclusivity: increase in overall representation of black managers at middle management as a % of all middle managers	2.5%
		100.0%

See in this extract how the remuneration is based on a **balanced scorecard** which integrates financial and non-financial performance indicators.

KPI's include

➢ Financial performance measures

   (EBITDA; HEPS; ROIC; Cash conversion)

➢ Medical entity and industry-specific *performance measures*

   (Consistency of carel; Digitisation)

➢ Non-financial indicators

   (Environmental sustainability; Human capital and transformation)

*These KPI's will also be linked to the entities **strategy** to ensure long-term sustainability and growth.*

3. Summary

In this learning unit, we focussed on financial performance measures in divisionalised companies, primarily ROI, RI and EVA®. The need for non-financial performance measures to balance short-term financial measures was also considered.

LEARNING UNIT 5.2   Transfer pricing in divisionalised companies

Prior Learning

This course assumes students have already mastered the work equivalent to that presented in Unisa's preceding undergraduate degree. Please ensure that you are up to date with the prior learning for transfer pricing and alternative transfer pricing methods. If not, please refer to your **undergraduate study material** and revise the textbook (Drury) using the page numbers below:

Prior Learning	Drury SA 1st edition	Drury 10th edition
Before studying this topic, you should be able to do the following: • Describe the different purposes of a transfer pricing system. • Explain the difference between intermediate and final products. • Identify and describe the different transfer-pricing methods that are used in the short term and in a perfectly competitive market. • Identify the need for the inclusion of opportunity costs in the transfer price. • Calculate the applicable opportunity costs when using variable cost plus opportunity cost as the transfer-pricing method.	**Applicable references:** Chapter 21: Pages 643–660	**Applicable references:** Chapter 20: Pages 525–533

1. Introduction

In the previous learning unit, we discussed divisional performance evaluation by employing appropriate performance measures such as ROI, RI and EVA®. We explained the importance of distinguishing between managerial and economic performance when appraising divisional financial performance.

In this learning unit, we shall discuss various methods that can be employed to determine internal transfer pricing and achieve organisational objectives and the general goals of transfer pricing. We shall also focus on resolving transfer pricing conflicts.

2. Goals of a transfer pricing system

• To motivate the divisional managers to make decisions to the advantage of the company or group as a whole (goal congruence).
• To ensure that each division's performance is reasonable, measurable and comparable (achieve equity).
• The system should be simple to operate and administer.
• The divisional managers should still be able to make autonomous decisions and enter into negotiations with each other.
• If possible, healthy competition between divisions should be encouraged by the transfer pricing system.

Note that transfer prices between different divisions in the same company impact the performance of divisions. Divisional financial performance measures were discussed in the previous learning unit, 5.1.

3. General guidelines (Rules of thumb)

The following 'rules of thumb' may be applied when a question asks for the calculation of a transfer price that will lead to goal congruence within the company:

1) **Minimum transfer price (that the supplying division will accept)**

   o The minimum transfer price should comprise the incremental cost (usually variable cost plus any increase in 'cash' fixed costs) and opportunity cost.

   o Opportunity costs exist only if there are sacrificed external sales due to the internal transfer of goods (and if the *contribution* is thus lost).

2) **Maximum transfer price (that the receiving division would pay)**

   o If there is an external market to buy from, the transfer price should be the *market price minu*s savings on selling and transport expenses.

3) **The maximum negotiated profit**

   o This refers to the incremental profit that would be made by the receiving division on the ultimate sale of the goods.

4) **The negotiated transfer price** (normally obtained through negotiation between the selling and buying divisions)

   • It should lie between the minimum and maximum prices calculated.
   • Range of acceptable transfer prices:

   Upper limit (determined by the <u>buying division</u> – receivers of product) (MAXIMUM)

   $\Updownarrow$

   Lower limit (determined by the <u>selling division</u> – suppliers of product) (MINIMUM)

Advantages of negotiated transfer prices:

Negotiated transfer prices preserve the autonomy of the divisions, which is consistent with the spirit of decentralization / divisionalisation.
The managers negotiating the transfer price are likely to have much better information about the potential costs and benefits of the transfer than others in the company.

The above can be summarised as follows:

MIN	= Incremental cost + opportunity cost
	Opportunity costs exist only if there are sacrificed sales due to transfer

MAX	**External market**
	= Market price - saving on selling and transport expenses
	If **no external market**
	= Variable cost + negotiated profit
	Maximum negotiated profit = *incremental profit by receiving division on sale of goods.*

Final transfer price = negotiation (between minimum and maximum price).

Activity 5.2.1

Attempt question: (Drury Student Manual)
SA 1st ed: Question 21.3, page 154-155, solution 385-386
10th ed: Question 20.3, page 143 -145, solution p 355-356

Feedback 5.2.1

Note the impact of the three different scenarios on the transfer price.

Activity 5.2.2 – Transfer price (Famous Fishing (Pty) Ltd – Adapted)

Metal can producer

In order to optimize its operations, FFWC has bought a local metal can factory and is incorporating it as a division of FFWC starting 1 May 2019. The factory only manufactures one size of can i.e. **400g.** The factory currently supplies 50% of what FFWC's pilchard can need at R2 700 per 1,000 cans - a market-related price.

From discussions with the factory's management, the following information has been obtained:

1.   The selling price for the financial year ended 31 December 2019 and is expected to increase by 10%.
2.   The variable cost per can for the 2019 year is expected to be R1,02.
3.   Fixed costs for the 2019 year are expected to be R52,8 million.
4.   The average net assets during the 2019 year are expected to be R88 million.
5.   The factory has a production capacity of 38 million cans per annum, and the 2019-year demand from external customers is expected to be 30,5 million cans.
6.   Factory management's proposed transfer price for the cans to the FFWC is full cost plus 20%.

FFWC has subsequently decided that the metal-can factory must fully satisfy FFWC's (internal demand) demand before selling externally. FFWC plans to can 7 300 **tons** of pilchards during the financial year ending 30 December 2019.

Required:
Calculate the **minimum** price **per can** that the **metal can factory** division will be willing to accept when selling the cans to the canned fish (cannery) division.

Feedback 5.2.2

⚠️ **Minimum price = incremental cost   +   opportunity cost**

(variable cost + any increase in 'cash' fixed cost) + (contribution lost on sacrificed external sales)

Step 1: Determine if opportunity cost is applicable *(will there be __sacrificed__ external sales):*

	Cans
Maximum capacity – given	38 000 000
Internal demand (7 300t x 1 000 / 0.4kg)	(18 250 000)
Available for external demand	**19 750 000**
External demand – given	(30 500 000)
Shortage (sacrificed external sales)	**(10 750 000)**

Do not confuse **cans and tons**

Step 2: Determine Contribution

	R per can
Selling price [R2 700/ 1 000 x 1.1]	2,97
Variable cost – given	(1,02)
Contribution	**1,95**

Step 3: Determine minimum transfer price

	R
Variable cost per can – given	1,02
Lost contribution	1,15
⚠ Each of the **18 250 000 internally transferred cans** should be **allocated a portion of the total lost contribution of R20 962 500** = 10 750 000 x R1,95 / 18 250 000 = R20 962 500 / 18 250 000 =R1,15	
Minimum transfer price per can	**2,17**

Transfer price always **per unit (can) NOT in total**

4. Behavioural implications of transfer pricing

The selling division may refuse to supply due to the following:

The price offered cannot cover marginal cost (where marginal cost pricing is used).
The price offered not being able to cover full costs (where full-cost pricing is used).
The price offered cannot give the supplying division optimum profitability (where market-related prices are used and divisional performance is judged on profitability).
Failure to agree to a negotiated price.

The buying division may refuse to take supply due to the following:

The price charged is considered excessive or more than the market.
In cost-based approaches, this may be due to disputes relating to the supplying division's cost structure or the size of the markup.
In market-based approaches, there may be disputes about the quantum of the discounts for cost savings related to internal transfers.

Activity 5.2.3

Attempt question: (Drury Student Manual)
SA 1st ed: Question 21.7, parts (a) and (b) only, page 158
10th ed: Question 20.7, parts (a) and (b) only, page 148

Feedback 5.2.3

Note the impact of the three different external demand levels on divisional and group profits.

ALTERNATIVE CALCULATION METHOD:

	Components	Components	Components
Maximum capacity	35 000	35 000	35 000
Internal demand	(20 000)	(20 000)	(20 000)
Available for external demand	15 000	15 000	15 000
External demand	(15 000)	(19 000)	(35 000)
Shortage	–	(4 000)	(20 000)

Division S

Contribution = $200 – $195 = $95 per unit

External demand (components)	15 000	19 000	35 000
	$000	**$000**	**$000**
Internal sales – variable cost portion of $105	2 100	2 100	2 100
Internal sales – lost contribution of $95	–	380	1 900
Total internal sales	2 100	2 480	4 000
External sales (15 000 at $200)	3 000	3 000	3 000
	5 100	5 480	7 000
Less production costs [Variable (3675)+Fixed (1375)]	(5 050)	(5 050)	(5 050)
Profit	50	430	1 950

Activity 5.2.4: Calculating a transfer price

A company operates two divisions, Able and Baker. Able manufactures product X, whereas Baker manufactures product Y.

Product X could be used as a component in the manufacture of product Y. X by Able and Y by Baker

	Able X	Baker Y
The associated product information at full (normal) capacity is as follows:		
Production capacity (units)	10 000	5 000
	R	R

Note that the information is given per unit

	Able X	Baker Y
Variable costs per unit **(excluding selling costs)**	30	33
Variable selling costs per unit	2	2
Fixed overheads per unit	5	5
	37	40
Product X	-	?
	37	?

The variable selling costs will not be incurred on inter-divisional transfers of products.

The information contained in each of these sub-sections should be taken independently from each other, unless otherwise stated.

REQUIRED

(a)   The transfer pricing system operated by a divisional company has the potential to make a significant contribution towards the achievement of corporate financial objectives. Explain the **potential benefits of operating a transfer pricing system within a divisionalised company.**   (3)

> Theory

(b)   Product X can be sold on the external market in unlimited quantities at R42 per unit. If Able can make an **autonomous** decision, what is the *minimum* unit transfer price that Able will accept for product X?   (2)

> What does this word (autonomous) mean? Independent, self-directed, self-governing. If Able was to make an "autonomous" decision it means that they will not consider the other divisions (i.e. Baker) when setting a selling price. Remember that you are looking at the price from Able's perspective.

(c)   An alternative for product X, to be used in the production of product Y, is not available from the external market. Calculate the *maximum* unit price that Baker will pay for product X, if product Y can be sold on the external market in unlimited quantities at R70 per unit.   (2)

> Remember that you are now looking at the price from Baker's perspective. There is not an alternative in the outside market so Baker has to source the product from Able.

   Able can sell 8 000 units of product X externally at R42 per unit. Calculate the *minimum* unit price that Able will accept if Baker is to purchase the remaining 2 000 units.

(d)   > This is from Able's perspective. They can produce 10 000 units in total. They only sell 8 000 units to the outside market so they do have 2 000 units left which are unsold. There is no opportunity cost because these units are "in stock".   (2)

(e)   The same information as in section (d) applies, except Baker wants to purchase 3 000 units from Able. Calculate the *minimum* cost per unit that Able will charge Baker.   (1)

> Baker now wants to purchase 3 000 units. How will the calculation change for the extra 1 000 units? You will have to "borrow"/take the 1 000 units from the outside market's order because you can only produce 10 000 units. The order for the outside market is 8 000 units. You have 2 000 units left which you can sell to Baker but there are still 1 000 units short. If you take it from the outside market's order then you must remember that there is an opportunity cost that needs to be taken into account: the profit that you will lose out on if you sell to the outside customer.

(f)   Assume there is no external market for product X. Answer the following question: What transfer price (charged by Able) for product X (to Baker), will always maximise group profits with such a market demand?   (2)

(g)   Assume Able is only a cost centre. Calculate the *minimum* cost per unit that Able will be happy with, with no corporate intervention in its decision, if Able only sells 7 000 units to Baker.   (3)

(h)   The same information as in (g) applies. Discuss and calculate what the probable transfer price will be if the company's objective is to obtain a balance between the corporate financial objectives (as discussed in (a)).   (6)

CIMA adapted

Feedback 5.2.4

> *Note:*
> This question comprises short sub-sections, which test your knowledge of the application of relevant costing principles to transfer pricing.
> It explains the reasoning for the use of, or for omitting, certain cost items in the transfer price calculations*.*

(a) **Potential benefits** of operating a transfer pricing system include:
- Achieving the highest overall company profit (short-term goal).   (1)
- Achieving goal congruence between divisions and the group.   (1)
- Create a sustainable divisional autonomy and localised decision-making.   (1)
- Efficient measurement of divisional financial performance through the generation of a recognised income figure.   (1)
- As a strategic method, the transfer price could be set above the marginal cost and signalled to competitors.   (1)

                                                                    Maximum (3)

(b)   Minimum price: R40   (2)

Calculation:

R42 (market price) less R2 (saving in variable selling costs).
At this price Able will be indifferent between internal transfers and selling to the external market, as the same profit will be generated with either transaction.

(c)   Selling price: R70   (1)

  Less: R40 (total incremental cost for Baker)   (1)
  Less: R0,01 (to make a minimum profit)

> It is the least profit that you can make.
                                                                                (2)

  = R29,99

  In examinations, make a note of the 0,01 adjustment, BUT **use the (rounded) R30.**

Note:

As no external market exists, the receiving division will at most be willing to pay the variable cost of X plus a negotiated profit.
This negotiated profit is the incremental profit that will be made by the receiving division (Baker) on the ultimate sale of the goods.
The calculation will therefore be:
Negotiated transfer price = incremental cost[1] of X + negotiated profit

        Note[1] : incremental cost
        = relevant variable + relevant fixed cost + apportioned lost contribution

The fixed cost for Baker is also included in the total cost, as Baker must incur the fixed cost to complete the product.
The assumption is made that, if no internal transfer was to take place, Baker will not be able to function as it is reliant on the internal transfer.
Thus, Baker will close without the transfer and the fixed costs will be eliminated (avoided).

(d)   Marginal cost: R30

(1)

    Add: R0,01 (to make a minimum profit)
               = R30,01

> Remember that you are calculating the MINIMUM price that the division will accept. They want to cover at least their costs and make the minimum profit of 1c. (not to break even which equals -0 profit). Again, *work with* R30 as the profit will be negotiated.

Note:

o   The definition of marginal cost is the additional cost of one extra unit of output.
o   Here the marginal cost is R30 as no incremental fixed costs will be incurred.
o   If additional manufacturing capacity (fixed cost) will be needed to produce units above and beyond 8 000 units, then additional fixed costs will also be included as part of the marginal cost.
o   Therefore we do not, in this case, include any fixed costs as these will already be covered in the first 8 000 units of product X sold externally. Able will probably calculate the unit cost for the first 8 000 units sold externally as follows:

Variable costs per unit

= R30 (variable cost) + R2 (variable selling costs)
= R32

Fixed costs

Total = 10 000 units times @ R5 per unit = R50 000

Fixed costs per unit (if we only produce 8 000)

= R50 000 / 8 000
= R6,25 [This now includes the under-recovery of FC]

Total cost per unit

  = R32 + R6,25
  = R38,25

(e)   Minimum cost: marginal cost plus opportunity cost (lost contribution from an external sale)

    Marginal cost = R30   (1)
    Opportunity cost = R42 (external selling price) - R30 (variable cost) - R2 (selling cost)
    = R10 per contribution unit   (3)
    Total = R10 x 1 000 units = R10 000
    Per unit transferred = R10 000 / 3 000 units = R3,33 per unit transferred

    Note:

    o Firstly, in calculating the lost contribution from an external sale, we deduct the R2 (variable selling costs) as this cost will be incurred on an external sale.
    o Secondly, the lost contribution is apportioned to each product as incremental cost.

    o   We calculate lost contribution as we want to include in the minimum price the contribution towards fixed costs and profits that could be made on an external sale.

  o   Minimum cost = R30 + R3,33
  o   = R33,33 + R0,01 (to make a minimum profit or negotiate a profit)
  o   = R33,34

ALTERNATIVE:

	TOTAL R
Minimum price for first 2 000 units = R30, therefore 2 000 x R30	60 000
Minimum price for last 1 000 units = R30 + 10, therefore 1 000 x R40	40 000
Total price for 3 000 units	100 000

Average minimum price per unit = R100 000 / 3 000 = R33,33

(f)   Marginal cost

Marginal cost = R30   (2)

> *Note:*
>
> This price will always maximise group profits as it will result in no internal (inter-divisional) profits, which can otherwise complicate things.
>
> This will obviously satisfy the transfer-pricing goal of optimising corporate profits, but it will compromise the other transfer-pricing goals (such as achieving goal congruence and fostering divisional autonomy.
>
> In calculating the lost contribution from an external sale, we also deduct the R2 (variable selling costs) as this cost will be incurred on an external sale.

(g)   Able will need to cover its total cost:

R30 (variable cost)   (1)
plus (R50 000 / 7 000) = R7,14 (fixed cost allocated over units manufactured)   (2)

o   As Able is now a <u>cost centre</u> responsible for covering all costs, the fixed cost will have to be included in the transfer price calculation.

> Make note of this.

o   No profit is made in a cost centre, so no amount is added to ensure a minimum amount.

o   The total fixed costs are recovered over only 7 000 units → which is the total supplied to Baker.
o   It is, therefore, necessary to calculate the total fixed cost and divide it by 7,000 units (instead of the capacity of 10,000 units) to ensure that the total cost is recovered.
o   We exclude variable selling costs as this cost will not be incurred on an internal transfer and is, therefore not relevant.   (1)

(h)   A reasonable transfer price will normally be obtained through a process of negotiation after *maximum and minimum prices* have been calculated.   (1)

Minimum price

This is where the corporate financial objective of achieving optimal corporate profitability will be satisfied first.   (1)

This is where the transfer price per unit = R30 (marginal cost)   (1)

Maximum price

This is where the corporate financial objective of proper performance measurement will be satisfied first.   (1)

At this price, Able will cover its full costs: (1)

= R37,14 [as calculated in (g)]

Preferably, the full standard cost should be used to avoid transferring Able's inefficiencies (in case of adverse variances) to Baker.   (2)

Probable transfer price:

This will lie between R30,00 and R37,14 and the final price will be obtained through negotiation (probably with corporate intervention) and will depend on which corporate financial objective weighs the most.   (1)

                                                                                    Maximum   (6)

Video

Watch the videos about a transfer pricing principles and example available on *My*Unisa refer to lesson 5.1.

RECAP QUESTIONS from tutorial letter 103 that will be made available later for revision and assessment preparation purposes:
- Hero part d;
- WaterCounts part g, h and i;
- Famous fishing part e and g;
- Kwini part e;
- Blexem part d.

Enrichment activity
- Kganyago (Part B) part e and f;
- Angora part c and d;
- Inzinkuni part b;

5. Summary

In this learning unit, we focussed on the various methods that can be used to determine internal transfer prices, goals of a transfer pricing system and resolving transfer pricing conflicts.

PART 3 – DECISION-MAKING

PART 3 – PURPOSE

The purpose of part 3 is to enable students to have a critical and informed understanding of the key terms, rules, concepts and established principles of collecting and using information in making short-term decisions.

PART 3 CONSISTS OF THE FOLLOWING LEARNING UNITS:

LEARNING UNIT	TITLE
LEARNING UNIT 6	INFORMATION APPLICATION TO DECISIONS
LEARNING UNIT 7	INFORMATION FOR DECISION-MAKING

PART 3, LEARNING UNIT 6 – INFORMATION APPLICATION TO DECISIONS

LEARNING UNIT 6   LEARNING OUTCOMES

After studying this topic, you should be able to do the following:

- Determine how costs and revenues should be measured for a range of non-routine short-term and long-term decisions.
- Understand the important role of cost information in pricing and product-mix decisions.

THIS LEARNING UNIT CONSISTS OF THE FOLLOWING SUB LEARNING UNITS:

LEARNING UNIT	TITLE
LEARNING UNIT 6.1	Relevant costs and revenues for decision-making
LEARNING UNIT 6.2	Pricing decisions and profitability analysis

LEARNING UNIT 6.1   Relevant costs and revenues for decision-making

Prior learning

This course assumes students have already mastered the work equivalent to that presented in Unisa's preceding undergraduate degree. Please ensure that you are up to date with the prior learning for relevant costs and product-mix decisions when capacity constraints exist. If not, please refer to your **undergraduate study material** and revise the textbook (Drury) using the page numbers below:

Prior learning	Drury SA 1st edition	Drury 10th edition

Before studying this topic, you should be able to do the following:
 	
• Distinguish between relevant and irrelevant information with regard to a specific decision.
• Calculate relevant incremental cash flows in a given scenario.
• Make preliminary recommendations, supported by appropriate calculations, based on the following advanced scenarios:
  o special pricing (special orders)
  o product mix when capacity constraints exist
  o replacement of equipment
  o outsourcing (make or buy)
  o discontinuation of products, product lines or divisions
• Define and identify limiting factors in a given scenario.
• Calculate contribution of the limiting factor per unit in a given scenario.
• Determine the optimal allocation of available resources and the optimal product mix.
• Calculate the maximum price to be paid for additional supplies of the limited resources per input unit.
• Discuss qualitative issues for each decision, including but not limited to environmental, social and governance aspects.
• Identify circumstances under which linear programming would be required to solve a multi-product, multi-constraint scenario and which elements are required to do the programming (instruct the tool). Interpret the results of such linear programming. Consider and conclude whether linear programming is required, but the execution thereof is excluded.
	Applicable references:
	
	Chapter 11: Pages 283–303
		Applicable references:
		
		Chapter 9: Pages 197–215
		
		Chapter 26: Pages 694–696
		
		Skae et al. 10th edition
		Chapter 6:
		6.4 Investment decision
		6.5 Keep versus replace
		6.8 Qualitative factors

INTEGRATION: Relevant costing and decision-making are important and integrated topics and can also be seen in the finance section of the syllabus. The principles of relevant costing are the foundation of relevant cash flows used in Investment decisions.
Revise **Skae et al. 10th** edition Chapter 6

1. Introduction

In this learning unit, we will discuss measuring costs and benefits for non-routine decisions such as deciding on making a component within the company, buying from an outside supplier, introducing a new product, and replacing existing equipment. The focus is that in **non-routine decisions**, we report only those costs and benefits relevant to the specific alternative courses of action. Consequently, only relevant costs and revenues/benefits should be considered in decision-making (decision-relevant approach). A relevant cost or benefit is a future cash flow arising or changing as a direct consequence of the decision under review. In this section, we shall look at the key concepts that should be applied in making product-mix decisions when capacity constraints exist and the pricing of special orders. Finally, we shall discuss equipment decisions, explaining why equipment book values are irrelevant in such decisions.

Focus notes

Relevant cost or benefit – is a **future cash flow** arising or changing as a **direct consequence of the decision under review**.

You should be able to incorporate time value of money into your relevant costing decisions (relevant cash-flows)!

Costs and benefits independent of a decision (i.e. not influenced by a decision) are irrelevant and need not be considered when making the decision. Only **differential or incremental cash flows** should be taken into account.

Cash flows that will be the **same for all alternatives** are irrelevant.

Sunk costs are cash flows that have **already been incurred** and are *irrelevant* for decision-making.

Committed costs (past and future) cannot be relevant to a manager is decision to improve or maximise profits.

Fixed Costs are irrelevant costs (except for such costs as incremental and divisible fixed costs)

Total Variable Costs: Variable costs are often considered as relevant costs. Committed variable costs are nevertheless irrelevant to decision-making.

The total relevant cost of production is usually the variable cost per unit multiplied by the additional units produced plus (or minus) any change in the total expenditure on fixed costs.
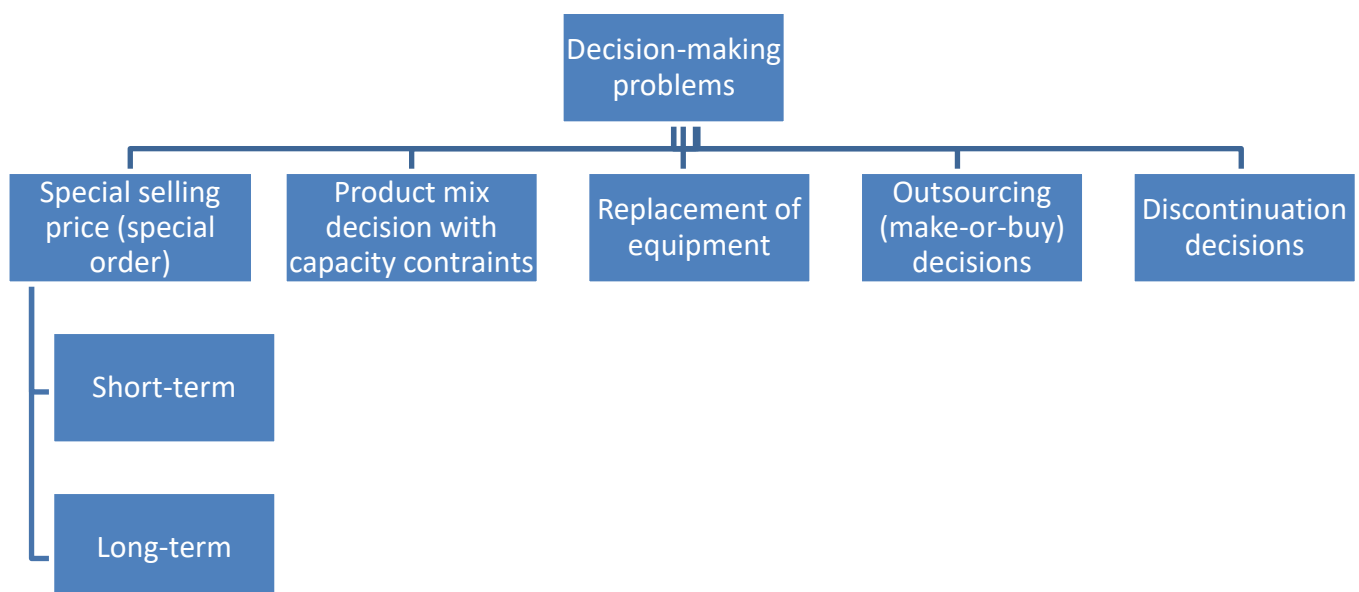
2. Guidelines for determining material relevancy

Purchased in the past	• Sunk cost (only if not regularly used and replaced, then use the relevant cost to purchase)
Ordered or received, not yet paid	• Sunk cost (already committed to pay), unless able to return the goods to the supplier, or regularly used and replaced, then use the relevant cost to purchase
In stock and no other use at present	• No value (0)
In stock and could be sold directly	• Net realisable value
In stock and may be used on another job	• Lost contribution (opportunity cost)
In stock and frequently used	• Replacement cost
Used as a substitute	• Cost saved by not having to purchase other material
Must otherwise be disposed of	• Opportunity saving

Relevant cost of materials

Are materials already in stock?
— No → Relevant cost = cost to purchase
— Yes ↓

Are materials used regularly and replaced when stock runs out?
— Yes → Relevant cost = cost to purchase
— No ↓

Do the materials have an alternative use/ can they be sold if not used?

- Sold → Relevant cost = net realisable value (opportunity cost)
- Alternative use → Relevant cost = lost contribution (opportunity cost)
- Must otherwise be disposed of → Relevant cost = Opportunity saving
- Can't be sold or no alternative use → Relevant cost = ZERO

3. Some guidelines for determining labour relevancy

Salaried labourers:

- Already working at business = No relevant cost
- Work overtime = Overtime cost is relevant

Additional labourers / wage workers:

- Employ additional labourers = Basic pay
- New labourers work overtime = Basic pay plus overtime
- Specialised labour (scarce) = Basic pay + Opportunity cost of projects sacrificed

Activity 6.11.1: Measuring relevant costs and revenues for decision-making

Special order – Cultural Day

The local municipality is hosting a cultural day for schools in the area and has asked HotDog to prepare a quote to provide each child with a food package consisting of: One Easy-dog Hotdog, One Soft drink, One Health bar. For the tender, the MD will assume a price for the Easy-dog of R12,50 from the Supply Division. The normal selling price for an Easy-dog Hotdog is R25. The MD is eager to get the contract as there are many of these events country wide and he had a few ideas to maximise his profit:

- 350 children are expected to attend. As HotDog wants to promote its brand, it said it will provide 10% additional packages at cost to cover for any additional children attending as well as free delivery.
- Soft drinks will have to be acquired. The current market price is R5,50 each. There are currently 150 cans in inventory which was acquired at R5,20 to send to the franchise-holders.
- HotDog plans to provide an all-in-one parcel to the children by packing everything into a polystyrene box. Since this differs from their normal inventory, it will have to be acquired from a new supplier. There is however a minimum order quantity of 400 at 50c per box.
- The health bars are also not sold at the stores and will have to be acquired at R4,50 each. The minimum order quantity is 2 000 bars. The MD suggested that they sell the rest of the bars at their Gauteng stalls as an experiment.
- For packing and quality control of the parcel, workers will have to work overtime. The MD will have to work 20 additional hours to prepare the tender. His currently hourly rate is R450. Three wage earners who normally earn R35/hour will work 4 hours overtime each for two days. The overtime rate is calculated at 1,5 times the normal wage rate. The Supply division are expected to work 10 hours overtime in preparation of the Easy-dogs. These employees earn the same wage rates as the other wage labourers. HotDog subscribes to the Basic Conditions of Employment act.
- The MD has found that this will be the ideal time to buy a new delivery vehicle he was planning on for a while now to help with operations at a cost of R285 000. SARS has allowed an annual 20% wear and tear deduction.
- Fixed overhead is allocated at a rate of R20 per labour hour.
- Variable overhead is expected at R2,50 per parcel.
- The MD expects a 20% mark-up on relevant cost.

REQUIRED		
(a)	Calculate the expected selling price per food package for the special order linked to the Cultural Day on a relevant costing basis. Clearly show the relevant cost value for each of the items. Explain each relevant value you have evaluated and why the values you have excluded are not relevant. Discuss whether it is likely that the municipality will accept the deal.	(10)
(b)	Discuss the factors to be considered in determining a selling price that should be quoted for the **special order.**	(10)

Feedback 6.11.1 Basic relevant costing example

(a)   Special order – cultural day   [10]

Description	Per unit	Qty	Price total	Motivation
Quantity		350		
Additional at cost		35		(350 x 10%)
Quantity final		**385**		
Easy-dog Transfer price	12.50	385	4,812.50	Actual cost incurred
Soft Drink	5.50	385	2,117.50	Soft drinks replaced frequently, hence replacement value
Parcel	0.50	400	200.00	Different than normal packaging, thus won't be able to use again
Health Bar	4.50	385	1,732.50	Only 385 relevant as they can sell the rest
MD Salary			-	Not relevant - fixed salary
Wages	52.50	24	1,260.00	Overtime R35 x1.5 - relevant as additional cost (4 hours x 3 workers x 2 days = 24 hours)
Wages – SupplyD			-	Not Relevant - included in transfer price
New Delivery vehicle			-	Not Relevant – will be acquired anyway
Fixed Overhead			-	Not incremental cost
Variable Overhead	2.50	385	962.50	Will be incurred and incremental
Total Cost			**11,085.00**	
Mark up on cost			2,015.45	11,085 x 20/100 x 350/385 - 35 at cost##
			13,100.45	
Price per parcel		350	**37.43**	

##Give 1 mark for applying the mark-up correctly even when the student did not split.

Alternative				
At Cost (11,085/385)	*28.79*	*35*	*1,007.73*	(1)c for treating the extra 10% at cost
At Cost + markup	*34.55*	*350*	*12,092.73*	(1)c for applying the markup on the 350 units
			13,100.45	

Conclusion: The municipality will most likely accept the offer as:

- They get 10% at cost+ Free delivery   (1)
- Though It would cost them slightly less to purchase it themselves (R25 + R5.50 + R4.50 +   (1)
  R.50=R35.5) with the exclusion of convenience.

(b) Factors to be considered

> **Note:**
> Product specification varies from existing.
> Relevant and variable costs is **not** the same principle!! Variable costs could for example be irrelevant and fixed costs could sometimes be relevant.

- Assess whether **adequate production capacity** exists over the time during which the order is to be executed. There may be a shortage of capacity to satisfy the special order as well as normal commitments during that period. Consequently, normal production may be **disrupted, resulting in lost sales**. If this is the case, pricing would have to take such losses into account **(lost contribution)**.
- Effect on the planned sale now and in the future (**gaining market share/ entrance into similar events**) or

    o Selling price in relation to normal selling prices.
    o If the price is lower, **existing customers** may be alienated.

- If the price is too low, it may result in competitors reducing prices, which would in turn introduce a risk of overall price reduction in the industry.
- Assess how competitors might price for such an order **(market prices)**.
- Employees packing and checking quality are **working overtime** and may be overworked and become demoralized.
- The company is under pressure to generate adequate profits. This order presents the opportunity to boost profits and achieve its target.
- Sufficient funding must exist to cover **working capital** requirements associated with the order (variable or fixed).
- The eventual selling price must exceed **the incremental costs plus lost contribution associated with the order**
- Any **initial investments** required must be included, e.g. **staff training expenses**.
- The order arose because a competitor went out of business. Therefore, this may be a **recurring order** and accordingly pricing must take cognizance of the **long-term perspective.** Repeat orders may require the creation of **additional capacity, which will give rise to additional fixed costs.**
- Increasing labour and variable costs for the first 1000 units Labour and variable at 50% higher than for the existing product should be considered. Ass well as the subsequent reduction of this increase due to an 80% learning.
- Consider other **viable alternatives** that could be forgone and ensure their respective opportunity costs are incorporated in the calculations where necessary.
- Asses if they will meet the **deadline** of the cultural day.

4. Product mix decisions when capacity constraints exist (limiting factors)

Note: This is a particular weakness area to be thoroughly addressed.

Activity 6.11.2

MicroWave Electronics manufactures three types of household appliances. Due to a high level of technical expertise required for production, only 5 400 labour operating hours are available during May 20X3. Import restrictions imposed during the same month also limits the company's supply of raw materials to 14 400 circuits.

	Micromaster R	Supercook R	Wonderwave R
The standard cost per unit of production is:			
Raw materials			
• Boards (R2 per board)	(152)	(72)	(56)
• Circuits (R9 per circuit)	(288)	(216)	(144)
Direct labour (R30 per hour)	(180)	(180)	(180)
Fixed cost (R10 per labour hour, based on maximum capacity)	(60)	(60)	(60)
Standard cost of sales	(680)	(528)	(440)
Standard selling price	1 100	960	820
Standard profit	**420**	**432**	**380**
	Units	Units	Units
Budgeted production	150	300	450

The company is subject to certain lower sales limits because of fixed contracts. The company is contractually bound to produce at least 60 Micromasters, 60 Supercooks and 100 Wonderwaves (these quantities have been included in the budgeted production figures above). The market for Wonderwaves is currently limited to 510 units (including fixed contracts).

REQUIRED	
(a) Calculate the most optimal sales mix for MicroWave Electronics and the resulting net profit.	15

Feedback 6.11.2

Step 1: Establish the limiting factor (scarce resource) (and sales demand if necessary) if not clearly given in the scenario

Calculation of constraints

Labour:	Required: 900 units x (R180 / R30) 6 hrs each =	5 400 hours	(1)
	Available: =	5 400 hours	(1)

No constraint – there are sufficient hours available to produce all the required products.

Circuits: Required:
       Micromaster: 150 units x R288 / R9 p.u.   = 4 800 circuits
       Supercook: 300 units x R216 / R9 p.u.   = 7 200 circuits
       Wonderwave: 450 units x R144 / R9 p.u.   = 7 200 circuits
                 900   19 200 circuits   (2)
     Available: 14 400 circuits

💣 **Constraint applies** – not enough circuits available to produce all the budgeted products.

Step 2: Calculate the contribution per unit for each product

Contribution per product	Micromaster R	Supercook R	Wonderwave R
Standard profit	420	432	380
Add back: fixed cost of production	60	60	60
Contribution	**480**	**492**	**440**

The **add back** of fixed costs is a well-used examination 'trick' as it saves time and limits calculation and transcribing errors.

Step 3: Calculate the contribution per unit of limiting factor

NB: Maximise profit by maximising contribution per limiting factor

	Micromaster R	Supercook R	Wonderwave R
Contribution	480	492	440
Divided by the number of circuits required	32	24	16
Contribution per limiting factor	**15**	**20,5**	**27,5** (3)

Step 4: Rank products from highest to lowest i.t.o. contribution per unit of limiting factor

Ranking	**3**	**2**	**1** (1)

Step 5: Consider minimum required quantities (if applicable) – reduces scarce resource that is available

💣   **But there are minimum required quantities, and the following must therefore be used:**

(Students often forget to consider the minimum requirements for given contracts)

    Micromaster: 60 units x 32 circuits   = 1 920 circuits

    Supercook: 60 units x 24 circuits   = 1 440 circuits

    Wonderwave: 100 units x 16 circuits   = 1 600 circuits

                          4 960 circuits required to comply with contracts. (1)

Remainder available: 14 400 (Step 1) – 4 960 = 9 440 circuits

Step 6: **Allocate the limiting factor (scarce resource) to the highest ranking product**

Circuits available for the Wonderwave: 590 products (9 440/16 circuits)   (1)
But the maximum demand for Wonderwave (after taking into account the fixed contract) is currently limited to: 510 – 100 = 410 products
Therefore, after using all the circuits required to produce the maximum quantity of Wonderwave, there still remains: 9 440 – [410 units x 16 circuits] = 2 880 circuits   (1)

Step 7: **Allocate the limiting factor (scarce resource) to the next highest-ranking product and so on until the scarce resource is used up**

Use these circuits to produce the next highest-ranking product, i.e. the Supercook:
2 880 circuits available / 24 circuits per unit = 120 products possible.
                                                                                    (1)

The circuits will thus be used up. Therefore, It is impossible to produce any additional Micromasters (above the fixed contract quantity).

The optimal mix is therefore

Micromaster	60 units per contract
Supercook	180 units (60 units per contract + 120 possible units)
Wonderwave	maximum demand of 510 units (100 units per contract + 410 (1) additional units)

Profit from the optimal mix			
		R	
Micromaster	60 units x R480	28 800	
Supercook	180 units x R492	88 560	
Wonderwave	510 units x R440	224 400	
Contribution		341 760	(1)
Less: fixed cost	5 400 hours x R10	(54 000)	(1)
Net profit		287 760	(15)

5. Decisions on the replacement of equipment

Activity 6.11.3

Revise Example 11.4 in the Drury textbook (SA 1st ed: pages 295 – 296 or Example 9.4 10th ed: pages 206 – 207).

Feedback 6.11.3

Consider the irrelevance of the book value of old equipment in a replacement decision, i.e. past or sunk costs are irrelevant for decision-making.

6. Outsourcing or make-or-buy decisions

Activity 6.11.4

Revise Example 11.5 in the Drury textbook (SA 1st ed: pages 297 – 299 or Example 9.5 10th ed: pages 207 – 210).

Feedback 6.11.4

Note the difference in total net costs for the two cases i.e. no alternative use of released capacity compared to using the released capacity to make another component.

7. Discontinuation decisions

Activity 6.11.5

Revise Example 11.6 in the Drury textbook (SA 1st ed: pages 300 – 302 or Example 9.6 10th ed: pages 210 – 213).

Feedback 6.11.5

The impact of the closure of the Bangkok territory is calculated by comparing total company profit if the territory is kept open to the profit if the Bangkok territory is closed.

 Video

Watch the videos about a relevant costing principles and example available on *My*Unisa refer to lesson 5.1.

 RECAP QUESTIONS from tutorial letter 103 that will be made available later for revision and assessment preparation purposes:

- Hero part h;
- WaterCounts part d;
- Ice Castle part e;
- Cita and Box part a.

Enrichment activity

- Potting (Part B) part a, b and c;

8. Summary

In this learning unit, we focussed on measuring the costs and benefits for various non-routine decisions i.e. the relevant costs and revenues / benefits.

9. Self-assessment activity

Answer question 11.6 on pages 72–73 (Drury Student Manual, SA 1st ed.) or question 9.6 on pages 58–59 (Drury Student Manual, 10th ed.) and compare your answer to the solution in the same book.

LEARNING UNIT 6.2   Pricing decisions and profitability analysis

Prior learning

This course assumes students have already mastered the work equivalent to that presented in Unisa's preceding undergraduate degree. Please ensure that you are up to date with the prior learning of the role of cost information in pricing decisions and a price-setting firm facing short-run pricing and product-mix decisions. If not, please refer to your **undergraduate study material** and revise the textbook (Drury) using the page numbers below:

Prior learning	Drury SA 1st edition	Drury 10th edition
Before studying this topic, you should be able to do the following: • Differentiate between price-setting and price-taking organisations. • Distinguish between customised and non-customised products. • Explain the relevant cost information that should be included in the long-term external pricing decisions for price-setting organisations. • Identify the role that different levels of fixed cost play in the price-taking organisation when deciding to discontinue a product or product line from the product mix. • Describe different cost-plus pricing methods for setting the long-term selling price. • Explain the limitations and benefits of cost-plus pricing. • Identify and describe different pricing policies from a marketing perspective.	**Applicable references:** **Chapter 12:** Pages 323–338	**Applicable references:** **Chapter 10:** Pages 230–242

1. Introduction

In the previous learning unit, we discussed the relevant costing approach, which prescribes that only relevant costs and revenues/benefits should be considered in decision-making and considered product mix decisions to maximise profits in the short-term when capacity constraints exist. We also discussed equipment decisions, explaining why equipment book values are irrelevant in such decisions. In this section, we shall consider the importance of cost information in determining the relative profitability of various products and services in an organisation and thereby enable management to determine the target product mix to focus energies on. Students should note that the firm may be a price-setting firm or prices may be set by market forces of supply and demand (price-taking firm) and these situations require different approaches. In the latter situation, cost information that supports product-mix decisions will be emphasised.

2. Mark-up and margin

The following section on mark-up and margin is included here as it often features in cost-based pricing strategies:

Margin vs mark-up
The concept of mark-up and margin features in the determination of selling prices (pricing policy).

MARK UP:

*   **Selling Price = Cost + (Mark up % x Cost)**

```
          %
Sales   160
Profit   60
Cost    100
```

*   **Mark-up works only with cost (may need to convert)**

MARGIN:

*   **Cost = Sales - Margin %**

```
          %
Sales   100
Margin  37.5
Cost    62.5
```

*   **Margin works only with sale**

WARNING

Where a question featuring sales quotes a mark-up % - You will need to change the mark up % to a margin % before calculating profit AND vice versa.

Activity 6.12.1: Calculate the mark-up & margin

*   A Limited would like to know the profitability of its sales (Gross Profit). The following information is provided:

✓   Sales =   R 10 m
✓   Profit mark-up = 25 %
    o   *What is the gross profit in rand terms?*

*   B Limited would like to calculate its total sales. The following information is provided:

✓   Cost of sales =   R 4m
✓   Profit margin = 20 %
    o   *What is the sales in rand terms?*

Feedback 6.12.1

*   In A Limited's case, a mark-up is given but we know that sales work with a margin. We therefore need to change the mark-up to a margin.

✓   Profit mark-up = 25%
✓   Margin = 25/(100 + 25) = 25/125 = 0,20 (20%)

    o   *The gross profit in rand terms = 0,20 x R 10 m* **= R2m**

*   In B Limited's case, a margin is given but we know that cost of sales works with mark-up. We need to change the margin to mark-up.

✓   Profit margin = 20 %
✓   Mark-up = 20/(100 – 20) = 20/80 = 0,25 (25%)
✓   Gross profit = 0,25 x R 4m = R1m

    o   *Sales = Cost of sales + Profit =* R 4m + R1m = **R5 m**

3. Pricing decisions

Activity 6.12.2: Cost-based pricing

Big time Limited is a manufacturer of soft drinks. Drinks are mixed and bottled in an automated process supervised by a few technicians.

The majority of its production costs are fixed and are common to all of Big Time's products. The market for soft drinks is very competitive and all of Big Time's products face strong price competition.

Big Time has recently developed a new sports energy drink, which will be sold in one-litre bottles under the brand name 'Zoom'.

The production of Zoom is more complicated than that of Big Time's existing soft drinks, involving more ingredients, a large variety of materials that are more expensive with more mixing operations.

The **variable production** cost of 4,000 litres of Zoom is **R0,20 per litre, including packaging**. Variable production cost consists entirely of direct material cost.

> Make note of this.

Big Time's management accountant is considering how to charge overhead costs to the new product and the price at which it should be sold. She is considering the following three approaches:

Approach 1:

This would involve not charging overhead to the product and pricing the new product at **variable production cost plus a 300% mark up.**

> What is my variable cost? R0,20 How do I add 300%? x 3?

Approach 2:

This would involve using a **general overhead absorption rate of 400% of direct material cost.** The product would then be **priced at full absorption cost plus a 20% margin on sales.**

> What do I understand from this? Overheads are 400% of direct materials. How do I calculate this? 0,20 (direct materials) x 4
> This is based on sales. What information do I have? Cost information. I need to change the margin to a mark-up (based on sales).

Approach 3:

This would involve using an **activity-based costing approach to arrive at the full cost**. The product will be priced at this **full cost plus a 20% margin on sales**.

> The margin is given but you have costing information. Therefore convert the margin to a mark up (for cost).

Activity-based costing rates:

Overhead item	Driver rate
Stores administration cost	R100 per ingredient used.
Technician salaries	R300 per mixing operation.
Despatch cost	R200 per customer delivery.

The 4,000 litres of Zoom used **twelve different ingredients** and required **eight mixing operations**. **Ten separate deliveries** were required to deliver it to customers.

> R100 x 12 – do not forget this is total cost. You have to divide by 4 000 to get the cost per litre.
> R300 x 8
> R200 x 10

REQUIRED

(a) Calculate the **selling price per one-litre bottle** of Zoom that would result from each of the above three approaches.

> Note that they are asking for the price PER litre. Do not give the total selling price. Exam technique.

(b) Explain why an activity-based costing approach would be more useful in costing products than a traditional absorption costing approach, given the circumstances faced by Big Time.

(c) Explain two advantages and two disadvantages of cost plus pricing.

Feedback 6.12.2

(a) Calculate the selling price per one-litre bottle of Zoom that would result from each of the above three approaches.

Variable cost plus	**R per litre**
Variable cost	0,20
300 % mark up	0,60
Selling price (R0,2 x 4)	**0,80**

> 0,20 x 4 = 0,80
> This is confusing – it is better if we say 0,20 + 0,60

Absorption cost plus	**R per litre**
Variable cost	0,20
Overhead (400%)	0,80
Production cost	1,00
Margin (R1,00 x 20 ÷ 80)	0,25
Selling price (R1,00 ÷ 0,8)	**1,25**

> NB: do you understand what is being done here?
> ✓ Profit margin = 20% (0,25 ÷ 1,25)
> ✓ Mark up = 20/(100 – 20) = 20/80 = 25%

Activity-based costing plus   **R per litre**

Variable cost	0,20
Stores administration (12 x R100 ÷ 4,000)	0,30
Technician salaries (8 x R300 ÷ 4,000)	0,60
Despatch (10 x R200 ÷ 4,000)	0,50
	1,60
Margin (R1,60 x 20 ÷ 80)	0,40
Selling price (R1,60 ÷ 0,8)	**2,00**

(b)   Explain why an activity-based costing approach would be more useful in costing products than a traditional absorption costing approach, given the circumstances faced by Big Time.

Traditional absorption costing was developed at a time when many organisations produced only a narrow range of products and when overhead costs were only a small fraction of total costs. For many companies these circumstances no longer exist, and this appears to be the case for Big Time.

As is common in many process industries the majority of Big Time's costs are fixed. Its fixed costs are also common to all of its products. The way in which these costs are charged to products will have a significant effect on product cost.

The manufacture of Zoom is more complicated than Big Time's usual products, using more ingredients and requiring more mixing. Activity-based costing recognises that activities cause overhead cost: the more complex the product the more likely it is to create demand for activities and hence cause overheads to be incurred. In contrast many traditional absorption-costing systems assume that products cause overheads in proportion to their production volumes and allocate large proportions of overhead to high volume products.

Big Time's overhead absorption rate is based upon material cost. Under this approach products with more expensive materials will be charged with more overheads even though the cost of their materials does not necessarily cause more overheads to be incurred.

Big Time faces strong price competition in all of its products. It is therefore important that all of its products have the most accurate costing possible in order to set competitive prices, whilst at the same time covering their costs.

(c)   Explain two advantages and two disadvantages of cost plus pricing.

Advantages

Cost plus pricing offers a simple way of pricing products. For firms with a large number of products to price it is important that pricing decisions can be safely delegated to junior management.

Cost plus pricing is sometimes seen as a way of justifying prices. Firms who use it can be seen as taking a 'fair' margin on cost. Cost plus arguments are commonly used as a way of justifying price increases.

The mark up charged could be varied between products (and customers) depending upon market conditions.

Basing prices on full cost plus should ensure that a company working at normal capacity will cover its fixed costs and earn a profit.

Disadvantages

In its simplest form cost plus pricing fails to recognise that there is a relationship between the price charged and the quantity sold. For example a firm faced with falling demand (and hence a higher unit cost due to fixed costs being spread more thickly over a smaller number of units) would, under the logic of cost plus pricing, increase its price!

Again in its simplest form it fails to allow for competition. In many markets the price charged by competitors is a major determinant of prices charged.

In companies that sell more than one product the price determined by the cost plus formula is significantly affected by the method used to charge overhead costs to products. Arbitrary treatment of overhead will lead to arbitrary prices.

Cost plus pricing can lead to a complacent attitude to cost control and the attitude that cost increases can be passed on to customers in higher prices. In a competitive market this is a dangerous attitude.

4. Summary

In this learning unit we discussed the importance of cost information for short-term and long-term pricing decision in price-setting organisations. In price-taking organisations cost information is still important to determine the relative profitability of different products and services.

5. Self-assessment activities:

Attempt two questions: (Drury Student Manual)

SA 1st ed: Question 12.2, page 80-81. (Solution page 305–306)
10th ed: Question 10.2, page 66. (Solution page 264–265)

SA 1st ed: Question 12.6, page 83-84. (Solution page 308–309)
10th ed: Question 10.5, page 69. (Solution page 267–269)

Feedback: Question 12.2 SA 1st ed. Or 10.2 (10th ed. Drury Student Manual)

What information has been given?

- 2 products EXE and WYE.
- 3 service departments, stores, maintenance and admin departments.
- Step wise apportionment of service dept. costs.
- General factory overheads apportioned according to floor space.
- Mark up of 25% (note how the cost is established before the mark up is added to it.)
- Information on the annual volumes and costs is given.

Once you have read through the question, you should have identified/listed at least the above.

What is required?

a)   **Budgeted** selling price for **ONE** unit of **EXE** and **WYE** based on **usual mark up**. *So what should I understand from this? I must use the budgeted figures to obtain the selling price. They want the selling price of one unit only. Therefore it shouldn't be given in total. It is for both products. I should use the usual mark up (25% according to the scenario.)*

b)   2 independent events are given for additional business opportunities. The company must respond to these. In both cases you must deal with: discussion, calculation, assumptions.

c)   Practical theory

Solution

a)   Note the following information was given in the question: "the company establishes product costs based on **budgeted volume** and marks up these costs **by 25%** in order to set target selling prices."

Calculations:

Factory overheads = £3.6m
Based on floor space

EXE	640
WYE	480
Stores	240
Maint.	80
Admin	160
	1 600

EXE = 3,6 x 640/1 600 =1,440
WYE = 3,6 x 480/1 600 = 1,080
Stores = 3,6 x 240/1 600 = 0,54
Maintenance = 3,6 x 80/1 600 = 0,180
Admin = 3,6 x 160/1 600 = 0,36

Apportionment of service departments

This is based on departmental usage. If you look at the required you will note that: the admin department is used by EXE, WYE, Stores and maintenance. The maintenance dept is used by EXE, WYE and Stores. The Stores department is only used by EXE and WYE. This gives you an indication of how the reallocation should be done.

> **Note:** 4 → 3 → two products

Admin Department = £0,56m
EXE = 0,56 x 40% = 0,22
WYE = 0,56 x 30% = 0,17
Stores = 0,56 x 20% = 0,11
Maintenance = 0,56 x 10% = 0,056

Maintenance = £0,536
EXE = 0,536 x 50% = 0,268
WYE= 0,536 x 25% = 0,134
Stores = 0,536 x 25% = 0,134

Stores = £0,986
EXE = 0,986 x 60% = 0,592
WYE = 0,986 x 40% = 0,394

Full cost
EXE = 5 124 000/ 150 000 = £34,16
WYE = 2 976 000/ 70 000 = £42,51

Selling price
EXE = £34,16 x 1,25 = £42,70
WYE = £42,51 x 1,25 = 53,14

b)   **Admin Department = £0,20m**
c)

    EXE = 0,2 x 40% = 0,080
    WYE = 0,2 x 30% = 0,060
    Stores = 0,2 x 20% = 0,040
    Maintenance = 0,2 x 10% = 0,020

    Maintenance = £0,320
    EXE = 0,32 x 50% = 0,160
    WYE= 0,32 x 25% = 0,080
    Stores = 0,32 x 25% = 0,080

    Stores = £0,320
    EXE = 0,320 x 60% = 0,192
    WYE = 0,320 x 40% = 0,128

    Full cost
    EXE = 3 032 000/ 150 000 = £20,21
    WYE = 1 468/ 70 000 = £20,97

Feedback: Question 12.6 (SA 1ˢᵗ ed. Drury Student Manual) or Question 10.5 (10ᵗʰ ed. Drury Student Manual)

Things that you should learn from this question:

- How to allocate resources optimally when faced with scarce/limited resource issues. A situation that is assumed to take place in the short term.
- The question also focused on elements of price elasticity in its simplicity, students should be familiar with the terminologies used in the solution, i.e. total and marginal contribution.

PART 3, LEARNING UNIT 7 – INFORMATION FOR DECISION-MAKING

LEARNING UNIT 7   LEARNING OUTCOMES

After studying this topic, you should be able to do the following:

- Understand the methods of incorporating uncertainty into the profitability analysis.
- Calculate and explain the meaning of expected values.
- Explain the meaning of the terms of standard deviation and coefficient of variation as measures of risk and outline their limitations.
- Describe and calculate the value of perfect and imperfect information.
- Explain and apply the maximin, maxi-max and regret criteria.
- Explain the implications of pursuing a diversification strategy.

THIS LEARNING UNIT CONSISTS OF THE FOLLOWING SUB LEARNING UNITS:

LEARNING UNIT	TITLE
LEARNING UNIT 7.1	Decision-making under conditions of risk and uncertainty

LEARNING UNIT 7.1   Decision-making under conditions of risk and uncertainty

Prior learning

This course assumes students have already mastered the work equivalent to that presented in Unisa's preceding undergraduate degree. Please ensure that you are up to date with the prior learning of risk and uncertainty. If not, please refer to your **undergraduate study material** and revise the textbook (Drury) using the page numbers below:

Prior learning	Drury SA 1st edition	Drury 10th edition
Before studying this topic, you should be able to do the following: • Distinguish between risk and uncertainty • Describe the different concepts relating to probability measurements. • Calculate probability distribution and expected value. • Identify qualitative factors that may have to be considered when a decision is made in conditions of risk and uncertainty. • Explain the meaning of standard deviation and the coefficient of variation as measures of risk. • Recommend courses of action based on elementary scenarios involving standard deviation and the coefficient of variation.	**Applicable references:** **Chapter 13:** Pages 323–338 Leave out: Buying perfect and imperfect information page 365–367.	**Applicable references:** **Chapter 12:** Pages 285–298 Leave out: Buying perfect and imperfect information page 293–294.

1. Introduction

In the previous learning unit, we focused on the importance of cost information for price-setting firms for both short-term and long-term pricing decisions. We also examined a price-taking firm facing long-run product mix decisions. In this unit, we shall examine the impact of risk and uncertainty in business decision-making. Managerial subjectivity influences business decisions because managers normally draw from their expertise, knowledge, past experience, and existing situations that are likely to affect future events due to the uncertain business environment. We shall also look at how the principle of probability theory enables management to consider the degree of uncertainty associated with each course of action when making business decisions. Finally, we shall describe and calculate the value of perfect information, explain and apply the maximin, maximax and regret criteria.

2. Expected value, standard deviation and coefficient of variation

Activity 7.1.1: Calculation of expected value

According to market research done by ABC Ltd their projected sales of Product X at various levels for FY2020, are as follows:

Annual sales 1 kg-bags	Probability
29 000	30%
33 000	55%
35 000	15%

Required: Calculate the expected number of 1 kg bags of Product X that will be sold in FY2020.

Feedback 7.1.1

Annual sales 1 kg bags	Probability	Weighted
29 000	30%	8 700
33 000	55%	18 150
35 000	15%	5 250
Expected sales quantity	100%	**32 100**

Activity 19.1.2: Calculate an expected value

A newly formed company called Success (Pty) Ltd has obtained a contract to supply the Zac, its new product, to one of the big national supermarket groups in the country. This company intends to start production only in March following the installation of sophisticated new machinery. Success management has agreed to supply the national supermarkets with whatever quantities of Zac they require at a price of R40 per unit. The machinery supplier has just informed Success (Pty) Ltd that delivery of the machinery will be delayed by six months. The sales manager stated that though the demand is currently uncertain, *it would have been well within the capacity of the permanent machinery they were to have installed*.

Here are the best estimates of the total demand for the first half year:

Estimated demand for the first half year:

Quantity (000 units)	Probability
10	0,5
14	0,3
16	0,2

This new company intends to meet its contractual obligations regardless of the level of demand and thus considers the possibility of hiring equipment on which temporary production can take place. The details of the three machines that can be hired are as follows:

	Machine A	*Machine B*	*Machine C*
Production capacity per half year	10 000 units	12 000 units	16 000 units
Variable cost / unit	R6,50	R6,00	R5,00
Other fixed costs total per half year	R320 000	R350 000	R400 000

Once maximum capacity is reached, the total variable costs stabilise and do not increase.
There will be an additional variable material cost of R5/unit, however, 20% discount per unit will be given for purchases in excess of 10 000 units.

If *production capacity falls below demand*, Success (Pty) Ltd can subcontract production *to the extent of 6 000 units* provided

- they pay R30/unit for up to 4 000 units subcontracted
- they pay R35/unit in excess of 4 000 units

The sales manager has emphasised the importance of making the choice of which machine to hire before the exact demand is known, due to the lead-time required for setting up production. It will however be available in time for scheduling a standard monthly production level to meet the demand.

The sales manager is also considering enlisting the services of a reputable firm of market researchers who could accurately inform Success (Pty) Ltd whether demand is to be 10, 14 or 16 thousand units.

(Drury adapted)

REQUIRED
(a) Calculate the possible monetary outcomes for each of the three machines and, using expected values, advise Success (Pty) Ltd management on its best course of action.

Feedback 7.1.2

(a)   *Calculation of expected values for each of the three machines.*

Estimated demand (000)	Sales @ R40/unit (R000)	Total costs (R000) (A)	Profit (R000)	Probability	Expected value (R000)
Machine A					
10	400	435	(35)	0,5	(17,5)
14	560	571	(11)	0,3	(3,3)
16	640	649	(9)	0,2	(1,8)
					(22,6)

Estimated demand (000)	Sales @ R40/unit (R000)	Total costs (R000) (B)	Profit (R000)	Probability	Expected value (R000)
Machine B					
10	400	460	(60)	0,5	(30,0)
14	560	548	12	0,3	3,6
16	640	616	24	0,2	4,8
					(21,6)

Estimated demand (000)	Sales @ R40/unit (R000)	Total costs (R000) (C)	Profit (R000)	Probability	Expected value (R000)
Machine C					
10	400	500	(100)	0,5	(50,0)
14	560	536	24	0,3	7,2
16	640	554	86	0,2	17,2
					(25,6)

Calculation of total costs

Note that with machine A you can only produce 10 000 units. Therefore the additional 4 000 units to meet demand will be subcontracted.

(A)

Machine A (max capacity of 10 000 units)	10 000 units (R000)	14 000 units (R000)	16 000 units (R000)
Variable cost of R6,50 / unit *(max capacity)*	65	65	65
Fixed costs	320	320	320
Material costs (**Note: R5/unit for the first 10 000 units, R4/ (R5 x 80% = R4) unit for demand > 10 000 units**	50	66	74
Subcontracting costs *(Note: R30/unit for up to 4 000 units, then R35/unit for subcontracting > 4 000 units)*	-	120	190 4 000 x 30 = 120k 2 000 x 35 = <u>70k</u> <u>190k</u>
	435	**571**	**649**

(B)

Machine B (max capacity of 12 000 units)	10 000 units (R000)	14 000 units (R000)	16 000 units (R000)
Variable cost of R6,00 / unit *(max capacity)*	60	72	72
Fixed costs	350	350	350
Material costs (**Note: R5/unit for the first 10 000 units, R4/unit for demand > 10 000 units**	50	66	74
Subcontracting costs *(Note: R30/unit for up to 4 000 units, then R35/unit for subcontracting > 4 000 units)*	-	60	120
	460	**548**	**616**

(C)

Machine C (max capacity of 16 000 units)	10 000 units (R000)	14 000 units (R000)	16 000 units (R000)
Variable cost of R5,00 / unit *(max capacity)*	50	70	80
Fixed costs	400	400	400
Material costs (**Note: R5/unit for the first 10 000 units, R4/unit for demand > 10 000 units**	50	66	74
Subcontracting costs *(Note: R30/unit for up to 4 000 units, then R35/unit for subcontracting > 4 000 units)*	-	-	-
	500	**536**	**554**

Recommendation

Management should choose machine B as it yields the lowest expected loss, particularly if the decision is based on expected values.

It should be noted that though machine C yields the biggest expected loss, it has a 20% probability of generating a profit of R86 000. A risk-taker might prefer machine C to machine B.

3. Summary

In this study unit, we examined the impact of risk and uncertainty in business decision-making. We also discussed the principle of probability, the value of perfect information and the maximin, maximax and regret criteria.

> **Focus Notes**
> - The concept of *expected value* considers a range of possible outcomes rather than a single estimate. It involves multiplying each outcome (say, projected sales level) by its associated probability (the likelihood that it will occur).
> - The *standard deviation* calculates the degree of variability in the possible outcomes.
> - Though the expected value, standard deviation and coefficient of variation sum up the characteristics of alternative courses of action, these measures do not provide the decision-maker with all the relevant information as does the probability distribution.
> - When assigning a reasonable probability to possible outcomes is difficult, management may employ the "*maximin, maximax and regret*" criteria to make decisions.

4. Self-assessment activities

Attempt question: (Drury Student Manual)
SA 1st ed: Question 1.8, page 92 (Stow Health Centre). Solution pages 316 - 318.
10th ed: Question 12.7, page 83 (Stow Health Centre). Solution pages 286 - 287.

Feedback: Question 1.8 (SA 1st ed.) or 12.7 (10th ed.) – Stow Health Centre
Occupancy levels

Maximum capacity = 50 clients x 350 days = 17 500
90% occupancy = 17 500 x 90% = 15 750
75% occupancy = 17 500 x 75% = 13 125
60% occupancy = 17 500 x 60% = 10 500

RECAP QUESTIONS from tutorial letter 103 that will be made available later for revision and assessment preparation purposes:
- Hero part k;
- Tholakele part e;

Enrichment activity
- NH-Agri part c

INTEGRATED SELF-ASSESSMENTS

As mentioned in the Introduction section, you will now have the opportunity to assess whether you can apply your technical knowledge of individual topics, in an integrated scenario. We will start with an easier case study and then progress to a more advanced one.

General Guidelines

You should attempt the case studies under exam conditions. Time yourself.
In real tests, you receive the scenario first and have reading time before receiving the required section. You should attempt the case studies in this tutorial letter in the same manner.

Read the information in the scenario at least twice

Ensure that you have read every line in the scenario. Remember that you have to use all the information provided in the scenario. Read the scenario line by line and highlight important information, relating this as far as possible to particular topics and principles even though you do not yet know the content of the required section.

Read the 'required' very attentively. Note specifically what you should present in the answer, **e.g.**

- budget, actual or forecast amounts – what advice is required
- for the year, month or week
- standard or actual
- costing basis (variable or absorption)
- minimum price for a special project
- expected value, standard deviation, coefficient of variation
- minimum and minimum transfer pricing
- performance measurements (ROI, RI, EVA®)
- advise management on best course of action to derive profitability

This is the methodology you should use for every question you attempt.

We will now take you through activities to illustrate the approach. You are also advised to work through as many questions as possible in the Drury Student Manual. Use information encountered for the first time to build up a database of 'info statements' linked to 'what to do's'. You need to look for this when reading a test or examination scenario.

Once you have read and understood the scenario and the required you can start answering the question.

Test questions

Test questions should be attempted in the designated time of 60 minutes, including reading time of 15 minutes. Try to use the approach applied in the tutorial letter: after reading all the information, make a short list of the critical information and 'to do's'. Check your list against the solution as part of the self-evaluation process. If you have missed something, interrogate yourself. Is this a reading, interpretation, knowledge or concentration problem. This will then point you to the remedy(ies) required. Once you have assessed yourself, use the test commentary as a learning tool to eradicate the mistakes made.

Activity 1 – Integrated self-assessment

Ruf Ltd is a medium-sized company in the confectionery business. They sell jelly-based sweets by the kilogram. The directors of Ruf Ltd have decided to apply for a listing on the Altx sector of the JSE Securities Exchange SA.

The management accountant has extracted the following trial balance as at 28 February 20x8:

	Note	DR R'000	CR R'000
Sales	1		100 320,0
Delivery costs	2	401,3	
Depreciation – factory and equipment		4 800,0	
– administrative		820,0	
Interest paid	3	2 457,6	
Materials purchased	4/5	58 000,0	
Overhead costs – fixed		4 794,2	
– variable		2 280,1	
Salaries – administrative	6	10 100,2	
– sales		3 009,6	
Packaging costs		1 824,0	
Travelling		490,7	
Wages – manufacturing	7	6 020,3	
Current assets		10 994,0	
Current liabilities			5 829,3
Inventory	8	1 200,0	
Loans – long term			20 480,0
Non-current assets		58 288,0	
Reserves			17 940,0
Share capital			20 100,0
Taxation			810,7
		165 480,0	165 480,0

Additional information

1.   Sales for the year were made at an average price of R8,80 per kilogram.
2.   Delivery costs vary with sales.
3.   Interest is paid at a fixed rate of 12% p.a. on the long-term loans.
4.   Materials were purchased at an average cost of R4,00 per kilogram.
      On 28 February 2023, 250 000 kilograms of raw materials were in inventory (inventory).
      The material usage variance for the period was RNIL, due to efficient usage of material.
5.   Ruf Ltd has determined the standard cost of one kilogram of sweets
      (from 1 March 2022 to 28 February 2023) to be:

	R
Material (1,25 kg input @ R3,96 / kg	4,95
Depreciation – manufacturing	0,40
Overheads – fixed	0,40
Overheads – variable	0,20
Packaging	0,15
Wages	0,50
	6,60

The standard cost per kilogram was based on production of 12 000 000 kilograms sweets.

6.   Administrative salaries are considered to be of a fixed nature.
7.   Manufacturing wages are considered to be of a fixed nature.

8.   Inventory on 1 March 2022 consisted only of completed product, valued at R6,00 per kilogram - no raw materials were held on this date.
        Valuation of closing inventory: Raw materials at cost and completed products at standard cost.

REQUIRED	Marks
Calculate Ruf Ltd's profit before taxation for the year ended 28 February 20x8. (**No** variances are required.)	(20)

The given information can also be used for break-even calculations and standard costing analysis

- Consider what information you would have used in such a case.
- If you were a lecturer, what other areas could you have assessed with the given information, or by adding some extra information?

(Test 2006: adapted)

Feedback 1

Note 1: What were you provided with in this question?

- A trial balance – take note of all the balances that are given to you in this question.
- Sales @ average net price
- Materials @ average net cost
- Opening and closing inventory of raw materials and finished goods → always a good starting point for a question. Questions often give 3 of the 4.
- Cost per kilogram of sweets (fixed overheads are included in this balance)
- Fixed and variable expenses
- 20 marks equal 30 minutes based on 40 test marks in one hour

Note 2: Read the required carefully

Even if you don't immediately understand the question, it will still be a guide for what to look for in the scenario. Keep the following in mind:

1. The required section usually follows the flow of the scenario.
2. The marks shown will be indicative of the time to be spent on a particular section. Pay attention to the critical words (verbs), e.g., calculate, evaluate, advise, etc.

Note 3: Calculate Ruf Ltd's profit before taxation for the year ended 28 February 20x8. (No variances are required.) All inventories are valued at standard cost.

What do you understand from this?

- **Year-end – 28 February 20x8** (Check what the dates of the information given to you are in the question; note that your year-end is 28/02/x8.)
- On what basis should the profit be determined and closing inventory valued? The standard cost includes fixed cost per kg, therefore the absorption costing method applies.
- **No variances are required –** what do they mean? Even though standard costs are provided (for inventory valuation purposes), it will not be necessary to calculate **a volume variance for fixed overheads** or any other variance.
- **Closing inventories at actual and standard cost** – make a note of this.
- The material usage variance is RNIL. This implies that all material issued to production was used efficiently, that is at the required standard!
- You can therefore use the materials issued to determine how many units were manufactured!

Note 4:

- The first objective is to split the costs between manufacturing and non-manufacturing, as only manufacturing costs may be taken into inventory.
- Quantities for sales and production must be determined to get the impact on inventory.
- In this case production is less than normal capacity of 12 000 000 kg; however, no volume variance was required – relating to allocation of fixed overhead.
- Inventory at 28 February 20x8 consists of both material and completed product.
- Sales cost is usually a function of total sales value.
- The inventory in the trial balance relates only to completed units (opening balance) per note 8. Note 4 states that there were raw materials on hand in 20x8. The implication is that one must determine whether there were also completed units on that date (20x8).

Statement of Profit or loss and other Comprehensive Income for Management Purposes

		R'000	
Sales (11 400 000 kgs @ 8,80)		100 320,0	(1)
[Good practice to show quantity and price]			
Opening inventory (200 000 @ 6,00 – given note 8)	1 200,0		(2)
Materials	58 000,0		(1)
Depreciation – manufacturing	4 800,0		(1)
Overheads – fixed	4 794,2		(1)
Overheads – variable	2 280,1		(1)
Packaging	1 824,0		(1)
Wages	6 020,3		(1)
Closing inventory	(2 320,0)		(1)
Cost of sales		76 598,6	(1)
Gross profit		23 721,4	
Delivery costs	401,3		
Depreciation – admin	820,0		
Salaries – admin	10 100,2		
– sales	3 009,6		
Travelling	490,7		
Operational costs		14 821,8	(2)
Operating profit			
Finance charges		8 899,6	(1)
Net profit		2 457,6	
		6 442,0	

Calculation

1. Materials purchased   58 000 000 ÷ 4
                                                          = 14 500 000 kg   (1)

2.   Production

	RAW kg
Opening inventory (given in note 8)	0
Purchased	14 500 000
Closing inventory (note 4)	250 000
Issued production	14 250 000 (1)
(÷ 1,25 kg standard)	

	COMPLETE Kg	(1)
Opening (Note 8: R1 200 ÷ R6,00)	200 000	
Sales	(11 400 000)	
Produced – same as sales (14 250 000 kg ÷ 1,25 kg standard)	11 400 000	
∴ Closing inventory – complete (no change on O/I)	200 000	(1)

3.   Inventory

	R	
Materials 250 000 x R4	1 000 000	(1)
Product 200 000 x R6,60 (standard cost price)	1 320 000	(1)
	2 320 000	

		Raw materials *Kg*		**Finished goods** *Units*	
Opening balance	**Given**	**0**		**200,000**	
				(1 200 000 / 6)	
				(14 250 000)	
Purchased 58 000 000/4 =		**14 500 000**	Produced	÷ 1,25	
				11 400 000	
Less:	**Issued to production #2**	**(14 250 000)**	Sold	**(11 400 000)**	
				[100 320000/ 8,80]	
	(Balancing figure)				
Equal	**Closing inventory**	**250,000**		**200,000**	(Balancing figure)
@ Actual/Standard		**at R4**		**at R6,60**	
				1,320,000	
		1,000,000			

Activity 2 – Advanced integrated self-assessment

Crax Ltd has for many years produced its own well-known brand of savoury snacks exclusively for the retail consumer market (Spar, Checkers, etc). Recently, it introduced a reduced fat product, hoping to penetrate the highly lucrative diet food market, but its penetration into this market has been slower than predicted.

Production takes place at its highly automated plant in Pinetown. The production process starts with the mixing of ingredients (flour, butter and oil) and kneading of the dough. Dough is then cut into forms and baked. After baking the savoury spices are sprinkled over just before sealing into individual packets. Retail snacks are sold in packets of 250 g. The diet snacks are 20% smaller per biscuit than the retail snacks, uses less butter and oil and it is also slightly less savoury in order to cut down on kilojoules. It is baked longer for a more crispy effect. Due to the lower butter and oil content, it takes longer to knead the dough. Diet snacks come in packets of 200 g. The size of the foil wrapping of individual packets are similar for the retail packets and the diet packets.

Crax's existing costing system is very unsophisticated and the system does not distinguish between savoury snacks produced for the retail market or those for the diet market. The costs include direct materials being flour, butter and oil (used to make the dough) and savoury spices, as well as fixed overhead costs. A single fixed overhead cost pool for all other conversion costs related to production exists. Fixed production overhead costs are allocated to inventory on the basis of kilograms processed. Although the dough for the two products differ in terms of its contents, the physical quantities are used as an allocation base.

This year's total actual costs of producing 21 600 000 packets for the retail market and 3 000 000 packets for the diet market are:

	R
Flour, butter, oil ("dough") used	24 000 000
Savoury spices	6 000 000
All other production costs	10 476 000

Recently, Crax lost the bid for a large new contract for Weigh-Less branded snacks. Its bid price was reportedly R0,20 per kg higher than the winning bid. This came as a shock to Crax as they only added a 4% profit margin onto its cost to arrive at the bid price per kilogram, as the industry is fiercely competitive. Moreover, their plant was widely acknowledged as being in the upper quartile for operating efficiency. The finance manager was subsequently fired for producing inaccurate costing information.

The new financial manager decided to explore several ways of refining the costing system. Firstly, it was identified that R1 230 000 of the R10 476 000 production costs pertained to packaging costs (foil wrappings). Packaging time per product unit is identical for the two products. In terms of savoury spices, 96% of orders (time and value) was spent on retail and the remainder on the diet orders.

Secondly, she applied activity-based costing (ABC) techniques to examine how the two products (retail snacks and diet snacks) used the production processes differently. Three main activity areas could be distinguished. An engineering firm was also employed to execute a time and motion study to determine how long each product takes to produce. It was further decided that from now on fixed production overhead should rather be allocated based on throughput (minutes per kilogram).

The actual fixed overhead cost (making up part of the production overhead) for each activity area and throughput (in minutes) per kilogram is as follows:

Activity area	Total cost R	Retail Min/kg	Diet Min/kg
Kneading of dough	1 500 000	1,50	2,00
Cutting into forms	2 850 000	0,50	0,50
Baking	4 896 000	2,00	2,50
	9 246 000		

There was no opening or closing inventories (raw materials, work in progress or finished goods). The plant is running at its long-term capacity and operations are very efficient. You can assume actual costs and throughputs to equate to budgeted costs and standards.

	REQUIRED	Marks
(a)	Using the **existing** costing system, estimate what the **competitor's** bid price per kilogram of snacks in the Weigh-Less contract was. (Work to three decimals.) 9	(6)
(b)	Using the **revised** cost allocation and an activity-based costing approach, determine what the absorption cost per kilogram of retail snacks is compared to that of diet snacks. (Work to three decimals.)	(18)
(c)	How might Crax Ltd use the revised costing system to make better business decisions? 3	(4)
(d)	Propose two possible areas that can be further investigated to improve cost allocation between the retail and diet snacks.	(4)
(e)	If the selling price **per kg** is R7,05 and R6,70 for retail and diet snacks respectively, determine the breakeven sales volumes for both products based on the **new** cost allocations. You may assume a constant sales mixture of 9:1 for retail vs diet snacks and that the nature of the costs do not change.	(7)
(f)	One of the two ovens is going down for planned maintenance at the end of next quarter for a period of 3 days. The remaining oven cannot cope with the total daily required production of retail and diet snacks. **Describe** how you would go about optimising the production schedule during that period with a supporting calculation.	(5)
(g)	Briefly list the potential risks to Crax Ltd of • continuous power outages • outsourcing the production of the diet product	(6)

Feedback 2

Note 1: What have they given in this question?

•   2 products, different weights
•   Same size wrapping
•   Fixed overhead pool allocated on weight (kgs)
•   Production quantities
•   Dough also on physical (kg) basis, as above for FOH
•   Special order not accepted
•   Special order: 4% margin on **cost** – high efficiency
•   Overhead cost split into packaging and three activities, all time driven
•   No opening or closing inventory, implies production = sales
•   Running at LT capacity and efficiency, see margin above
•   Actual costs equate to budgeted costs

Note 2: Read the required carefully.

You will now have an idea of how the question information relates to the required section. Keep in mind that the marks shown will be indicative of the time to be spent as a particular section (50 marks = 75 minutes). Note the highlighted words:

(a)   Existing … competitor's
(b)   Revised
(e)   per kg … new (cost)
(f)   describe …

Note 3: What do you understand from this?

(a)   Using the existing (→ absorption costing) costing system, estimate what the competitors' bid price
          … (→ benchmark for costs).
(b)   … revised cost allocation and an activity-based approach (approach is given):
(c)   …use the revised cost system (ABC), to make **practical** recommendations; start with the revised
          cost calculated in (b))
(d)   … two further areas to improve … (→ look at what is the same under the old and may change
          when using the new)
(e)   … sales price per kg … calculate BE based on new cost (ABC) and given mix …
          (→ contribution and variable and fixed cost required)
(f)   Describe … with a supporting calculation (→ oven implies baking the constraint)
(g)   Risks (→ relevant to the current processes)

NB: Note the request to work to three (3) decimals.

Note 4: Focus notes

Use the focus notes to correct your mistakes.

Feedback – Suggested solution

(a)   **Bid price of competitor using the current costing system**

Direct costs:	R	
Dough	24 000 000	(✓ given: use weights)
Savoury spices	6 000 000	
All other production costs	10 476 000	(✓ given: use weights)
Total absorption cost	40 476 000	(1)
Retail kilograms = 21 600 000 ÷ 4 = 5 400 000 kg		(1)
Diet kilograms = 3 000 000 ÷ 5 = 600 000 kg		(1)

If you multiplied by 4 or 5, see note 1 below.

Cost per kilogram [R40 476k ÷ (5 400k + 600k)]	R6,746	(1)

Requested 3 decimals - implies answer will not be a nice clean number eg R6,70.

Crax's bid price [[R6,746 x (1+ 4%)]	R7,016	(1)

Competitor's bid price [R7,016 – R0,20]	R6,816	(1)
		(6)

Weight Watchers = diet

Focus notes

1. In tests and exams candidates often display a limited knowledge of measures and conversions, e.g. the number of units in a dozen, and in this instance, the number of grams in a kilogram. This is worrying, as a candidate at this level of study is expected to display a proper general knowledge. We recommend that candidates, who know that they have insufficient knowledge of measures and conversions, consult other sources to improve their knowledge in this regard.

2. Candidates' answers did not comply with the required format. A "price per kilogram" with calculations to "…three decimals" was required. However, answers were often presented in a price per unit (not per kilogram) and calculations were seldom performed to three decimal points. We recommend that candidates read the required section properly and follow it exactly.

3. Candidates made many basic calculation errors, thereby losing valuable marks.

4. Candidates did not display logical thinking, e.g. a candidate might have calculated a cost of R800 per kg of snacks. In such a case, candidates are not expected to always revisit their calculations, but candidates can still illustrate their thinking skills with a comment such as "this answer is clearly unreasonable, however due to time constraints I will not be able to revisit my calculations".

(b)   **Absorption cost per kilogram using the ABC system**

An immediate split between direct (variable) and fixed

Calculation of total cost

	Retail R'000	Diet R'000	
Direct costs:			
Dough (5 400 000kg / 6 000 000kg x R24 600 000kg / 6 000 000kg x R24m)	21 600	2 400	(2)
Savoury spices (R6m x 0,96; R6m x 0,04)	5 760	240	(1)
Packaging (wrappings) (21 600k/ 24 600k x R1 230k; 3 000k/ 24 600k x R1 230k)	1 080	150	(1)
	28 440	2 790	

Packaging pro-rated on number of packets as same size

Fixed overhead production costs:

Kneading – time used:

Retail = 5 400 000 x 1,50 = 8 100 000 minutes		(1)
Diet = 600 000 x 2,00 = 1 200 000 minutes		(1)
Total = 9 300 000 minutes		

	Retail	Diet	
Kneading – (8 100k/9 300k x R1 500k)	1 306		(1)
Kneading – (1 200k/9 300k x R1 500k)		194	(1)

Cutting – time used:

Retail = 5 400 000 x 0,50 = 2 700 000 minutes   (1)
Diet   = 600 000 x 0,50 = 300 000 minutes   (1)
Total   = 3 000 000 minutes
Cutting – (2 700k/3 000k x R2 850k)   2 565   (1)
Cutting – (300k/3 000k x R2 850k)   285   (1)

Baking – time used:

Retail = 5 400 000 x 2,00 = 10 800 000 minutes   (1)
Diet   = 600 000 x 2,50 = 1 500 000 minutes   (1)
Total   = 12 300 000 minutes
Baking – (10 800k/12 300k x R4 896k)   4 299   (1)
Baking – (1 500k/12 300k x R4 896k)   597   (1)
Total absorption cost   36 610   3 866

Check: total cost (R36 610 000 + R3 866 000 = R40 476 000)

> Costs are allocated based on kg x minutes as the throughput are defined as min/kg. You should not have used packets x minutes.

Cost per kilogram (R36 610 000 ÷ 5 400 000 kg);
(R3 866 000 ÷ 600 000 kg)   R6,780   R6,443   (2)
                                                         (18)

Focus notes

Candidates' answers did not comply with the required format. No comments or explanations were required yet some students found the time for it. Also see point 2 under part (a) above for comments that also apply here.

(c)   **Comment on the ABC impact**

- *Pricing decisions*: Adding the normal 4% mark-up to the cost per kilogram of the diet snacks of R6,443 would have given a bid price of R6,701.   (1)
- This would have beaten the competitor's bid of R6,816 and Crax Ltd would have gotten the order.   (1)
- *Product design decisions*: ABC provides a road map as to how to reduce the costs of individual products by analysing the relative components.   (1)
- By focussing on the high cost components overall costs can be reduced by managing costs (matching resource supply with resource demand ABM)   (1)
- *Process improvements*: Each activity area is now highlighted as a separate cost. Improvements in efficiencies can also drive down costs per kilogram.   (1)
- *Product profitability analysis:* ABC will allow the company to perform a product profitability analysis and in doing so to formulate a better idea of the profitability of the different products being manufactured.   (1)
- Other valid point [maximum of 1 point]   (1)

                                                                    Maximum (4)

Focus notes

This part of the question was answered poorly. Candidates displayed a lack of insight and struggled to apply theory to practical situations. For such questions, it is recommended that candidates plan their answers properly and apply lateral thinking.

(d)   **Additional areas to investigate**

- Can cost of ordering be obtained and allocated according to number of raw material orders placed?
- Setup costs related to changing the cutting dies from the larger retail snacks to the smaller diet snacks.
- Setup costs related to changing the flavour of the savoury spices, e.g. salt & vinegar to cheese.
- Setup costs related to changing the setting in order that less savoury spice is added to the diet snacks.
- Setup costs related to changing the foil wrapping for the diet snacks.
- Diet snacks use less butter and oil: determine actual usage for direct costs.
- Amount of foil in packaging might well be different between the two products – hence requiring a different cost allocation.
- An alternative basis could be considered for the allocation of spice costs – e.g. consumption based.
- Is there a difference between the degrees Celsius at which the two products are baked? Might have impact on allocation of electricity costs?
- Any other valid point. [maximum of 1 point]

Two each, maximum (4)

Focus notes

This part of the question was also answered poorly. Setup costs were seldom addressed, and an alternative basis for the allocation of costs relating to spices and wrapping were seldom mentioned.

(e)   **Breakeven sales mixture:**

	Retail R/kg	Diet R/kg	
Selling price – given	7,05	6,70	(1)
Variable costs – See (b)			
Retail (R28 440k / 5 400k)	5,27		(1)
Diet (R2 790k / 600k)		4,65	(1)
Contribution	1,78	2,05	(1)

Weighted average contribution mixture = [(9 x 1,78) + (1 x 2,05)]/10 = R1,807(1)

Breakeven   = (1 500 000 + 2 850 000 + 4 896 000) [Fixed costs] / 1,807 = 5 116 768 kg   (1)
Ratio: 4 605 092 kg (round up) retail and 511 677kg diet. [split 9/10 and 1/10]   (1)
(7)

This is defined as "common" fixed costs as the two products are manufactured on the same machines. See Drury SA 1st ed pages 268–271 (10th ed pages 182–184) for multi-product CVP.

If it was two production lines, we could do the alternative.

Common fixed costs can only be avoided if none of the products are manufactured.

Focus notes

The relative simplicity of a breakeven sales-volume calculation does not underscore the importance of this figure. Here it was slightly complicated by two different products contributing to fixed costs, which seem to have posed a problem to many candidates. Students who experienced difficulty with this section, are advised to obtain further practice by attempting several other questions on this topic.

(f)   **Optimising production**

- As the oven represents a scarce/limited resource, the contribution should be determined per limiting factor – thus contribution per baking minute. (1)
- You should calculate the contribution per minute by dividing the contribution per kg (calculated in part e) by the number of minutes of **baking time** per kg. (1)
- Preference should be given to filling orders first for the product with the highest contribution per minute. (1)

	Retail	Diet	
Contribution per kg	1,78	2,05	
Baking time per kg (min per kg)	2,00	2,50	
Contribution per baking minute	0,89	0,82	(2)

∴ Retail snacks should be given preference   Maximum   5

(g)   **Power outages**

- Product not fully/properly baked and lost (1)
- Cost base increase due to above (1)
- Sales and deliveries not met, customers may be lost (1)
- Damage to equipment in the long-term resulting from power surges (1)
- Opportunity cost of underutilising capital equipment (1)

   Outsourcing

- Knowledge base taken over by outsourcing party (1)
- Lost market, taken over by 3rd party (1)
- Non-delivery by 3rd party in terms of agreement (1)
- Sub-standard quality products delivered or increased cost of monitoring (1)

                                                                    Maximum 6

   Focus notes

   For this part, candidates unexpectedly failed to score high marks. In future, candidates could improve their answers to similar questions by using the assumption (unless stated otherwise) that one valid-point will earn only one mark. For such questions, candidates should also attempt to incorporate real-world factors where possible and apply lateral-thinking.

Enrichment activity

Follow the link and watch the "How it's made" episode about the production of savoury crackers (biscuits) called soda crackers:

https://www.youtube.com/watch?v=_5c2tlLVYic
Note the different stages in the production process.

TEST 1 topics (2021 test 3): DOUGHNUT KING   **40 marks**

Doughnut King (Pty) Ltd (DK) is well known for its sweet doughnuts. It has a factory store centrally located in Johannesburg from where it produces and sells doughnuts to its franchise stores countrywide. DK is committed to producing high quality products and guarantees the freshness of its doughnuts for seven days. DK uses an absorption costing system for financial reporting purposes and currently allocates fixed production costs based on labour and machine hours.

DK produces and sells two types of doughnuts, namely *Cinnamon or Dazzled*. Cinnamon doughnuts are covered with cinnamon and sold for R250 per 1kg box. Dazzled doughnuts are topped with chocolate chips and sold for R300 per 1kg box. The weight of the carton box is negligible.

The following production and sales information is available for the year ended 28 February 2021:

Description	Cinnamon		Dazzled	
	Budget	Actual	Budget	Actual
Production	425 000 kg	440 000 kg	155 000 kg	160 500 kg
Sales	422 500 kg	439 000 kg	151 000 kg	154 500 kg
Labour hours	50 000 hours	52 600 hours	25 000 hours	27 800 hours
Machine hours	70 000 hours	73 500 hours	30 000 hours	36 400 hours

Notes:

1. There was no budgeted opening or closing inventory of raw materials or work-in-progress and no completed doughnuts at the beginning of the 2021 financial year.
2. Total budgeted fixed costs was R10 000 000 for the 2021 year. Budgeted fixed labour costs accounted for 40% of the total fixed costs. The remaining fixed costs are referred to as 'Other fixed overheads' which was accounted for using machine hours.
3. Total actual fixed costs was R10 500 000 for the 2021 year which was split in the ratio 36 to 64 between labour and other fixed overhead costs.
4. The budgeted contribution margins from the management accounting reports for Cinnamon and Dazzled are 45% and 43% respectively.

Bagel expansion

DK management want to diversify its product ranges to include bagels (a round yeast roll with a hole in the middle). The current plant can be modified by the addition of a new production line. The plant has sufficient capacity to accommodate the line at its current location. Current permanent staff have 200 hours spare capacity to work on the new production line per month. The new production line will require 3 000 hours per month. Management will employ several new staff members either on a permanent or hourly basis. Current and new staff will be trained on the procedures of the new product line. The Chief Operating Officer (COO) is concerned that it may take too long for the new product line to break-even.

REQUIRED		MARKS	
		Sub-total	**Total**
(a)	Calculate the actual value of closing inventory for Cinnamon and Dazzled, for the year ended 28 February 2021. • You may ignore volume and expenditure variances. *Communication mark – Layout and structure*	13 *1*	14
(b)	Calculate the following **Other** fixed overhead cost variances for the year ended 28 February 2021: (i) Expenditure variance; and (ii) Volume variance. (iii) State the effect each variance above will have on gross profit. • You may assume that the volume and expenditure variances are incorporated into the gross profit. • **No** marks are awarded for labour related fixed overhead variances. • **No** split between Cinnamon and Dazzled required.	 *3* *3* *2*	8
(c)	Discuss whether activity-based costing will be appropriate for DK's current doughnut production operations.		6
(d)	Discuss six (6) **quantitative** factors, which you will consider in calculating the break-even for the new bagel expansion for the first year.		6
(e)	Discuss six (6) **qualitative** factors, which you will consider for the bagel expansion. *You can exclude any possible Covid-19 impact in your discussion*		6
TOTAL			40

TEST 1 topics (2021 test 3) – DOUGHNUT KING SOLUTION   **40 marks**

c = consequential mark if criteria is met

| (a) | Calculate the actual value of closing inventory for Cinnamon and Dazzled, for the year ended 28 February 2021. | 13 | |
| | You may ignore volume and expenditure variances. *Communication mark – Layout and structure* | 1 | 14 |

Communication mark: Calculating total inventory value, i.e. not per unit including all 3 elements

STEP 1

Total Fixed Cost	R10 000 000	
Fixed Labour cost @40%	R4 000 000	(½)r
Other fixed overhead @60%	R6 000 000	(½)r

Sub-total step 1: 1 max

STEP 2

2a. Budgeted fixed <u>labour</u> rate

$$\frac{4\ 000\ 000}{50\ 000 + 25\ 000 \text{ labour hours}}$$

$$\frac{4\ 000\ 000}{75\ 000 \text{ hrs}}$$

R 53.33   **/labour hour**
   (½)r

2b. Budgeted labour hours per kg

Cinnamon	Dazzled
50 000 hours	25 000 hours
425 000 kg*(½)r	155 000 kg*(½)r
= **0.12 h/kg**	**0.16 h/kg**
*must use budget	*must use budget

2c. Fixed labour cost allocated per 1kg box

Cinnamon	Dazzled
R6,40 or R6,27	**R8,53** or R8,60
(rounding diff)	(rounding diff)
[R53.33 x 0.12]	[R53.33 x 0.16]

Sub-total step 2: 1½ ma

Step 3:

3a. Budgeted other fixed overhead rate (based on machine hours)

$$\frac{6\ 000\ 000}{70\ 000 + 30\ 000}$$

$$\frac{6\ 000\ 000}{100\ 000 \text{ hrs}}$$

R 60.00   **/machine hour**
   (½)r

3b. Budgeted machine hours per kg

Cinnamon	Dazzled
70 000 hours	30 000 hours
───────────	───────────
425 000 kg*(½)r	155 000 kg*(½)r
= **0.16 h/kg**	**0.19 h/kg**
*must use budget	*must use budget

3c. Fixed labour cost allocated per 1kg box

Cinnamon	Dazzled
R9,60 *or R9,88*	R11,40 *or R11,61*
(rounding diff)	*(rounding diff)*
[R60 x 0.16]	[R60 x 0.19]

Sub-total step 3: 1½ max

STEP 4: Production cost per 1 kg box

	Cinnamon		Dazzled	
Variable Cost [R250 x [55/100]] [R300 x [57/100]]	R137,50	(1)r	R171,00	(1)r
Fixed Labour	R6,40	(½)c Step 2	R8,60	(½)c Step 2
Other fixed overhead	R9,88	(½)c Step 3	R11,61	(½)c Step 3
Total cost per 1kg box	**R153,78**	**(½)c***	**R191,21**	**(½)c***

* All three costs must be included

ALTERNATIVE	Cinnamon		Dazzled	
	PUx 425 000		**PUx 155 000**	
Variable Cost	R58,437,500.00	(1)r	R26,505,000.00	(1)r
Fixed Labour	R2,720,000.00	(½)c	R1,333,000.00	(½)c
Other fixed overhead	R4,199,000.00	(½)c	R1,799,550.00	(½)c
Total cost per 1kg box	**R65,356,500.00**		**R29,637,550.00**	
PER UNIT (/425' | /155')	**R153.78**	**(½)c***	**R191.21**	**(½)c***

Sub-total step 4: 5 max

Step 5: Actual closing inventory value

	Cinnamon	Dazzled
Production	440 000 kg	160 500 kg
Sales	439 000 kg	154 500 kg
= Closing inventory	**= 1 000 kg/ box**	**= 6 000 kg/ box**
	(1)r	(1)r
Actual closing inventory value [**1 000** x R153,78] [**6 000** x R191,21]	R153 780	R1 147 260
	(1)c	(1)c

Sub-total step 5: 4 max
Com mark 1
Total part a) 14

(b)	Calculate the following **Other** fixed overhead cost variances for the year ended 28 February 2021:		
	(i) Expenditure variance; and	3	
	(ii) Volume variance.	3	8

(iii) State the effect each variance above will have on **gross profit**.	*2*	
• You may assume that the volume and expenditure variances are incorporated into the gross profit. • **No** marks are awarded for labour related fixed overhead variances. • **No** split between Cinnamon and Dazzled required.		

(i)   Expenditure variance:

•	Budgeted Other fixed overhead cost was R6 000 000 [R10 000 000 x 60%]	R6 000' (1)r
•	Actual Other fixed overhead cost was R6 720 000 [R10 500 000 x 64%]	R6 720' (1)r
•	DK therefore spent R720 000 too much on Other fixed overheads costs, thus adverse expenditure variance.	R720' **A** (1)r (direction)

Note:
Expected other fixed overhead costs R6 000 000 but actual other fixed overhead costs were R6 720 000. Thus, spent R720 000 too much on Other fixed overhead costs.

(ii)   Volume Variance:

1.	Machine actually worked **9 900** more hours 109 900 (73 500 + 36 400) than the budgeted 100 000 (70 000+ 30 000) hours.	9 900h (1)r
2.	Thus a **favourable** volume variance of **R594 000** [R60 x 9 900] as DK was able to allocate all the fixed overheads to production.	R60 (1)c **R594 000 F**(1)r

Note:
If all goes according to plan, we would have allocated all **budgeted** fixed production overhead costs to the production account. However, due to the volume variance this does not always happen. In this question the capacity of the DK plant was over-utilised. Machine worked 109 900 hours instead of 100 000 as budgeted. More fixed overheads were absorbed than budgeted.

(iii)   Gross profit effect:

3.	Adverse Expenditure variance therefore **Gross profit** will **reduce by R720 000 (overstated)**	(1)c
4.	Favourable Volume variance therefore **Gross profit** will **increase by R594 000 (Understated)**	(1)c

(c)	Discuss whether activity-based costing will be appropriate for DK's current doughnut production operations.		6

Note:

ABC is recommended for organisations with the following **characteristics**:
  o Intensive competition
  o **Non-volume related fixed overheads** that are a **high proportion** of total fixed overheads
  o A **diverse range of products** that **consume organisational resources in significantly different proportions** (high product diversity).

1.	With reference to total production cost, the R10 000 000 (budget) or R10 500 000 (actual) annual fixed overhead costs is a **substantial cost, therefore ABC can be considered.** NOTE: if fixed cost is low, the implementation cost of ABC would likely not exceed the benefit	(1)d
2.	The drivers of the fixed overheads will have to be investigated to determine if they are **volume or non-volume related** NOTE: if machine or labour hour driven, ABC is not really beneficial	(1)d
3.	The doughnut market is **competitive**, and therefore it is imperative to determine the correct cost	(1)d
4.	The cost of implementing and operating an ABC system is much **more expensive** than a <u>traditional</u> absorption costing system e.g. training and software requirements / **cost vs benefit**	(1)d
5.	The **production process is the same** for both Cinnamon and Dazzled, only the final toppings differ. The range of doughnuts will **consume resources in very similar proportions**; Therefore, the **overhead costs** for each type of doughnut **will be very similar**.	(1)d (1)d
6.	CONCLUSION: DK **does not** meet ALL the requirements for ABC that the organisation should have.	(1)c

Available/Total 6

(d)	Discuss six (6) **<u>quantitative</u>** factors, which you will consider in calculating the break-even for the **<u>new bagel expansion</u>** for the first year		6

Note: To perform a break-even calculation you should:

1. Split the costs between its <u>Fixed</u> or <u>Variable</u> nature.
2. Determine which fixed costs are <u>common (shared)</u> with other divisions and which fixed costs are <u>specific</u> to each product.
3. Each division will have to first cover their specific (direct) fixed cost.
4. Determine the contribution per Unit.
5. Determine the budgeted/ normal sales mix.

The question relates to the break-even and not generic quantitative factors!
(Not market share/ demand, etc.)

1.	The current plant has sufficient space and **no additional plant space** has to be leased. The new production line will share in the common fixed cost of the current plant.	(1)d
2.	The cost of the 200 hours of current permanent staff is part of **common fixed cost** and the production line will **share** in this cost.	(1)d
3.	The staff training cost will be only for the Bagel expansion and is a **specific fixed cost.**	(1)d
4.	New/additional permanent staff will be treated as a **fixed** cost	(1)d
	And will be **only** for the **Bagel expansion** (direct cost), thus it is a **specific** fixed cost	(1)d
5.	**Staff employed on an hourly basis** is likely **variable cost** and should be incorporated into the contribution per bagel.	(1)d
6.	The **sales price** per bagel and **variable costs** per bagel will be difficult to determine as Bagel is a new product,	(1)d
	Making it difficult to **determine the contribution per bagel for the new product**	(1)d
7.	The impact of the **Learning curve** will be difficult to consider but will impact both the variable and fixed costs.	(1)d
8.	The normal/ budgeted **sales mix** between doughnut and bagels may be difficult to determine as bagels is a new product range.	(1)d

Available 9/ max 6

(e)	**Discuss** six (6) **qualitative** factors, which you will consider for the Bagel expansion.	6

1.	The possible positive impact on **staff morale** if DK shows signs of growth which may be perceived to create job security.	(1)d
	The possible negative staff morale working with new product range and new colleagues as this may create some uncertainty.	
2.	Determine the **market and franchisees perception** of the diversified product range.	(1)d
3.	Will the **quality** of the bagels be as high as the doughnuts quality for which they are famous.	(1)d
4.	Will they be able to **deliver** both product ranges **timeously** to franchisees and without a delay to the production of doughnuts.	(1)d
	Will the expansion hamper the current production, leading to current doughnut customer dissatisfaction as their orders may not be timeously filled, or quality could be compromised?	
5.	DK may **lose focus** of their doughnuts product range.	(1)d
6.	Will **other product ranges** (possible other diversification) be forfeited by expanding into bagels.	(1)d
7.	Will they be **price takers or setters** when determining the sales price per bagel? If the bagel market is **competitive** they will be price takers.	(1)d
8.	Is the effect of the large increase in production on supply chain logistics of procurement, storage (raw material, WIP and FGs) and **distribution** considered?	(1)d
9.	The expansion is **creating extra jobs** which is good for their reputation	(1)d
10.	The increase in production output affords DK the opportunity to **expand their base of suppliers to SMMEs i**n improve their **BBBEE** score.	(1)d
11.	As it is a new product, **new marketing initiatives** are needed / packaging must be considered	(1)d
12.	Possible additional time for **training**	(1)d

Available 12/ max 6

Note:
Students still do not answer the required. For (d) you should have listed only **quantitative factors**, and for part (e) only **qualitative factors.**
No marks were awarded if addressed in the wrong question

TEST 1 topics (2022 test 3): BABYLICIOUS FOODS   **40 marks**

Babylicious Foods (Pty) Ltd (**BL**) manufactures organic fruit puree blends for babies. The puree is produced at its plant situated in Mpumalanga. Babylicious has won several local and international awards for its organic puree recipes.

Babylicious fruit puree blend

Baby fruit puree blend is made by mixing seasonally available fruit (like apple, banana, peach etc.), based on existing recipes. Various fresh fruit is obtained from a few selected farms across the region. A selection of fruit is then combined based on the applicable recipe and cooked in batches of 100 litres. No normal loss takes place during the cooking process.

The fruit is deskinned, pitted, and crushed in a specialised mixer to form the raw puree and then boiled in a sealed cooker to prevent moisture loss. Quality control is critical and is performed throughout the process. Purified water and spices are added lastly and mixed to form the final puree blend. Once cooled down, the filling process is done by an automated filling machine where jars are filled to predetermined levels based on weight. Each jar is weighed twice electronically, before being capped, labelled, and sealed. After each puree batch is processed, the whole production line and all equipment are cleaned.

BL's plant operates for **twenty** (20) working days per month. Product details are as follows:

	Notes	Standard	Health
Volume of jar	1	700 ml	300 ml
Puree batches produced per day	2	3	1
Boiling time per batch		90 minutes	60 minutes
Puree content in final puree blend (%)	3	33%	40%
Quality checks per batch	4	1	3
Budgeted sales price per jar (R)		28,00	20,00
Budgeted variable cost per jar (R)		15,00	12,00

Notes:

1) Two products are produced, Standard and Health Puree Blend. The Health Puree Blend contains only fruit with a high vitamin C content and the cooking time is reduced.
2) Three batches of Standard are produced per day, and only one for Health.
3) The percentage of cooked puree contained per jar of final Puree Blend.
4) For the Standard puree, one (1) quality check is performed on the contents of the cooker. The Health puree has a specific mix of spices excluding sugar and three (3) checks are performed during its processing time.

The plant has a <u>monthly</u> budgeted fixed manufacturing overhead cost of R171 180. The manufacturing overhead is allocated to the two products based on the volume of final product produced.

BL has performed an activity-based costing (ABC) exercise with the following monthly data being recorded:

	NOTES	R
*Fruit crushing		5 000
*Processing	5	79 860
*Water and spices: adding and mixing		16 000
Filling of jars, capping and sealing		40 320
Quality control	4	30 000
TOTAL		**171 180**

* These costs should be included in one item for ABC reporting, excluding cleaning cost

5) Processing consists of the boiling time and the cleaning of the equipment. The cleaning cost amounts to twenty-five percent (25%) of this processing cost item only and should be shown separately.

6) During the financial year ended June 2022 BL actually sold 280 000 Standard and 140 000 Health jars of fruit puree blend at average prices of R25,50 and R19,00 per jar, respectively.

The annual non-manufacturing fixed costs are as follows:

	Standard R	Health R	BL Plant R	TOTAL
Sales related	24 000	24 000	6 000	54 000
Administrative			106 000	106 000
Total				**160 000**

- The sales related actual fixed costs for June were as budgeted, but R8 000 was saved on the administrative costs.

- Actual variable cost per Standard jar was thirty cents (30c) higher than budgeted in June, whilst Health increased by twenty cents (20c) per jar.

- The expenditure variance for the fixed manufacturing overhead of the plant was R21 800 favourable for the year.

- The plant was closed for two days in June for sterilisation after a quality check identified a bad batch of puree with possible health risks. BL had to completely clean and rinse the production line at a cost of R67 000 which was not budgeted for and is deemed to be a fixed cost. All batches still in stock were destroyed. The twenty working days were not impacted, scheduled maintenance was just postponed. The director of BL foods said that there is no need to recall the batches already shipped, as the quality control report stated that the risk as low. The Health and Safety manager has however asked that an additional full-time employee, at a cost of R10 000 per month be appointed to assist with the quality control.

	REQUIRED	Marks	
		Sub-total	**Total**
(a)	Calculate the fixed manufacturing overhead rate per product, per jar using:		
	(i) A traditional approach.	6	
	(ii) An activity-based costing approach.	9	15
(b)	Write a brief report to the directors of Babylicious in which you discuss when and how the performance of Babylicious may be enhanced by using Activity-Based Costing. Quote relevant numbers where applicable. (No general points will earn marks)	7	
	Communication skills – layout and structure	1	8
(c)	(i) Calculate the *actual* annual break-even point for both products in jars for the financial year ended June 2022.	8	
	(ii) Discuss what would happen to the break-even should the additional Health and Safety employee be employed and what will happen to the price and demand of the products.	4	12
(d)	Discuss the handling by BL of the bad batch of puree.	5	5
	TOTAL		**40**

TEST 1 topics (2022 test 3): BABYLICIOUS FOODS SOLUTION

(a)	Calculate the fixed manufacturing overhead rate per JAR using:		
	(i) A traditional approach.	6	
	(ii) An activity-based costing approach.	9	15

(i) Traditional and ABC overhead rates

100 litres = 100 000 ml
1) **Standard** 700 ml jar contains 33% puree = 231 ml per jar   (½)
   ∴ 100 000/231 = 432,9 >> 432* jars per batch   (1)
   * Note: Can't round up, as not sufficient material
   3 Batches p.d. @ 20 days = 432 x 60 = 25 920 jars per month   (½)c

2) **Health** 300 ml contains 40% paste = 120 ml per jar   (½)
   ∴ 100 000/120 = 833,3 >> 833 jar   (1)
   1 Batch p.d. @ 20 days = 833 x 20 = 16 660 jars per month   (½)c

Production per month

	Jars	Litre per jar	Volume (litres)	%	Cost (R)	Per jar(R)	
Standard	25 920	(x 0,7)	18 144	78.40	134 210,1	5,18#	(½)C
Health	16 660	(x 0,3)	4 998	21.60	36 969,9	2,22#	(½)C
	42 580		23 142	100.00	171 180,0		
			(1)c		(1)c		

#Allow small rounding differences

(ii) ABC

Filling allocated on a jar basis.
Quality control allocated on a test/check basis.
1) Batches 3 + 1 = 4
2) Time 270 (3 x 90) + 60 (1 x 60) = 330 minutes
3) Jar per day 432 x 3 + 833 = 2 129 or monthly (From (a))
4) Checks (3 batch x 1check) + (1batch x 3checks) = 6 → 50/50
   a. Processing (5 000 + (75%x79 860)59 895 + 16 000) = R80,895
   b. Cleaning 25%x79 860 = R19 965

		Split	ALT split	Standard (R)	Health
Cleaning	19 965(1)	3/4; 1/4		14 973.75	4 991.25
Processing	80 895(1)	270/330 60/330	3/4; 1/4	66 186.81 / 60 671.25	14 708.18 20 223.75
Filling	40 320 (½)	25920 & 16660 / 42 580 (a)		24 544.26	15 775.74
Qual Control	30 000 (½)	50/50		15 000	15 000
	171 180			120 704.83	50 475.17
Per unit		÷		25 920	16 660
				4.66	**2,51**

| (b) | Write a brief report to the directors of Babylicious in which you discuss when and how the performance of Babylicious may be enhanced by using Activity-Based Costing. Quote relevant numbers where applicable. (No general points will earn marks) | 7 | |
| | *Communication skills – layout and structure – Report layout* | 1 | 8 |

⚠️Focus of the answer should be on <u>enhancing</u> achieved by ABC, not if it will be optimal to use ABC

To: Babylicious Ltd
Date: 14 June 2022
From: XYZ Student [No Number/ID]
RE: Performance improvement through ABC

1.   Firms/enterprises benefit from ABC when they have **a range of products consuming resources differently** (different consumption ratios) (product diversity) e.g. Standard & Health puree.   (1)
2.   Products with **different production volumes produce different costs** e.g.   (1)
     Standard now R5,18 overhead per jar versus an ABC cost of R4,66.   (1)
3.   Firms/enterprises benefit from ABC when **non-volume related overheads**   (1)
     are a large proportion of total overheads. Only the filling cost is volume related (i.e. allocated based on number of jars). All other overheads are non-volume-related.
4.   When the cost base changes e.g. Health jar's overhead cost changes by
     R0,86 additional, the **price should be reviewed/redetermined**.   (1)
5.   **Incorrect pricing** (too low) may lead to product volumes increasing for a
     product which is actually making a lower profit than thought. Review of both
     our products are required.
6.   **ABC** identifies and allows for **non-value adding activities to be eliminated**. (1)
7.   Excess costs can be identified and changes made to processes. We should   (1)
     investigate the possibility of dedicated production lines for each product and
     determine whether capacity can be increased in that way.
8.   Other valid point   (1)

        <u>Points against</u>

9.   BB is not a **large company** and should investigate if **benefit** of ABC   (1)
     implementation **exceeding the cost** of ABC implementation.
10. BB has a low product diversity (only 2 products) and may not be consuming   (1)
     resources in a significantly different proportions (maybe more volume driven)

Kindly contact writer for any further information in this regard.

Yours faithfully

XYZ Student

                                                                    Max   <u>(7)</u>

| (c) | (i) | Calculate the *actual* annual break-even point for both products in jars for the financial year ended June 2022. | 8 | |
| | (ii) | Discuss what would happen to the break-even should the additional Health and Safety employee be employed and what will happen to the price and demand of the products. | 4 | 12 |

	Standard R	Health R	
Sales price	25,50	19,00	
Variable cost (+R0,30, +R0,20)	(15,30)	(12,20)	(1r)
Contribution (No fixed cost to be included, No GP)	10,20	6,80	(1c)
Sales quantity (280'+140' =420'. Then 280'/420' = 2/3 and 140'/420' = 1/3 **or** 66,67% and 33,33%)	280 000	140 000	(1)r
*not production qty's			
Weighted contribution (R10,20 x 2/3) + (R6,80 x 1/3) =		R9,07	(1)c

Fixed costs:

		R	
Manufacturing overhead (171 180 x 12) – 21 800		2 032 360	(1½)r
Sales related (given) (160 000 includes 57 000)	Must use	54 000	(½)r
Administrative (106 000 – 8 000)	weighted	98 000	(1)r
Ad hoc (Sterilising) cost (given)	average	67 000	(½)r
		2 251 360	
∴ Break-even jars (R2 251 360 / R9,07)		248,220.50	(1)c
∴ Standard jars (248 221 x 2/3)	165 481		(1)c
Rounding up – must show calc			
Health jars (248 221 x 1/3)	82 741		(1)c
Rounding up			
TOTAL		MAX	**8**
		AVAILABLE	**(10)**

ii) Discuss what would happen to the break-even should the additional Health and Safety employee be employed and what will happen to the price and demand of the products

1. Additional employee cost will be added to fixed cost   (1)
2. This would increase break-even (amount or R)   (1)
3. Sales price/Contribution would have to be increased to cover fixed cost increasing (1)
4. Demand might go down if price sensitive   (1)
    TOTAL & MAX   **(4)**

(d)	Discuss the <u>handling</u> by BL of the bad batch of puree.	**5**
1.	They should have **identified the reason** of the quality breach	(1)
2.	The company did the **correct thing** in immediately stopping and cleaning the system	(1)
3.	BL **correctly destroyed** the remaining stock on hand	(1)
4.	BL incorrectly did not recall the shipped batches and informed clients which is **unethical**	(1)
5.	The **ethical culture** of the company/director should be investigated	(1)
6.	Even though the risk is low as the reports stipulated, there could be huge **reputation risk tarnishing brand**	(1)
7.	And one would wonder why the stock was destroyed on hand	(1)
8.	This could give rise to **legal risk** should the babies become sick	(1)
9.	Which could affect the **going concern**	(1)
	Available	9
	MAX	5

TEST 1 topics (2023 test 3) : IHEMBE   **40 marks**

1. Background

Ihembe (Pty) Ltd ("Ihembe") is based in Durban, KwaZulu-Natal and is owned and operated Mr Madlala. Ihembe manufactures and sells large volumes of standardised T-shirts to large fashion retailers who customise the T-shirts by branding them with their logos. Ihembe's raw fabric rolls are sourced from local suppliers, whereafter the fabric is dyed, cut and sewn together by automated machines.

Mr Madlala incorporated Ihembe in 2002 and he has been the Chief Operating Officer since its inception. Ihembe has a 31 May financial year end and uses a variable costing system for internal decision-making. Its financial statements are prepared on an absorption costing basis and inventory is accounted for at actual costs and recorded on a first-in-first-out (FIFO) basis. T-shirts are only sold in boxes with each box containing 100 T-shirts and are not sold per T-shirt.

2. Production

Mr Madlala indicated that there was no time to perform a flexed budget throughout the 2023 financial year. He has managed to quickly compare the budgeted and actual financial statement figures and provided you with comments from the different managers.

Extract of the Budgeted and Actual Statement of profit or loss for the year ended 31 May 2023:

	Notes	Budget	Actual	Variance (F) Favourable (A) Adverse
		R'000	R'000	R'000
Sales	1	**2 790 000,0**	**3 265 500,0**	**475 500,0 F**
Cost of sales		**(1 318 277,5)**	**(1 745 690,0)**	**(427 412,5) A**
Fabric	2.1	1 162 500,0	1 574 390,0	(411 890,0) A
Dye	2.2	86 800,0	98 000,0	(11 200,0) A
Direct labour	3	34 177,5	38 500,0	(4 322,5) A
Fixed manufacturing costs	4	34 800,0	34 800,0	0,0
Gross profit		**1 471 722,5**	**1 519 810,0**	**48 087,5 F**

Extracts from the management reports for the 2023 financial year:

T-shirt	Budget	Actual
Opening inventory (boxes)	0	0
Production volume (boxes)	310 000	313 000
Sales volume (boxes)	310 000	311 000
Sales price	R9 000 per box	R10 500 per box

Notes and comments

1. Mr Madlala is very proud of the sales team manager, Mr Aaron Davies, and how his team was able to use the price elasticity principle to their advantage.

2. Fabric and Dye are purchased just-in-time.

Raw materials	Budget	Actual
2.1 Fabric	150 metres of fabric should be issued to production per box of T-shirts produced at R25 per metre.	155 metres of fabric issued to production per box of T-shirts produced at a **total purchase cost** of R1 574 390 000.
2.2 Dye	R2,80 per T-shirt.	**Total purchase cost** of R98 000 000.

2.1. The purchasing manager, Mr Dumi Tjano, has changed suppliers and is confident that the new fabric is of superior quality despite more off-cuts due to different dimensions of the new supplier's fabric rolls. Clients also confirmed their improved satisfaction with the T-shirt quality based on a recent customer survey.

2.2. Dumi commented: "These days, things sometimes cost more than you think. Everything is up, inflation, electricity and diesel. Luckily, we kept the normal wastage of Dye to 1% which is in-line with the budget."

3. According to the budget 3,15 labour hours are required at R35 per hour to produce one box. Ms Shivani Gani, the production manager, indicated that her team of labourers actually worked 1 100 000 hours in the year. According to the Human Resource manager, actual total wages amounted to R38 500 000 for the year. Labour is treated as a variable cost for the 2023 financial year.

4. The fixed overhead allocation rate is based on 600 000 machine hours. Shivani is very pleased with the machine's production efficiency as it was able to produce more boxes and was operated for 5 806,45 more hours than budgeted and still managed to stick to the total fixed manufacturing budget of R34 800 000.

3. Budget 2024

Upon investigation, Shivani realised that the total labour cost includes managers who are permanently employed and earning fixed monthly salaries as well as temporary staff hired per hour to operate machines. She has asked you to assist her with splitting the labour cost for the **2024** financial year to reflect its true nature.

After discussing the 2024 annual sales projections with the sales manager, the highest **production** volume is estimated to be 350 000 boxes and the lowest is 300 000 boxes. After further discussion with the human resource (HR) manager it was determined that the **total labour** cost for 2024 is estimated in- line with the **production** projections to range between R38 200 000 and R39 800 000, respectively.

Aaron, the sales manager, realised that the off-cuts could be used to make "scrunchies" (a type of hair-elastic). He estimates that he will be able to sell 1 800 000 scrunchies in 2024 for R8 each and that each scrunchy would cost an additional R3,20 to produce.

4. T-shirt printing expansion

In an effort to remain competitive, Mr Madlala has purchased large scale T-shirt printing equipment at the end of 2023 for R3 800 000. It is anticipated that 20% of the 320 000 T-shirt box sales for **2024** will be sold with a printed customised logo on the T-shirts. These T-shirts are referred to as "printed" and the remainder will be sold unprinted and referred to as "plain".

Internal research at a cost of R18 000 provided you with the following estimates:

Description	Plain T-shirts	Printed T-shirts
Sales price R per box	10 800	12 000
Variable cost R per box	(5 540)	(5 700)
Fixed production R cost per box *(includes machine and labour)*	(215)	(235)
Contribution R per box	5 260	6 300
Gross profit R per box	5 045	6 065
Sales volume boxes	256 000	64 000

Round all amounts to two decimals

Ignore Value-Added Tax (VAT), Dividends Tax and any possible impact of Section 8 of the Income Tax Act.

	REQUIRED	Marks	
		Sub-total	**Total**
(a)	(i) Calculate the closing inventory balance (Rand value) for **T-shirts** (finished goods) for the Statement of Financial Position as at 31 May **2023**.	3	
	(ii) Reconcile the actual profit per the Statement of Profit or loss and other comprehensive income with the management reports for the year ended 31 May **2023**.	3	
	• *Assume an absorption profit of R1 530 966 721.*		
	• *Labour is treated as a variable cost.*		6
(b)	Critically evaluate Ihembe's **actual** performance based on the Statement of Profit or Loss and other comprehensive income for the financial year ended 31 May **2023** compared to the **2023 budget**.		
	Use the following headings for your discussion:		
	i) Sales;	3	
	ii) Raw material (fabric and dye);	7	
	iii) Direct labour;	3	
	iv) Fixed production cost; and	3	
	v) Closing inventory (T-shirt boxes).	2	
	Communication skills – logical argument.	1	
	• *Your discussion should **include calculations** and **amounts**.*		
	• *Your discussion should **include errors** made by Mr Madlala.*		
	• ***Do not** reperform "the extract".*		
	• ***Do not** perform standard costing variances.*		19
(c)	You were requested to assist with the following for the 2024 financial year:		
	(i) Assist Ms Gani by calculating the labour cost for the **2024** financial year to reflect its nature.	3	
	(ii) Discuss and conclude if **scrunchies** should be treated as joint or by-products.	3	6
(d)	Calculate the budgeted break-even number of boxes per T-shirt type ("plain" or "printed").	8	
	Communication skills – layout and structure.	1	
	• *Ignore the sales from scrunchies.*		
	• *Assume fixed and variable costs correctly reflect the nature of labour costs.*		9
TOTAL			**40**

TEST 1 topics (2023 test 3) : IHEMBE SOLUTION   **40 marks**

(i) Calculate the closing inventory balance (Rand value) for **T-shirts** (finished goods) for the Statement of Financial Position as at 31 May **2023**.	
(ii) Reconcile the actual profit per the Statement of Profit or loss and other comprehensive income with the management reports for the year ended 31 May **2023**.	
• *Assume an absorption profit of R1 530 966 721.*	
• *Labour is treated as a variable cost.*	

(i) T-shirts inventory balance (R value)

Production volume	313 000	
Sales volume	311 000	
Closing inventory	**2 000**	½ r

Description	Calc	R per box	
Fabric	R1 574 390'/ 313'	5 030,00	½ r*
Dye	R98 000'/ 313'	313, 10	½ r*
Labour	R38 500' / 313'	123,00	½ r*
	R5 466,10 [1 745 690' - 34 800') /313'] R5 577, 28 is wrong as FC is included [1 745 690' /313']		*Alt for *1½ r*
FOH rate	FOH allocation Rate per unit (R34 800' /310') or (R58 per hour x 1,94hrs per box) Rate per hour: 34 800' /600' Hours per box: 600'/310')	112,26	½ r
Total production cost		**5 578,36**	
Closing inventory	2 000 x 5 578,36	**11 156 720,60**	½ c

Total 3

(ii) Reconciliation Absorption vs Variable

	R	
Profit on an absorption costing basis 31 May **2023**	1 530 966 721	1r Given
Fixed cost element included in closing inventory for absorption costing: *R112,26 x 2 000* *(R58 x 1,94hrs) part a*	(224 520)	**FC element** NOT Volume variance Allow rounding diff but Must be reasonable *1c for FOH rate x Closing inventory*
Profit on a variable costing basis 31 May **2023**	1 530 742 201	1c variable cost profit must be less and must relate to FC

Total 3

Alternative

Variable costing:

Description	R	R	
Absorption costing profit		**1 530 966 721**	1r *Given*
Sales	3 265 500 000,00		
Variable COS	**(1 699 957 795,53)**		
Fabric	1 564 330 000,00		1c
Dye	97 373 801,92		
Direct labour	38 253 993,61		
Fixed manufacturing costs	(34 800 000,00)		
Variable profit		**1 530 742 204,47**	1c *variable cost profit must be less and must relate to FC*

(b)	Critically evaluate Ihembe's **actual** performance based on the Statement of Profit or Loss and other comprehensive income for the financial year ended 31 May **2023** compared to the **2023 budget**. Use the following headings for your discussion:		
	vi) Sales;	3	
	vii) Raw material (fabric and dye);	7	
	viii) Direct labour;	3	
	ix) Fixed production cost; and	3	
	x) Closing inventory (T-shirt boxes).	2	
	• *Your discussion should include **calculations** and **amounts**.*		
	• *Your discussion should include **errors** made by Mr Madlala.*		
	• ***Do not** reperform "the extract".*		
	• ***Do not** perform standard costing variances.*		18

Communication skills – logical argument	*1*	**19**

Correct comment on performance	Marks
i) Sales	
1. Actual sales price per box increased with R1 500 (of R10 500 exceeding the budgeted R9 000 per box) and the sales volume did not decline (as would be expected due to price elasticity) but increased with 1 000 boxes.	1d ↑ SP R1 500 more 1d ↑ SQ 1 000 more
2. Actual total sales volume and price outperformed its budget. This indicates that there was an **increased demand /increased market share** of 1 000 boxes and that the products are **not as price elastic** as Mr Madlala indicated.	1d ↑demand/ ↑ market share/ effective marketing 1d **not** very elastic
	SUBTOTAL 4 MAX 3

ii) Raw material	
3.1 **Fabric** actual total purchase cost was **incorrectly** included as Cost of sales even though not all boxes were sold as there are 2 000 boxes in closing inventory (part a). COS fabric should relate to sales volume and amount to **R1 564 330**' [1 574 390/313' X 311']	1r R1 564 330* *ALT* 2 000 closing inventory*
3.2 The production manager spent **R7,45** per meter *(R25 vs R32,45)* more on fabric than budgeted. 3.3 [1 574 390/(313' x 155m)]=R32,45	1 r overspent ½d **R7,45** per meter *Or (R25 vs R32,45)*
3.3 This increased cost is due to the **improved quality** of fabric that could also give rise to the **increased sales demand** as confirmed by customer satisfaction survey.	1d ↑quality ↑demand
3.4 Comparing increased Sales value of **R475 500**' to increased Fabric cost of **R359 127,25**' to determine that the increased quality did lead to actual increased profit of R116 372,75' • *Increased Sales value by* R475 500' • *Increased fabric cost = R7,45x 155m x 311' = (R359 127,25'*) • *Increased profit =* R116 372,75'	1d ↑profit given ↑ R475 500' 1r (R359 127,25') 1c R116 372,75'
3.5 The new fabric requires **5 meters more input** thus 5 m **more wastage /"off-cuts"** per box due to different dimensions of the new suppliers fabric rolls.	1d ↑ off-cuts **5 m**
3.6 **Inefficiencies** machine operations and settings and labourers relating to more wastage/ "off-cuts" should be investigated.	1d ↑ inefficiencies
3.7 Therefore the budget should have followed an ex post variance analysis (been **adjusted** or flexed**)** to reflect the **permanent change of input quantity**.	1d ex post variance analysis/ flexed for permanent change
	SUBTOTAL 9

4.1 **Dye** total purchase cost of R98 000 000 was included even though not all boxes were sold as there are 2 000 boxes in closing inventory (part a). COS Dye should therefore be **R97 373,80**' [98 000'/313' X 311'] based on sales volume.	1 r R97 373,80' * *ALT* 2 000 closing inventory*
4.2 **Normal wastage remained unchanged** thus **no inefficiencies** relating to Dye machine or labourers operating the Dye machine. The increased cost of Dye therefore does **not** relate to **handling** inefficiencies but to increased cost of Dye.	1d **no handling** inefficiencies (no abnormal wastage)
4.3 Increased Dye purchase cost of R98 000 000 **relates to the change of dimensions of the new fabric rolls** *Or* As there was more fabric input required (155 m actual vs 150m budgeted with more cut-off) **more dye would be used and purchased**.	1d **increased dye** purchase cost due to new fabric roll dimensions and cut-offs
4.4 Therefore the budget should have followed an ex post variance analysis (been **adjusted** or flexed**)** to reflect the **inflation, electricity and diesel** that lead to increased Dye cost prices.	1d ex post variance analysis/ flexed for permanent change
4.5 Increased cost could also indicate improved Dye quality (R3,13 actual Vs R2,80 per t-shirt).	1d ↑ quality ½ r R3,13
	SUBTOTAL 5 ½
	Subtotal 14 ½ / MAX 7

iii) Direct labour	
5.1 Closing inventory allocation should be deducted, and the total 2023 COS labour is therefore **R38 253,99'** [R38 500 000/313 000 x 311 000]	1 r R38 253,99' * *ALT* 2 000 closing inventory*
5.2 The actual labour rate per hour was R35 [R38 500 000/1 100 000 hours) which equalled the budgeted labour rate per hour of **R35.**	1r Price unchanged at R35
5.3 The budgeted **labour hours** per box was 3,15 thus in total 985 950 total labour hours were expected (313 000 x 3,15). The labourers had spent **114 050** additional **inefficient hours** [1 100 000- 985 950] indicating poor performance. Or **3,5** more inefficient hours per box [1 100 000/313 000]	1r 114 050 ↑ *or* *3,5 ↑ hours per box additional* 1d inefficient hours
	SUBTOTAL 4/*MAX 3*

iv) Fixed production cost	

6.1 FOH Allocation Rate per hour = **R58,00**
    [R34 800 000,00/ 600 000 hours]
6.2 Allocated fixed manufacturing overhead = **R35 136 774,19**
    [605 806,45 hours XR58,00]
	½ r R58,00 FOH rate
	½ r 605 806,45 hours
	½ r 35 163 774,19 allocated

6.3 As the total actual and budgeted FOH are the same R34 800 000 there is **no expenditure** variance.	1d **no** expenditure variance.
6.4 The production manager and team were able to operate the **machine efficiently** and an additional 5 806,45 hours were worked and an allocated additional FOH cost therefore a favourable volume variance of R336 774,19 was achieved. FOH favourable volume variance = **R336 774,10** [5 806,45 XR58,00] or [35 136 774 – 34 800 000]	1d ↑ machine efficient as it worked more hours 1r **R336 774,10** Favourable FOH volume variance
6.5 Additional machine hours could lead to additional maintenance cost and time or otherwise the risk of machine break-down increases.	1d ↑ machine maintenance cost
	SUBTOTAL 5½/MAX 3

v) Closing inventory (T-shirt boxes)	
7.1 There are 2 000 T-shirt boxes on hand at year-end that should be deducted from cost of sales with a value of R11 156 720,60 (part a). The total production costs relating to 313 000 boxes should not be included in Cost of sales only the sales quantity boxes of 311 000 should be reflected as production costs are carried over to 2024 year in closing inventory.	1d Ihembe did not account for closing inventory which would have carried production cost over to the 2024 period.
7.2 As T-shirts are standard and sold in bulk and has a long product lifetime it is **unlikely** that the increase in production volume resulting in closing inventory would lead to **obsolete inventory/** *Or obsolete due to rapid changes in the fashion industry*	1d not obsolete/ obsolete
7.3 Inventory holding cost for 2000 boxes is still not too high/ but it is more than budgeted.	1d inventory holding cost
7.4 Opening inventory allows for inventory to be immediately available and enhance customer satisfaction.	1d available inventory
	SUBTOTAL 2/MAX 2

MAX 18
Com 1
Total 19

(c)	You were requested to assist with the following for the 2024 financial year:		
	(i)	Assist Ms Gani by calculating the labour cost for the **2024** financial year to reflect its nature.	3	
	(ii)	Discuss and conclude if **scrunchies** should be treated as joint or by-products.	3	6

(i) **Labour (high-low cost)**
Total cost = (Variable cost x Units produced) + Fixed costs

Step 1: Determine Variable cost per unit

=   Cost at highest activity level – Cost at lowest activity level
      Units produced at highest activity level – units produced at lowest activity level

Labour (Using High-low method):

High-low method	Prod volume	Total cost (R)
Lowest level #	300 000	R38 200 000
Highest level #	350 000	R39 800 000
Difference	**50 000**	**1 600 000**
	½ r	½ r

Variable portion cost per box	R	
R 1 600 000 / 50 000	**32,00**	1
		r

Step 2: Determine fixed cost
Fixed costs = Total cost - (Variable cost x Units produced)

Fixed cost
= 38 200 000 - (300 000X R32) *½ c*
= 38 200 000 – 9 600 000
= 28 600 000   *½ c don't mix levels*
Alternative
= 39 800 000 - (350 000X R32) ½ c
= 39 800 000 - 11 200 000
= 28 600 000   ½ c don't mix levels

Total 3

(ii) **Scrunchies** should treated as joint or a by-products.

⚠ **NOTE:** The significance of **Total sales value** (Quantity times price per unit) **R14 400 000** derived from scrunchies should be discussed and not the price per unit of R8.

Should **NOT** conclude or discuss Joint product criteria.

A by-product is a secondary unit produced in a joint production process. Its production is incidental, i.e. there was no explicit intention to produce the by-product. It has little value in relation to the main product.   (Leaning purpose)

1.	The scrunchies production results from **off-cut** and is **incidental** to the production of T-shirts.	1d off-cut = incidental
2.	The **total sales value of R14 400 000** (1 800 000 x R8) derived from scrunchies production is 0,4% **insignificant / minor relative** to the T-shirt 2023 sales value of R3 265 500 000.	1d minor total sales value 1r (0,4%) Or R14 400'
3.	**Conclusion:** Given the above points, scrunchy production does not meet the criteria of a joint-product and hence should be treated as a **by-product.**	1d by-product

Total 4/ max 3

(d)	Calculate the budgeted break-even number of boxes per T-shirt type ("plain" or "printed").	8	
	• *Ignore the sales from scrunchies.* • *Assume fixed and variable costs correctly reflect the nature of labour costs.*		
	Communication skills – layout and structure	*1*	9

Communication skills – layout and structure	

Step 1: Total Fixed costs

Fixed costs	R	
Fixed manufacturing overheads **-plain** [215 x 256 000]	55 040 000	
Fixed manufacturing overheads -**printed** [235 x 64 000]	15 040 000	
Total	**70 080 000**	1r	Do NOT split FC

Subtotal FOH 1

Step 2: Contribution per box

Contribution per box	Plain R			Printed R	
Contribution	5 260	½ r		6 300	½ r

Subtotal CI 1

⚠️ Must use **BUDGETED** sales volume to determine sales **mix ratio**

Step 3: Weighted average contribution per box:

= (5 260 x **80%)**   + (R6 300 x **20%) or** **= (5 260 x 256 000/320 000)**   + (R6 300 x 64 000/320 000)**
= 4 208   **(1)c**   + 1 260   **(1)c** must use budget sales Q   must use budget sales Q
= R5 468 per box

Weighted Average 2

Alt 2 - Weighted average contribution = Total contribution / Total shirts

= [(5 260 x 256 000) + (R6 300 x 64 000)] / 320 000
= [R1 346 560' (1)c# + R403 200' (1)c#] / 320 000
= R1 749 760' or #2c for the total / 320 000
= R5 468 per box

Weighted Average 2

Alt 3 - Batch approach: Weighted average contribution per batch

Ratio of visitors per batch: Child : Adult Pool : Adult Non-Pool

                   256 000: 64 000

                   (256k / 64k) : (64k / 64k)

                     4 : 1 (Total = 5)

Contribution per batch = (4 x R5 260) + (1 x R6 300)

                         = R21 040 (1) c + R6 300 (1) c

                         *= **R27 340***

Weighted Average 2

Step 4: Break-even – total number of boxes:

  Break-even = Fixed cost / **Weighted** average contribution per box

= 70 080 000/ R5 468
= **12 816,39**   (1)c NOT two BE points

BE 1

Alt 2: Break-even = (Fixed cost / Total contribution) x Total budgeted sales unit
= *(**70 080 000**/ R1 749 760') x 320 000*
= *0,040 x 320 000*
= *12 816 (1)c NOT two BE points allow for rounding diff*

BE 1

Alt 3: Break-even: Number of batches
Break-even = Total fixed cost / contribution per batch
= *70 080 000/ R27 340*
= *2 563,28 batches (1)c NOT two BE points*

BE 1

⚠️ Always show rounding! **MUST round UP to break-even.**

Step 5: Break-even number of boxes per product:
Plain = 12 816,38 x 80%
= 10 253,10   (1)c must use budget sales Q and be reasonable
= **10 254** boxes (½)c round **up**
Printed = 12 577 x 20%
= 2 563   (1)c must use budget sales Q and be reasonable
= **2 564** boxes (½)c round **up**

Split 3

  Alt 2: Batches split

= 2 563,28 x 4 plain batches : 2 563,28 x 1 printed
*= 10 253,12 plan (1c) : **2 563,28** (1c)   printed*
= 10 254 Plain ½ c (rounded UP) : 2 564 Printed ½ c (rounded UP)

Split   3

TOTAL 8

TEST 2 topics (2021 test 4) : SPIRARA FARMERS   **40 marks**

Spirara Farmers Pty (Ltd), (**SF**), have been in the farming business for over 3 years. SF supplies medicinal herbs, grown on their 20 hectare farm, to natural medicine companies and produce homeopathic remedies (natural medicinal herb mixtures) for human use. During the beginning of 2020 the company created two autonomous operational divisions (**Homeopathy and Farming**) with each division being a profit centre. The company was classified as an essential service during the COVID-19 lockdown periods in 2020 and 2021 and operations continued. SF has a 30 September financial year end.

Homeopathy division

The division produces a natural herbal mixture called "Chipi", which treats fevers, coughs and flu. The product is sold in 50g sachets to pharmacies.

Chipi requires the precise mixture of raw materials to enable the highest levels of product efficacy. The mixing of the herbs is done by hand, in batches of 200g, and the division has developed the following standards for 200g of its Chipi product:

Standard variable manufacturing cost per 200g of Chipi:

Raw materials	Notes	
Ashi - 120 grams (dry)	1	R96,00
Nthwela @ R500/kg	1	R40,00
Labour	2	R40,00
Variable overheads	3	?

Notes:

1. Ashi raw material is sourced internally, from the farming division.
   Nthwela raw material (mixture of herbs) is sourced from an external company. Homeopathy does not keep raw materials inventory, and all raw materials are recorded at actual cost.
2. To produce 200g of Chipi 38 minutes and 24 seconds clock hours are required, and the company has agreed to pay an hourly rate of R62,50 per clock hour. Direct labour cost is considered variable and a 75% productivity rate on the direct labour is considered normal taking into account labour laws.
3. The division absorbs variable overheads at R124 per productive direct labour hour.
4. The COVID-19 impact was projected to affect the economy for the next 24 months, and this was one of the underlying assumptions when preparing the current budget (due to staff availability even though operations will continue due to being an essential service).

The following **actual results** was reported for the **month** of June 2021:

Ashi materials purchased	34kg at R800 per kg
Nthwela materials	21kg was purchased at R10 500
Chipi (50g sachets)	1 070 sachets were actually produced
Direct labour	200 labour hours were clocked but only 160 hrs at a standard hourly rate of R62,50 was paid to the employees. The 160hrs are productive hours.
Actual variable overhead	R12 000

The Homeopathy division sold 1 000 sachets of Chipi for the month of June 2021, in line with monthly budgeted sales target (spread evenly over 12 months). The Homeopathy division's director has forced the employees to accept 160 hours for the calculation of the June salary payments, and wants the accountant to show this as a favourable labour variance for the next directors' meeting. All employees are employed permanently and have recently been complaining about this unfair treatment for 6 months.

The Homeopathy division's director argues that the current standard costs are not relevant and should be revised based on the following:

- The impact of COVID-19 was unpredictable and does not seem to be factored in the budget;
- The budget did not take into account the raw material price increases resulting from the shortage of supply caused by COVID-19 restrictions and demands;
- Due to COVID-19 and lockdowns, employees experienced low morale resulting in lower productivity which was not incorporated in the budgets.

Farming Division

The Farming division specialises in the primary agricultural farming of medicinal herbs.

The director of the Farming Division has just signed a two-month fixed price contract to supply a maximum of 120kg per month of wet Ashi (being a flexible supply contract with a minimum delivery of 50kg) to a pharmacy chain in South Africa. The contract starts in the next month and will fully utilise all the capacity of the Farming division for the next two months.

Monthly Ashi farming budget applicable for the next 2-months:

Farm variable cost per 5kg (wet)	R230,00
Farm fixed costs for 125kg (wet)	R46 000
Herb drying costs per 1kg (wet)	R5,00
Expected external revenue based on current demand	R65 000
Maximum monthly capacity (wet)	125 kg

To get an acceptable dry Ashi product, wet Ashi must lose 20% of its weight during the drying process.

The farming sector for herbs is dominated by small farm owners with an average size of 60ha of farmland. Many of the farm owners have more than 10 years of medicinal herbs farming experience. There are five farming businesses owned by big pharmacy chains in the country. According to company policy, internal demands must be met first.

REQUIRED		Marks	
		Sub-total	**Total**

(a)	Prepare the following information for the Homeopathy division for the monthly directors' meeting:
	    i. Direct material mix and yield variance
	    ii. Variable overhead efficiency variance
	Communication skills – layout and structure
		9
		3
		1
			13

(b)	Provide **a report** to the directors on matters related to standard costing and the results of June 2021. The report should address the following issues:
	
	    i. Discuss possible reasons for the direct materials variances, calculated in part (a) (i) above.
	    ii. Analyse the issues the director raised regarding the relevance of the current standard costs. Advise if the current standards should be revised.
	Communication skills – logical argument
		4
		
		4
		1
			9

(c)	Discuss the issues to consider on the decision taken by the director of the homeopathy division regarding payment of labour hours.	4	4
(d)	Critically discuss the pricing strategy that should be undertaken by the Farming division to remain relevant in the herbal medicinal market.	4	4
(e)	Calculate the minimum transfer price **per kg of dry Ashi** product that would be acceptable to the Farming division during the two-month contractual period.	10	10
TOTAL			**40**

TEST 2 topics (2021 test 4) : SPIRARA FARMERS SOLUTION   **40 marks**

(a)	Prepare the following information for the Homeopathy division for the monthly directors' meeting:
	   i. Direct material mix and yield variance
	   ii. Variable overheads efficiency variance
	   Communication skills – layout and structure
		9
		
		3
		1
			13

Communication skills :(using proper headings and showing F/A/U on variance calc)   (1)

i.   Material mix variances

	Actual issued in actual mix (kg)	Actual input in std mix (kg)	Variance (kg)	Std price/kg R	Variance R
1) Ashi (55 x **120 /200**)	34	**33**	(1)	800.00*	(800) A
2) Nthwela (55 x (**80 /200**)	21	**22**	1	500.00	500 F
	55	55			300 A

*Ashi standard price per kg = (R96.00/120g) x 1000g

Yield variances

	Actual input in std mix (kg)	Std qty for actual production (Expected input)	Variance (kg)	Std price R	Variance R	
3) Ashi (1 070 x 0.120kg/4)	33	**32.1**	(0.9)	800.00	(720) A	(½)c
4) Nthwela (1 070 x 0.08kg/4)	22	**21.4**	(0.6)	500.00	(300) A	(½)c
	55	53.4			(1 020) A	
	(½) c (carry over)	(2) r		(½) r		

                                                                          Total   4

Alternative 1:
5)   *Actual input*   55 kg
6)   *Expected output (55kg/50g)*   **1 100**   (1) r
7)   *Actual output (given)*   1 070
8)   *Yield variance sachets (1 100 – 1 070)*   **(30)**   (1) c
9)   *Yield variance (R) (30 x R34* /50g sachet (*Calc*   **R1 020 A**   (1) c
       1)
*Calc 1: *Standard material mix and price per sachet:*
10)   *= R96 + R40 =* **R136/4 = R34 per sachet**
                                                                             (1) r
                                                                  Total   4

Alternative 2:
11)   *Actual output*   1 070
12)   *Expected input (1 070 x 50g)*   **53.5 kg**   (1) r
13)   *Actual input*   55 kg
14)   *Yield variance kg (negative) (55 – 53.5)*   **1.5 kg**   (1) c
15)   *Yield variance (1.5kg x R680 /kg (**Calc 2))*   **R1 020 A**   (1) c

16)   ****Calc 2:** *Weighted average price = R136/0.200kg=* **R680 /kg**   (1) r

                                                                  Total   4

ii.   Variable efficiency variance

> *This is when students have interpreted efficiency variance as implying the overall efficiency: (expected productive hrs given actual clock hrs – std productive hrs) x std rate/productive labour-hr*

Using productive hrs

	Expected productive hours given actual clocked hours	Expected productive hours given actual production	Variance (hrs)	Std price/productive hr	Variance R
Efficiency [(1070 x 38.4**)/(60min x 4pks)] x 75%	150*	128.4	21.6	124	2,678.40 A

*200hrs x 75% = 150
** 38 min + (24/60) = 38.4 min/4 = 9.6min/sachet (50g)

> *This is when students have interpreted efficiency variance as implying the overall efficiency: (actual clock hrs – std clock hrs) x std rate/clock labour-hr*

Alternative (using clock hours)

	Actual clock hours	Expected clock hours given actual production	Variance (hrs)	Std price/ clock hr	Variance R
Efficiency (1070 x 38.4**)/(60min x 4pks)	200	171,2	28,8	93	2 678,40 A

R124 x 75% = R93

> *This is when students have interpreted efficiency the new efficiency after considering idle: (expected clock hrs given actual productive hrs – std clock hrs) x std rate/clock labour-hr*

If considered idle variance: (using clock hours)

	Expected clock hours given actual productive hours	Expected clock hours given actual production	Variance (hrs)	Std price/ clock hr	Variance R
Efficiency (1070 x 38.4**)/(60min x 4pks)	21.33*	171,2	42,13*	93	3 918,40 A

R124 x 75% = R93
160hrs/75%

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This is when students have interpreted efficiency the new efficiency after considering idle:
(actual productive hrs – std productive hrs) x std rate/productive labour-hr

</div>

If considered idle variance: (using productive hours)

	Actual productive hours	*Expected productive hours given actual production*	*Variance (hrs)*	*Std price/ clock hr*	*Variance R*
Efficiency [(1070 x 38.4**)/(60min x 4pks)] x 75%	*160*	**128,4**	*31,6*	**124**	**3 918,40 A**

(b)	Provide **a report** to the directors on matters related to standard costing and the results of June 2021. The report should address the following issues:		
	iii. Discuss reasons for the reported materials variances, calculated in part (a)(i) above.	*4*	
	iv. Analyse the issues the director raised regarding the relevance of the current standard costs and advise on whether to revise the current standards.	*4*	
	Communication skills – logical argument	*1*	*9*

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Communication skills :(discussion applied to the scenario)   [1]

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(i) ***Points with reference to student's calculation results in part (a)***

Mix variance: (points with reference to students calculation results in part a)	
1. The correct raw material mix of 60% Ashi and 40% of Nthwela was not adhered to. More (61.8%) of Ashi and less (38.2) of Nthwela was used compared to budget,	1d
2. which would imply the **actual product efficacy would be reduced**.	1d
3. This may be linked to **a lack of proper skills/incompetent staff members/ lack of care/** or	1d
4. **lack of supervision** or	1d
5. it might be because of the **disagreements between the director and employees** on hours and payment, hence employees experienced low morale resulting in lower productivity	1d
6. MAX (mix)	3
7. Yield variance	
8. Overall, for all raw materials more material than expected was used by the division. This represents an **abnormal waste for the** division. May be caused **by lack of proper equipment/facility/gears for employees to maintain the quality of the herbs**. Herbs must be kept dry and avoid excessive moisture.	1d
9. The **quality of raw materials could be inferior**, which could have necessitated more raw materials needed from the suppliers and discarding the others.	1d
MAX (yield)	2
AVAILABLE	8
MAX	4

(ii)

The standards are based on **assumptions about the future.** Drury: "Standard costs are predetermined costs; they are target costs that should be incurred under efficient operating conditions."	Learning purpose
The **standards need to be reviewed and revised (constantly)** to ensure that they remain relevant, when information proving otherwise emerges.	Learning purpose
IAS 2 allows for inventory to be held at standard if standards approximates actual.	Learning purpose
Revision of standards:	
1. *Actual results due to unpredictable Covid 19 effects may cause actual not to approximate standard and either the standards should be revised, or Inventory should be accounted for at actual.*	1d
a. <u>First statement - Unpredictable impact of COVID-19:</u> 2. The **current budget and standards were set with a full knowledge** of the COVID-19 pandemic and its impact. The planning was done in the middle of the lockdown period and with clear information on what it entails.	1d
3. *As management will not be able to be held accountable for changes due to unpredictable changes caused by COVID 19 the standards should be revised to incorporate new standards.*	1d
a. <u>Second statement – **Price increases**</u>: 4. Looking at the actual price per kilogram of Ashi R800 and Nthwela **(R10 500/21kg = R500/kg)** it is the same as the planned price (Standard prices of Ashi (R96/0.120kg = **R800**)), this indicating the relevance of assumptions made during planning.	½ **(for R500)** ½ **(for R800)**
5. Therefore, there was no price increase as indicated by the director and the standards do not require revision.	1d
a. <u>Third statement – **Employee morale and productivity:**</u> 6. The budgets were set 4 months into lockdown measures due to COVID; **the low staff morale could have been missed and the impact may have been undermined**.	1d
7. Given the information on **complaints by employees**, the **reduced level of employee productivity, may be is due to the unfair labour practice** adopted by the director.	1d
8. Management are responsible for the decline in staff morale and labour efficiency and should be held accountable for these variances caused by lower morale due to forced reduction of staff salaries.	1d
a. <u>Conclusion - **Advise**</u>:	
9. Given the above, **a further investigation on labour issues** will need to be conducted and **standards possibly revised**.	1d
10. On **raw material quantity and prices, the standards do not need to be revised.** Standard quantities are restricted by the "precise mixture" optimal mixture requirements and the standard prices are the same as actual as indicated above.	1d
AVAILABLE	**10**
MAX	**4**

(c)	Discuss the issues to consider on the decision taken by the director of the homeopathy division regarding payment of labour hours.	4	4

1.	The company has **signed a contract of employment with its employees to pay clock hours** and at a rate of R62,50 per clock hour **It would be against the terms of contract not to pay clock hours and therefore illegal/ breach of contract**	1d
2.	The company may be **subject to legal action leading to hefty fines/ costs/ compensation.**	1d
3.	The director's approach **would demoralise employees** and **hinder the productivity and loyalty of employees** in the present and future/ Employees experienced low morale resulting in lower productivity	1d
4.	The **behaviour of the director** of going against the agreed terms is **not fair practice and does not uphold ethics code as prescribed by king IV.**	1d
5.	The communication to the accountant, to ensure a **distortion of performance** reporting **further shows lack of integrity and therefore unethical.**	1d
6.	**Staff could also strike/ union actions**, which could cause delays in production.	1d
7.	Consequently, **SF's reputation may be tarnished**, resulting in **customer boycotts.**	1d
	AVAILABLE	7
	MAX	4

(d)	Critically discuss the pricing strategy that should be undertaken by the Farming division to remain relevant in the herbal medicinal market.	*4*	*4*

1.	Internally transferring at R800/kg (dry) or (R800/80%) wet = R1000/kg compared to R620/kg external selling price, thus external selling at a discount.	1d
2.	**Spirara Farmers (SF) is new market entrant** (3 years) relative to the industry and the existing competitors.	1d
3.	The company farms on a smaller piece of land relative to other market participants**,** therefore **smaller** (20ha vs 60ha) **market share**	1d
4.	**Major buyers in the sector own farming entities**. These farming entities, therefore, **have leverage and influence in the industry**.	1d
5.	The above discussed points indicate that SF still needs to **penetrate** the market and therefore may have to **charge lower prices**.	1d
6.	Also mentioned above is an indication that SF is **not a price setter** but rather a **price taker**, given its perceived market share.	1d
7.	The company **could utilise cost reduction/management techniques such as target costing**, given their price taker position in the market.	1d
8.	Current transfer price does not seem fair as the farming division is transferring at selling price that is higher than the external selling price.	1d
9.	The transfer price should be negotiated between farming and homeopathy division.	
	AVAILABLE	8
	MAX	4

(e)	Calculate the minimum transfer price per kg of dry Ashi product that would be acceptable to the Farming division during the two-month contractual period.	*10*	10

Minimum price = incremental cost (i.e. variable cost + any increase in 'cash' fixed cost) + opportunity cost (i.e. contribution lost on sacrificed external sales)

Determine if opportunity cost is applicable (i.e. will there be sacrificed external sales):

		Kg (wet)	*Alternative 1* Kg (Wet x 2 months)	
1)	Maximum capacity – given	125	250	
2)	Internal demand (1000 x 30g)/80%	(37.5)	(75)	2
3)	Available capacity for External sales	87.5	175	
4)	Less Expected contract sales (given)	(120)	(240)	½ r
5)	Shortage (sacrificed external sales)	(32.5)	(65)	½ c
6)	The available capacity of 87.5kg is sufficient to meet the minimum contract requirements of 50kg.			1d

120g/4 = 30g per sachet

Alternative2: Capacity calculation (dry)

		Alternative 2: Kg (dry)	
1)	*Maximum capacity (125kg x 80%)*	100	½ r
2)	*Internal demand (1000 x 30g)*	(30)	1½
3)	*Available capacity for External sales*	70	
4)	*Less Expected contract sales (120kg x 80%)*	(96)	1 r
5)	*Shortage (sacrificed external sales)*	(26)	½ c
6)	*Converted to wet equivalent (26/80%)*	(32.5)	

120g/4 = 30g per sachet

Calc 1:

Contribution from external sales:

		R/kg (wet)	
1)	Selling price – (R65 000/125kg)	520,00	½ r
2)	Less: Variable costs (R230/5kg)	(46,00)	½ r
3)	Contribution	474,00	

Alternative 1: Contribution from external sales: (dry)

		R/kg (dry)	
1)	*Selling price – (R65 000/125kg)/80%*	650,00	1 r
2)	*Less: Variable costs (R230/5kg)/80%*	(57,50)	1 r
3)	*Contribution*	592,50	

Minimum transfer price per kg of dry Ashi:

		R per kg	*Alternative 1*	*Alternative 2*	
			Total per month (x37.5)	*Total x 2 months (x 75)*	
1)	Incremental cost per kg (wet)	46,00	*1 725,00*	*3 450,00*	1 c
2)	Drying cost	5,00	*187,00*	*374,00*	1 r
3)	Lost Contribution((R474 (Calc 1) x 32.5)/37.5)	410.80	*15 405,00*	*30 810,00*	2 c
4)	Relevant cost per kg (wet)	461,80	*17 317,50*	*34 635,00*	
5)	Relevant cost per kg (dry) [R461.8/80%]	577,25	*21 646,88*	*43 293.75*	1c
6)	Total/37,5kg/75kg		*577,25*	*577,25*	

Alternative 3: Minimum transfer price per kg of dry Ashi:

	R per kg	
1) Incremental cost per kg (dry)	*57,50*	*1 c (use variable cost)*
2) Drying cost – (R5/80%)	*6,25*	*1½ r*
3) Lost Contribution((R592,5 (Calc 1) x 26)/30)	*513,50*	*2 c*
4) Minimum per kg (dry)	*577,25*	

Available   10
Maximum   10

TEST 2 topics (2022 test 4): WEMOVE   **40 marks**

WeMove (Pty) Ltd ("WeMove") is a South African based private company that offers inter-province and holiday transport services. The company started operating in 2018 by offering shuttle services for both daily inter-province travel and customised holiday travel for groups. Customers for both daily and holiday shuttles need to pre-book and make payments online beforehand. WeMove has the necessary public licences and relevant approvals required to operate these shuttles on their designated routes. All shuttle drivers are adequately licenced, permanently employed and earn a salary only. Efficient shuttle drivers with the necessary licencing are readily available in the market. WeMove uses the direct costing system and has a December financial year-end.

DAILY INTER-PROVINCE SHUTTLE SERVICES (TAXI DIVISION):

The daily inter-province shuttle services operate on three routes, namely:

- Route 1 – Mpumalanga <> Gauteng
- Route 2 – Limpopo <> Gauteng
- Route 3 – Mpumalanga <> Limpopo

WeMove uses 14-passenger seater Quantum minibuses ("Quantum(s)") pulling luggage trailers for its daily routes and are all company-owned. A luggage trailer is always used for daily route trips. Currently the company owns 8 Quantums with trailers. Each Quantum and its trailer have a company logo, along with the company's name and details. The routes have been allocated to available Quantums as follows: Route 1 – three Quantums; Route 2 - three Quantums and Route 3 – two Quantums. Each route has its dedicated support staff to manage and oversee the online booking system. Unfortunately, Quantums cannot be transferred between routes due to licencing issues (licencing requirements are different for each route).

The budgeted information per **one-way trip** for the 2022 financial year for the **inter-province shuttles** are as follows:

Item	Route 1	Route 2	Route 3
Price **per passenger** per trip	R460	R480	R500
Total trips per route per day (route mix)	3	1	2
Contribution per trip[1]	R5 315	R5 661	R6 120

The above information is based on all shuttles operating for 30 days per month and at maximum passenger capacity per trip.

[1] The costs included in calculating the contribution include fuel costs, toll fees and variable administration costs for managing bookings.

Actual management report extract for the month of March 2022:

The inter-province shuttles operated for 30 days on all routes.

Item	Route 1	Route 2	Route 3
Total one-way trips for the month	360	240	144
Average number of passengers per one-way trip	14	10	6
Route specific fixed costs for the month[1]	R1 622 220	R950 000	R540 000
Variable costs per one-way trip	R1 275	R1 020	R567
Contribution per trip	R5 809	R4 500	R2 583

[1]R287 780 of the total actual fixed costs for the month are common fixed costs (i.e. not route specific) and thus not included above.

HOLIDAY SHUTTLES (TOURS DIVISION):

The holiday shuttles provide customised tours for various sightseeing trips in the Mpumalanga region. WeMove owns three Hyundai H-1 12-seater minibuses that it uses as tour shuttles. None of these shuttles have trailers or are branded. The shuttles are driven by WeMove drivers at all times and never by the customers. During the holiday season, these shuttles are in high demand but have never travelled more than 20 000km per shuttle per year. At an average, the Tours Division makes 20 trips per year per shuttle and earns a contribution of R5 500 per trip, per shuttle for the foreseeable future.

INCREASED DEMAND FOR DAILY INTER-PROVINCE SHUTTLES:

In the past two financial years (2020 and 2021), WeMove has gained great popularity and has seen increased demand within the Taxi Division, especially on Route 1. This increase resulted from the discontinuation of bus services on the routes by major bus companies due to losses incurred during the COVID-19 lockdown. The bus companies were major competitors to WeMove. Another reason for the increase in demand is the health and safety features, such as sanitisers, mask-wearing, and ventilation, that WeMove offer its travellers which are not offered by other public transport service providers. Finally, the predictability of the shuttles allows travellers to plan with a higher degree of certainty as opposed to other public transport, thus increasing its popularity.

WeMove needs two additional 14-passenger seater vehicles to fulfil the increased demand for Route 1.

Converting two of the H-1 12-seaters to 14-seater minibuses

Management is considering taking two of the 12-seater Hyundai H-1s and permanently re-assigning them to Route 1 (inter-province shuttle services) for the remainder of their useful lives. These two minibuses were bought 3 years ago at R650 000 each. WeMove depreciates all its vehicles at 20% per annum on a straight-line basis. At the end of their useful lives, inter-province shuttles and holiday shuttles are sold at R45 000 each and R60 000 each, respectively.

Management would like to add two extra seats in each of these Hyundai H-1s to provide extra capacity. The following relate to additional cost information:

Consultation for adding of seats	WeMove consulted with Hyundai International on the possibility of adding seats to their current 12-seater H1s. Hyundai International charged a consultation fee of USD300 to analyse this option. The consultation results were that WeMove would be able to add the extra foldable seats in the luggage space. The consultation fee will only be paid at the end of the month when the Rand:USD exchange rate is expected to be R14,62 = USD1.
Adding extra seats	It will cost R2 500 for the preparation and installation of one seat.
Trailers	Each trailer will be bought for R15 000.
Branding	WeMove uses an external company to do the branding. The branding company charges a flat fee on branding material of R500 per vehicles and R300 per trailer. In addition, a labour fee of R50 per hour is charged for the actual branding of the vehicles and trailers. It takes 2 hours to brand each vehicle and 30 minutes to brand each trailer.
Licencing and roadworthy testing	Since the use of the Hyundai H1s will now be for the daily transportation of passengers, a licencing fee with the taxi association of R2 600 per vehicle will have to be paid. In addition, a once-off cost of R2 500 per vehicle will have to be paid for SABS* approval. Thereafter, the normal annual roadworthy test applicable to all public transport vehicles will be performed for R1 000 per vehicle.
Maintenance	WeMove currently services the H1s at 20 000 km interval for R7 000. The cost per maintenance is not expected to change. It is estimated that each H1 will drive approximately 40 000 km per year.
Driver fees	The current drivers of the H1s are permanent employees and earn a salary of R7 500 per month, like the inter-province drivers.

*South African Bureau of Standards

Licencing of converted H1's

Due to the backlog caused by the COVID-19 restrictions, the next available bookings for initial roadworthy tests are only four months from now. In addition, the Department of Transport (DoT) is also experiencing a backlog with vehicle licences due to a short supply of paper for printing licence disks. Therefore, management is concerned that this option might not be immediately attainable since they may have to wait a long time before obtaining these licence disks for the shuttles.

The operations manager of WeMove, Ms Fiki, who is a qualified chartered accountant CA(SA), has suggested that they use her "contact" at the DoT to get ahead of the queues. She mentioned that her "contact" could ensure that the two converted shuttles get roadworthy certificates without being tested. Her contact will only require a "small gift", but she believes that the gift is a small price to pay for the company's advantage. She is quoted as saying: "the public transport industry is not for the faint-hearted. Without the proper *"contacts", a company will never operate. So, in my mind, it is simply business as usual."*

	REQUIRED	MARKS	
		Sub-total	**Total**
(a)	Calculate the Taxi Division's revenue margin mix variance per route and in total for March 2022.	7	**7**
(b)	Calculate the **actual** break-even trips for the Taxi Division for the month of **March 2022.**	6	**6**
(c)	Considering the increased demand for daily inter-province shuttles, draft an email to WeMove management wherein you:		
	• Identify, **with reasons**, the key limited resource in the Taxi Division. (*Limit your analysis to the information provided in the scenario.*)	2	
	• Briefly explain the steps they would have to follow in allocating this limited resource to maximise company profits.	2	
	In answering this question only, assume that: (i) no new vehicles will be purchased and (ii) management decided against converting the two shuttles. Communication skills – Layout and structure	*1*	**5**
(d)	Calculate the relevant **costs** *only* of the initial adoption of the option identified by WeMove to increase capacity. *Ignore time value of money.* *Provide brief explanations for amounts excluded in your calculations.*	12	**12**
(e)	Discuss six other key factors (not already included in part d) that WeMove should consider when deciding to convert the H1 12-seaters.	6	**6**
(f)	You are a member of the governing body of WeMove. Discuss your concerns about the suggestion offered by Ms Fiki. *Your discussion should include operational and ethical considerations.*	4	**4**
TOTAL			**40**

TEST 2 topics (2022 test 4): WEMOVE SOLUTION   **40 marks**

(a)	Calculate the Taxi Division's revenue margin mix variance per route and in total for March 2022.	7	7

Routes	Actual trips	Actual trips in standard mix*	Difference	Standard (Budgeted) Contribution	Variance		
Route 1	360	372# (1r)	(12)	R5 315 (½ r)	(R63 780)	Adverse	(½ c)
Route 2	240	124/126# (1r)	116	R5 661(½ r)	R656 676	Favourable	(½ c)
Route 3	144	248/246# (1r)	(104)	R6 120(½ r)	(R636 480)	Adverse	(½ c)
Total	**744**	**744**			**(R43 584)**	**Adverse**	**1c**

* Standard route mix is 3:1:2 for Route 1, Route 2 and Route 3 respectively.
\# 744 (total actual trips)/ 6 x 3 = 372 trips
  744 (total actual trips)/6 x 1 = 124 trips
  744 (total actual trips)/6 x 2 = 248 trips
        OR
\#744 (total actual trips) * 50% (90/180) = 372 trips
  744 (total actual trips) * 17% (30/180) = 126 trips
  744 (total actual trips) * 33% (60/180) = 246 trips

Total: 7 marks

(b)	Calculate the **actual** break-even trips for the Taxi Division for the month of **March 2022.**	6	**6**

	Route 1	Route 2	Route 3		
Actual Contribution	R5 809	R4 500	R2 583	Given	
Mix #	2,5 (½ r)	1,67 (½ r)	1 (½ r)	#	
Weighted Contribution	R14 522,50 (½ c)	R7 515 (½ c)	R2 583 (½ c)	Must use actual contribution	
Total weighted contribution				**R24 620,50**	
Fixed costs	R1 622 220	R950 000	R540 000	R287 780	
Total Fixed costs				**R3 400 000**	**1r**
BE batches	3 400 000/24 620,50 = 138,10 batches				**1 c**
Total trips	138,10 x (2,5 + 1,67 + 1) = 138,10 x 5,17 = 713,98 **(½ c)** Round up ≈ **714 trips (½ c)**				
Alternative: Total trips	138,10 x 2,5 =345,24 ≈ 346	138,10 x 1,67 =230,62 ≈ 231	138,10 x 1 =138,10 ≈ 139	**716 trips**	

% Alternative:

	Route 1	Route 2	Route 3		
Actual Contribution	R5 809	R4 500	R2 583	Given	
Mix #	48,39% (½ r)	32,26% (½ r)	19,35% (½ r)	#	
Weighted Contribution	R2 810,98 (½ c)	R1 451,70 (½ c)	R499,81 (½ c)	Must use actual contribution	
Total weighted contribution				**R4 762,49**	
Fixed costs	R1 622 220	R950 000	R540 000	R287 780	
Total Fixed costs				**R3 400 000**	**1r**
Total trips	3 400 000/4 762,49 = 713,91 trips **(1 c)** Round up ≈ **714 trips (1 c)**				

# Actual Route Mix Batches	
	%
Route 1 = 360/144 = 2,5	Route 1 = 360/744 = 48,39%
Route 2 = 240/144 = 1,67	Route 2 = 240/744 = 32,26%
Route 3 = 144/144 = 1	Route 3 = 144/744 = 19,35%

Maximum: 6 marks
Available: 6 marks

(c)	Considering the increased demand for daily inter-province shuttles, draft an email to WeMove management wherein you:		
	• Identify, **with reasons**, the key limited resource in the Taxi Division. (*Limit your analysis to the information apparent in the scenario.*)	2	
	• Briefly explain the steps they would have to follow in allocating this limited resource to maximise company profits.	2	
	In answering this question only, assume that: (i) no new vehicles will be purchased and (ii) management decided against converting the two minibuses.		
	Communication skills – Layout and structure	1	5

Date: 26 July 2022   **1r layout**
Time: 13:00   **(Date, To, from,**
To: WeMove Management   **subject)**
From: Student
Subject: Limited resources in WeMove

Dear Management,

Thank you for the opportunity to assist in this matter. Below are my inputs on how to identify the limited resources and how to allocate them in order to maximise profits.

-Since the **demand for trips is higher than what WeMove can cater for**, especially in   1r
the **short term**, there exists a limiting factor (number of available Quantums).
-Although, it seems at face value that the company has enough minibuses to meet the   1r
demand, **the inability to transfer these Quantums between routes makes them
limited in the short term**.
-In order to meet this increased demand, **more Quantum minibuses are required**, thus   1r
Quantums are the limiting factor.

                                                                                    Max 2

In order to allocate the Quantums to routes that will maximize profits, management would
have to:
1) Calculate the different **contributions per route per trip**   ½ r
2) Then divide these contributions by the **number of Quantums (limited resources)**   ½ r
allocated to each route - in order to get the contribution per limiting factor
3) Thereafter, **rank the three routes by highest contribution per quantum per trip**   ½ r
(highest to lowest)
4) Finally, **allocate the Quantums to routes based on the above rankings.**   ½ c
                                                                                    Max 2

Please do not hesitate to contact me should you need assistance in performing this
exercise.

Kind regards,
Student

Total: 6 marks
Max: 5 (1 comm, 2 identify and 2 steps)

(d)	Calculate the relevant **costs** *only* of the initial adoption of the option identified by WeMove to increase capacity. *Ignore time value of money.*		
	Provide brief explanations for amounts excluded in your calculations.	12	**12**

Item	Amount	Comment/Workings	
Shuttle purchase cost	0	Sunk cost – already incurred 3 years ago	½d
Depreciation - minibuses	0	Non-cash item	½d
Residual loss	R30 000	R15 000 x 2 shuttles (R60 000 – R45 000 = R15 000)	1r
Consultation fee	0	Sunk cost – already incurred, won't change with decision	½d
Extra seats	R10 000	(2 shuttles x 2 seats = 4 seats) x R2 500 per seat	1r
Trailers	R30 000	2 trailers x 15 000 - 1 trailer per shuttle	1r
Branding -Material	R1 600	R500 X 2 shuttles (1/2 r) + R300 X 2 (1/2 r) trailers	
Branding – Labour	R250	[R50 x 4 HRS (2 HRS per shuttle x 2)] (1r) + [R50 x 1 HRS (30mns per trailer x 2)] (1r)	
Licencing	R5 200	R2 600 per shuttle x 2 shuttles	1r
SABS Approval	R5 000	R2 500 per shuttle x 2 shuttles	1r
Normal annual roadworthy test	0	Committed cost – incurred irrespective of the option. (1000 per vehicle X 2 vehicles = R2 000)	½d
Maintenance – first 20 000km	0	Committed cost – incurred irrespective of the option	½d
Maintenance- Second 20 000km	14 000	Each shuttle will require one extra maintenance per year. (R7 000 x 2)	1r
Support staff bookings	0	Committed cost – incurred irrespective of the option.	½d
Lost contribution	R440 000	R5 500 x 20 trips x 2 busses x 2 years	1r
Driver fees	0	Committed cost - Permanent employees, paid regardless of this option – won't change with decision	½d

| Total relevant costs | **R536 050** | | 1c |

Available Marks: 14,5 marks
Maximum: 12

(e)	Discuss six other key factors (not already included in part d) that WeMove should consider when deciding to convert the H1 12-seaters.	6	**6**

1.	- Will the **drivers need training** since they will now operate inter-province routes? - possible delay in realising gains and **possible training costs.**	1r
2.	- This option will likely **decrease the idle time of the H1 drivers** under the holiday Tour Division.	1r
3.	- Is the **increased demand sustainable**- what will happen now that COVID seems to have subsided? Or what if the bus lines reopen these routes?	1r
4.	- Consider that the **wear and tear of the H1's is now accelerated**, from doing less frequent holiday routes to doing daily trips. These might need to be replaced sooner than initially anticipated.	1r
5.	- Annual **maintenance costs will increase, due to increase trave**l - will the income generated be sufficient to cover these extra costs?	1r
6.	- Will the **extra seats** installed provide travellers sufficient comfort, not **compromising the quality of travel** for clients?	1r
7.	- How will the reconfiguration of the shuttles affect the **insurance costs** - must also be factored in the breakeven analysis.	1r
8.	- This option also **increases annual costs** in the form of **annual roadworthy tests.**	1r
9.	- How will **customer loyalty** be impacted if, during holiday months, customers are **not able to get a shuttle**? Will they move to competitors?	1r
10.	- It might take a **while before the company obtains licences** allowing the company to operate the H1's as commuter vehicles.	1r
11.	- The increased capacity will assist in **decreasing the trips per day per minibus, thus decreasing future maintenance costs for the current Quantums.**	1r
12.	How will the H1 drivers feel about the change in the working condition, e.g. driving long distance daily trips as opposed to the occasional holiday trips based only in Mpumalanga.	1r
13.	- Other valid point	1r

Total available: 13 marks
Max: 6

TEST 2 topics (2023 test 4): STINA   **40 marks**

Stina Limited is a manufacturer and supplier of bricks, clay and coal used across a broad spectrum of applications within the low-cost housing and residential markets as well as in commercial and civil engineering projects. The group is located in Nigel, Gauteng and has a July financial year end. It operates through two segments:

1) Bricks department: Plant 1 and Plant 2 (As part of Stina Limited)
2) Coal and Clay: Ilahlssa Investments (Pty) Ltd (Ilahla), a wholly owned subsidiary.

Stina has two clay brick manufacturing plants with a combined production capacity of 160 million bricks per annum. These plants produce clay face bricks (face) as well as stock bricks for the construction industry. Ilahla has a mining capacity of approximately 800 000 tonnes of clay and 300 000 tonnes of coal per annum.

The group's impact on the community is further enhanced through the employment of 628 staff members. Value creation in Stina's business model remains vested in its ability to maintain consistent quality through experience and its upward diversification through investment. This ensures sustainability (volume and input costs) of raw material supplied and coal used in the burning of kilns for the baking of bricks. The location of the clay and coal reserves are in close proximity to the clay brick manufacturing plants which further enhances synergies in the Group.

Bricks Manufacturing

Stina uses the same manufacturing process and manufacturing plants for both the face and stock bricks. The clay and sand are mixed thoroughly and then water is added gradually until the mixture reaches the desired consistency for the face bricks. For stock bricks, lime, iron oxide and magnesia are also added to the mixture. The mixture is then formed into the shape of a brick and allowed to dry and harden before being baked in kilns (ovens) for two days using coal.

Both types of bricks are **only sold in pallets** of 7 500 bricks each. The 2024 financial year budgeted information per standard brick **pallet** is as follows:

Material	Face bricks	Stock bricks	Cost
Clay	1 875 kg	750 kg	R4,50 per kg
Sand	525 kg	1 425 kg	R0,75 per kg
Lime	N/A	150 kg	R0,495 per kg
Iron oxide and magnesia	N/A	150 kg	R13,50 per kg
Selling price **per pallet**	R3 250	R2 700	

Additional Information:

	Face bricks	Stock bricks
Budgeted sales (**bricks**)	63 million	84.6 million

The average consumption of coal used for the baking process for each pallet of face and stock bricks is 8 tonnes of coal. Stina sources all their required clay and coal from Ilahla and sales and production occur evenly throughout the year.

July production report

The actual production report for the month of July 2023 reflected the following:

	Face bricks	Stock bricks	Cost
Units produced - **pallets**	740 **pallets**	890 **pallets**	
Total clay used	1 392 **tonnes**	682.5 **tonnes**	R4,00 per **kg**
Total sand used	367.5 **tonnes**	758.3 **tonnes**	R0,85 per **kg**
Total lime used	N/A	45.5 **tonnes**	R120 per **kg**
Total iron oxide and magnesia used	N/A	30.3 **tonnes**	R15 per **kg**

Stina Delivery

Stina only delivers large orders (20 pallets or more) within Gauteng at R6 000 per delivery charged to the customer. All other orders must be collected by the customer. Stina expects that large orders from sales of both brick types would amount to 6 000 deliveries covering 120 000 kilometres for the 2024 financial year.

Stina outsources the delivery function to a logistics company, since specialised vehicles are required for loading and transporting of large orders. The following are details of the contract:

- The contract is valid for 5 years. (Stina entered the contract on 1 August 2021.)
- An initial contract fee of R600 000 was paid at the beginning the contract.
- Stina is charged an annual fixed fee of R1 000 000 irrespective of the number of deliveries made.
- A fee of R3 000 per order and R120 per kilometre travelled, from Stina to the customer's delivery address, is charged to Stina on each delivery made.
- A penalty of R25 000 per month will be levied for the remaining term of the contract for early termination.

Hamba Logistics

The Board of Directors are considering acquiring 100% shareholding of a logistic company, Hamba Logistics Pty (Ltd) (Hamba), effective 1 August 2023. Hamba primarily operates in South Africa and mainly services short to medium distance routes in Gauteng, North West, Mpumalanga and Limpopo with a large fleet of specialised vehicles. The company can service an equivalent of 15 000 large orders from Stina. The following details relates to the potential acquisition:

- Purchase price of Hamba is estimated at R5 000 000.
- The directors indicated that they would limit the operations to Gauteng and North West upon acquisition.
- The annual administration costs would be reduced to R500 000 per annum, since 90% of Hamba's admin staff would be retrenched, as Stina staff has capacity to take over the administrative function for the reduced service area.
- Other annual fixed costs would amount to R1 500 000.
- The delivery cost is R80 per kilometre.
- The acquisition would reduce the delivery price charged to customers by 30% per delivery.
- Hamba would also service Ilahla, should there be spare capacity.
- Should the purchase of Hamba proceed the contract with the current delivery contractor will be cancelled

Ilahla Investments

Ilahla sells their mined clay and coal to the bricks departments of Stina and to the external market. The current market price for clay and coal is R6 955 and R2 900 per tonne respectively. The delivery cost for clay is R1 000 per tonne and R500 per tonne for coal.

Ilahla supplies all clay and coal requirements for the bricks departments first before supplying to the external market. Ilahla's current external market share for coal is 200 000 tonnes per annum.

The costs to mine and sell a tonne of coal are as follows:

Cost Element	Amount
Variable production cost	R850
Variable selling and transportation costs – external market	R500
Fixed production costs	R600
Fixed non-production costs	R370

	REQUIRED	MARKS	
	NOTE: All your responses to the required should be in tonnes and not in kilograms	Sub-total	Total
(a)	Calculate the yield variance, in Rands, of **Stock bricks** for the month ending 31 July 2023.	9	**9**
(b)	Advise the management of Stina Limited, supported by detailed calculations (for one year only), on whether they should continue outsourcing the delivery function or proceed to acquire Hamba Logistics Pty (Ltd). Indicate reasons for all amounts deemed irrelevant. *Do not consider any qualitative factors, base your advice on calculations only.* *Communication skills – layout and structure*	8 1	**9**
(c)	Briefly discuss **two** positive and **two** negative key qualitative strategic factors that Stina needs to consider before making the decision to acquire Hamba.	4	**4**
(d)	Calculate the minimum and maximum transfer price **per tonne of coal** that Ilahla would have considered when establishing a transfer price to Stina.	12	**12**
(e)	Using the minimum transfer price calculated in (d), discuss whether the transfer price policy would benefit or disadvantage the Group as a whole. *Communication skills – logical argument*	5 1	**6**
	TOTAL		**40**

TEST 2 topics (2023 test 4): STINA SOLUTION   **40 marks**

(a)	Calculate the yield variance, in Rands, of **Stock bricks** for the month ending 30 June 2023.	*9*	**9**

Standard output per pallet:

Material	Quantity	Amount
Clay	0,75 ton	R3 375 (R4,50 X 750kg) **(½ r)**
Sand	1,425 ton	R1 068,75 (R0,75 x 1 425kg) **(½ r)**
Lime	0,15 ton	R74,25 (R0,495 x 150kg) **(½ r)**
Iron oxide and magnesia	0,15 ton	R2 025 (R13,50 x 150kg) **(½ r)**
Total	**2, 475 tons (1r)**	**R6 543 (1p)**

Therefore, output ratio is 2,475:1

> For using standard prices and not actual price

Expected yield:
Actual Input = 682,5 + 758,3 + 45,5 + 30,3 = 1 516,6 ton
Input per pallet yield = 2,475 tons
Expected yield = 1 516,6/2,475
        612,77 pallets (1 r)
Rounded down =   **612 pallets (½ r)**
Actual output =(890) pallets (given) **(½ r)**
Variance =   **(278) F pallets (1c)**
Variance in Rands = 278 x R6 543 = **R1 818 954 (1c)**

Alternative 1
Actual Input = 682,5 + 758,3 + 45,5 + 30,3 = 1 516,6 ton)**(1r)**

	Act std mix	Budget	Difference	Std Price R	Variance R
Clay	459.58 ½ c	667.5 ½ r	207.92	4 500	935 659.09 F ½ c
Sand	873.19 ½ c	1 268.25 ½ r	395.06	750	296 292.05 F ½ c
Lime	91.92 ½ c	133.5 ½ r	41.58	495.00	20 584.50 F ½ c
IO & M	91.92 ½ c	133.5 ½ r	41.58	13 500.00	56 395.45 F ½ c
	1 516.60	**2 202.75**	**686.15**	**1 r**	**1 813 931.09 F 1 c**

> Must have attempted to calculate the standard mix for 1 516.60 and not have used actual quantities.

> Must use standard price for all materials.

Max 9 marks

(b)	Advise the management of Stina Limited, supported by detailed calculations, on whether they should continue outsourcing the delivery function or proceed to acquire Hamba Pty (Ltd) and perform the delivery internally. Indicate reasons for irrelevant amounts. *Do not consider any qualitative factors, base your advice on calculations only.* *Communication: Layout and structure*	*8* *1*	**9**

> Communication Mark for table layout, separating the two options or clearly applying the incremental approach. No mark if mixed approaches.

Item	Calculation	Outsourcing R'000	Acquire Hamba R'000	Alt Incremental (Acquire) R'000
Delivery Income	(R6 000 x 6 000) (R6 000 x70% x 6 000)	(R36 000) **(½ r)**	(R25 200) **(½ r)**	R10 800 **(1r)**
Initial contract fee	Sunk cost **(½ d)**	R0	R0	R0
Annual fee	Given	R1 000**(½ r)**	R0	(R1 000) **(½ r)**
Delivery costs – fixed per delivery	(R3 000 x 6 000)	R18 000**(½ r)**	R0	(R18 000) **(½ r)**
Delivery costs – per KM	(R120 x 120 000km) (R80 x 120 000km)	R14 400**(½ r)**	R9 600**(½ r)**	(R4 800) **(1r)**
Penalty fees	(R25 000 x 36 months **(½ r)**)		R900**(½ c)**	R900**(½ c)**
Hamba purchase price	Given		R5 000 **(½ r)**	R5 000**(½ r)**
Annual admin costs	Given		R500 **(½ r)**	R500 **(½ r)**
Annual fixed costs	Given		R1 500 **(½ r)**	R1 500 **(½ r)**
Net profit		**R2 600 (½ c)**	**R7 700 (½ c)**	**R5 100 (1c)**

Advice:

Stina should acquire Hamba (Pty) Ltd as this would increase their profits. **(1c)**
Max 9 marks

(c)	Briefly discuss two positive and two negative key qualitative strategic factors that Stina needs to consider before making the decision to acquire Hamba.	*4*	**4**

Positive factors	
1. The investment in Hamba may offer necessary diversification . Stina group can expand into the logistics industry.	**(1d)**
2. Hamba may have excess capacity of 3 000 kilometres. This may be used to further assist Ilahla and thus benefit the group.	**(1d)**
3. Acquiring Hamba will provide Stina group the opportunity to expand the market into other provinces.	**(1d)**

Negative factors	
4. Stina group should consider how reducing the staff of Hamba will impact on their overall community engagement outlook.	**(1d)**
5. Limiting the routes means that most truck drivers would also be retrenched. How will this affect Stina's reputation	**(1d)**
6. Diversifying into the transport business may have challenges that Stina is not familiar with such as labour unions, traffic laws and other regulations within the logistic space.	**(1d)**
7. Other valid point (positive/negative)	**Max (1d)**

Avail: 5 marks
Max 4 marks

(d)	Calculate the minimum and maximum transfer price that Ilahla would have considered when establishing a transfer price to Stina.	12	**12**

⚠️ **Minimum price = incremental cost   +   opportunity cost**
(variable cost + any increase in fixed cost) + (contribution lost on sacrificed external sales)

Step 1: Determine if opportunity cost is applicable *(will there be __sacrificed__ external sales):*

	Tons
Maximum capacity – given	300 000
Internal demand (8t x 19 680* pallets) – ***8t must be correct**.	(157 440) **(1c)**
Available for external demand	**142 560**
External demand – given	(200 000) **(1r)**
Shortage (sacrificed external sales)	**(57 440) (1c)**

> Must be 8t and not simply multiplying by 7 500 bricks.

*Total number of pallets for the year: 63 000 000 face clay bricks + 84 600 000 stock bricks = 147 600 000 bricks/7 500 bricks per pallet = 19 680 pallets **(1r)**

Step 2: Determine Contribution

	R per ton
Selling price given	2 900
Variable cost – given (R850 **(½ r)** + 500 **(½ r)**)	(1 350)
Contribution	**1 550 (1c)**

> Must subtract only VC. No FC

Step 3: Determine minimum transfer price

	R
Variable production cost per ton	850 **(1r)**
Lost contribution ⚠️ Each of the **157 440 internally transferred tons** should be **allocated a portion of the total lost contribution.** = 57 440 x R1 550 = R89 032 000 **(1c)** = R89 032 000/ 157 440 =R565,50 **(1c)**	565,50
Minimum transfer price per ton	**1 415,50 (1c)**

> Must include variable costs **plus** lost contribution.

> ⚠️ **Maximum price = Market price – selling and transport costs**

Maximum = R2 900 (given) - R500 (given) **(1r)** = R2 400 **(1c)**

(e)	Using your calculated minimum transfer price, discuss whether the transfer price policy would benefit or disadvantage the Stina Group as a whole. *Communication: Logical argument*	5 1	6

> **Communication Mark for clearly articulating their thoughts**

1.	The minimum transfer price **compensates Ilahla for their lost contribution** on sales transferred to Stina, allowing Ilahla to **at least indifferent in terms of contribution margin.**	**(1d)**
2.	This price will ensure that Ilahla **produces at their maximum capacity** and thus resulting in **optimal operations.**	**(1d)**
3.	On the other hand, Stina benefits **from procuring coal at a less than market value amount.**	**(1d)**
4.	The decreased costs will enable Stina **to lower their external sales price of bricks and thus gain a higher market share.**	**(1d)**
5.	Stina currently has spare capacity (160m bricks – 147.6m = 12.4m bricks)	**(1d)**
6.	The higher market share would in turn result in **increased profitability.**	**(1d)**
7.	Although Ilahla might not achieve higher profits from the sacrificed tons of coal, it would be **better to focus on the market share of bricks** than to fulfil the coal market share as bricks is the **main product of Stina.**	**(1d)**
8.	Therefore, the minimum transfer price would **be advantageous** to the Stina Group as a whole.	**(1d)**
9.	Any other valid point	**(1d)**

Avail: 9 marks
Max 6 marks

MANAGEMENT ACCOUNTING GLOSSARY

Backflush costing: a simplified cost-accounting system in which all manufacturing costs are charged directly to Cost of Goods Sold, and then end-of-period adjustments are made to credit Cost of Goods Sold and debit the respective inventory accounts.

Cost object: anything which we want to know the cost of.

Direct cost: all costs that can be specifically and exclusively identified with a cost object.

Indirect cost: costs that can't be specifically and exclusively identified with a cost object.

Product cost: those costs that are identified with the product produced and are included in the inventory valuation.

Period cost: those costs that do not form part of the cost of the product and are thus not included in the inventory valuation. They are treated as expenses in the period that they were incurred.

Variable cost: a cost which varies in direct proportion to the level of activity.

Fixed cost: a cost which within certain output or revenue limits, tends to be unaffected by fluctuations in the levels of activity (output or revenue).

Semi- variable cost: costs that have both a fixed and variable component.

Mixed cost: See semi-variable cost.

Semi-fixed cost: fixed costs that increase in fixed increments once certain limits are exceeded.

Step-fixed cost: see semi-fixed cost.

Relevant costs and revenues: are those future costs and revenues that will be affected by the decision being taken. All relevant costs/revenues should be considered in management decision making.

Irrelevant costs and revenues: those that won't be affected (remain unaltered) by the decision.

Sunk cost: costs created by a decision made in the past and cannot be changed by a decision to be made in the future. It is money already spent that can't be recovered.

Committed cost: costs created by a decision made in the past, or a contract concluded in the past and cannot be changed by a decision to be made in the future. Although the money may only be spent in the future, the entity cannot legally refuse to pay.

Opportunity cost: the value of the benefit sacrificed when one course of action is chosen instead of the best alternative one. It represents the loss of a benefit that was unavoidable because another option/course of action was chosen.
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Incremental costs or revenues: the difference in total cost or revenue between alternatives; calculated to assist decision-making.

Differential costs or revenues: See incremental costs.

Marginal costs or revenue: the additional cost or revenue of one additional unit of output.

Limiting factor: any factor that is in scarce supply and that stops the organisation from expanding its activities further, that is, it limits the organisation's activities.

Cost allocation: the process of assigning costs to a product when a direct measure does not exist for the quantity of resources consumed by that product.

Allocation base: basis that is used to allocate costs to cost objects.

Cost driver: See allocation base.

Blanket overhead rate: the single overhead rate that is calculated for the organisation as a whole.

Volume variance: This occurs when the allocation base used to allocate overheads is different from the budgeted and actual activity.

Standard costs: predetermined target costs that should be incurred under efficient operating conditions.

Normal loss: losses that occur under efficient operating conditions and are unavoidable.

Abnormal loss: losses that are not expected to occur under efficient operation conditions.

Equivalent production: In process costing, when you convert the work-in-progress units into finished equivalents so that you can calculate a unit cost.

FIFO (First-in-first-out): a method of inventory valuation where you assume that the first item received in inventory will be the first item to be issued.

LIFO (Last-in-first-out): a method of inventory valuation where you assume that the last item received in inventory will be the first item to be issued. Cannot be used for GAAP valuations.

Joint product: When a group of products are produced at the same time and each product has a significant relative sales value. It only becomes distinguishable after the split-off point.

Flexed budget: a budget that is reconstituted after accommodating a change in sales and production volumes.

By-products: products that are part of a simultaneous production process which have a small sales value in comparison to joint products. It's production is incidental.

Absorption costing: a costing method that allocates all manufacturing costs (including fixed production overheads) to the cost of the product.

Variable costing: a costing method that only traces variable manufacturing costs to the cost of the product.

Direct costing: See variable costing.

Marginal costing: See variable costing.

Contribution: Sales less all variable costs

Normal average long-run capacity: a measure of the capacity required to satisfy average customer demand for the duration of several years. This takes into consideration seasonal and cyclical demands and increasing or decreasing trends in demand.

Break-even point: the sales volume point where neither a profit or a loss is made, i.e. profit = 0 or where all fixed costs are recovered.

Margin of safety: the difference between the expected level of sales and the break-even sales level.

High-low method: a mathematical technique used to separate mixed costs into their fixed and variable components.

Outsourcing: the process of obtaining goods or services from outside suppliers instead of producing the same goods or providing the same services within the organisation.

Cost-plus pricing: when a selling price is determined by adding an appropriate percentage mark-up to the estimated cost.

Target costing: when the cost price is determined by subtracting the standard or desired profit margin from the target selling price.

Standard deviation: the measure of the dispersion of a probability distribution.

Probability distribution: is the list of all possible outcomes of an event and the probability that each will occur.

Budgeting: concerned with the implementation of a long-term planning target for the year ahead.

Long-term plan: a statement of the preliminary targets and activities required by an organisation to achieve its strategic plans with a broad estimate of the resources required.

Return on investment (ROI): measures how a firm uses its capital to generate a profit.

Residual income (RI): an approach to measuring an investment centre's performance. It is the net operating income that an investment centre earns above the minimum required return on its operating assets.

Economic value added (EVA): a measure of a company's financial performance based on the residual wealth, calculated by deducting the cost of capital from its operating profit (adjusted for taxes on a cash basis).

Controllable investment: used to refer to the net asset base that is controllable by divisional managers.

Controllable contribution: total divisional revenues less all costs that are controlled by the divisional manager, excluding allocated costs from Head Office.

Transfer pricing: refer to the prices set on goods or services transferred between two departments or subsidiaries of a company. A transfer price is therefore the price which a receiving division will pay for the internal transfer of inventory or products by a supplying division.

Regression equation: identifies an estimated relationship between a dependant variable (cost) and one or more independent variables (i.e. an activity measure or cost driver) based on past observations.

Correlation coefficient (costing): measures the degree of association (or correlation) between the dependent and the independent variable.

Linear programming: a mathematical technique that can be applied to the problem of rationing limited facilities and resources among many alternative uses in such a way that the optimum benefits can be derived from their utilisation. It seeks to find a feasible combination of output that will maximise minimize the objective function.

Objective function: the quantification (in a mathematical function/formula) of an objective, for example: maximizing profits or minimising costs.

Inflation: a sustained, rapid increase in prices, as measured by some broad index (such as Consumer Price Index) over months or years, and mirrored in the correspondingly decreasing purchasing power of the currency.

Economic order quantity (EOQ): is used to determine the optimal length of production runs or the size of material orders. The objective is to determine how many units must be produced per production run, or how many units of inventory must be ordered per order.

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METRIC UNITS OF MEASUREMENT

Linear Measure (Length)

1 centimetre (cm)	= 10 millimetres (mm)
1 metre (m)	= 100 centimetres (cm)
1 metre (m)	= 1 000 millimetres
1 kilometre (km)	= 1 000 metres
1 millimetre (mm) = 0,1 centimetre (cm) (÷ 10)	1 cm = 10 mm (x 10)
1 centimetre (cm) = 0,01 metre (m) (÷ 100)	1 m = 100 cm (x 100)
1 metre (m) = 0,001 kilometres (km) (÷ 1 000)	1 km = 1 000 m (x 1 000)

Liquid Volume Measure

1 litre (l)	= 1 000 millilitres
1 kilolitre (kl)	= 1 000 litres

1 millilitre (ml) = 0,001 litre (l) (÷ 1 000)	1 l = 1 000 ml (x 1 000)
1 litre = 0,001 kilolitre (÷ 1 000)	1 kilolitre = 1 000 l (x 1 000)

Weight

1 gram (g)	= 1 000 milligrams
1 kilogram (kg)	= 1 000 grams
1 metric ton (t)	= 1 000 kilograms

1 gram (g) = 0,001 kilogram (kg) (÷ 1 000)	1 kg = 1 000 g (x 1 000)
1 kilogram (kg) = 0,001 (metric) ton (÷ 1 000)	1 ton = 1 000 kg (x 1 000)

Time

1 millisecond = 0,001 second
1 minute = 60 seconds
1 hour = 60 minutes
15 minutes = 0,25 hour (¼ hour)
30 minutes = 0,5 hour (½ hour)
45 minutes = 0,75 hour (¾ hour)
1 day = 24 hours
1 week = 7 days
1 year = 12 months
1 quarter = 3 months
1 decade = 10 years
1 century = 100 years
1 millennium = 1 000 years

When writing numerals, use the space as thousand separator, i.e. after every THREE numbers

                                                123 456 789.00
Write neatly in columns to avoid adding errors   987 654 321.00