

Essential Insight – Practical Guide Unit 3 Accounting and Finance Year 12 ATAR

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<p>Resource Hub Link: https://www.eibooks.com.au/acf</p> <ul style="list-style-type: none"> • Worked solutions to all questions. • Learning and Teaching Resources that align with book chapters. • SCSA Syllabus categorised to align with book chapters. • Current Sponsorship Opportunities • Community Partnership Opportunities • + Much more 	
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Accounting and Finance has components which are theoretically focused, and others which are primarily practically focused with some supporting theory. The table below breaks down what each textbook includes and how these can be used.

Textbook	This textbook includes:	This textbook is useful for:
Course Guide	<ul style="list-style-type: none"> • Theory for the theory-focused chapters of the course. • Student review questions for the theory focused chapters to assist student mastery of theory and useful for revision prior to assessments. • Key summary information from the practically focused chapters. <p>Note: Elaborated step-by-step explanation of practical chapters with practical review questions are included in the Practical Guide.</p>	<ul style="list-style-type: none"> • Student learning and teaching of theory chapters with practice questions. • Revising both theory and practical chapters when completing practice questions or revising prior to assessments. <p>Note: This textbook is similar in nature to a revision guide for the entire course, but it is also adequate for the learning and teaching of the theory chapters.</p>
Practical Guide	<ul style="list-style-type: none"> • All practical and theory for practical-focused chapters. • Step-by-step worked examples and practice questions to scaffold students from initial concept attainment to exam level. <p>Note: Chapters which are primarily theory-focused are included in the Course Guide.</p>	<ul style="list-style-type: none"> • Student learning and teaching of practical content-adjacent to relevant theory. • Student practice of practical chapters.
Exam Guide	<ul style="list-style-type: none"> • SCSA Year 12 exams categorised to match the chapters of the course and practical guides. 	<ul style="list-style-type: none"> • Student practice of exam questions at the end of all chapters of the textbook and prior to assessments.

These textbooks have been written succinctly whilst also covering all necessary content and skills required from initial concept attainment to exam level. The thorough nature of this book provides confidence that this resource contains all skills and content needed to achieve top ATAR results. The succinct nature of these textbooks is designed to assist with reducing barriers for all students. This succinct nature should also allow students to spend less time taking notes and more time applying higher order skills to gain mastery.

There are several research tasks throughout the textbooks that allow students to develop research skills and the ability to decipher paragraphs of text to apply relevant skills. These can also be adapted to be used as assessment project tasks.

A PDF copy of the textbook is available for teachers for use of projecting the textbook during class. If interested, please contact the email address on the Resource Hub linked on this cover page.

Chapters	
Unit 3	Unit 4
1. Introduction to Management and Financial Accounting 2. Internal and External Audit 3. Internal Control and Asset Management 4. Insolvency 5. Sources of Finance 6. Investment Options 7. Corporate Social Responsibility (CSR) 8. Cost Accounting 9. Cost-Volume-Profit Analysis (CVP) 10. Budgets 11. Business Planning 12. Capital Investment	13. Accounting Standards 14. AASB Conceptual Framework for Financial Reporting 15. Companies 16. Regulatory Bodies 17. Corporate Social Disclosure (CSD) 18. Cash Flows 19. Key Performance Indicators (KPIs) 20. Ratios

Chapters highlighted in blue are theory-focused chapters. Chapters highlighted in green are practical-focused chapters.

Foreword from Chartered Accountants Australia & New Zealand To Essential Insight Accounting and Finance Students

What does it mean to be an accountant?

If you're reading this, you already have an aptitude or interest in numbers and problem solving, but accounting careers are about so much more than that.

While the subjects you choose during high school will help you shape your futures, the beauty of accounting is that its relevant to any career you choose.

Accountants are woven throughout the global economy. A career in accounting opens doors in just about every corner of the world, across sectors, industries and businesses of every size.

Indeed, we'd like to tell you that accounting offers you a pathway to turn your passions into a career because it's hard to think of an industry or sector that doesn't have an accountant helping guide the big decisions.

Behind every athlete, every business big or small, every brand you love, every game you lose yourself in, there are financial experts making epic things possible. As an accountant, you're the go-to problem solver, using your money smarts and business skills to help your company or clients reach their goals.

And for the foreseeable future, there's huge demand for accountants. If you're seeking job security, global experiences, excellent earning potential, a dynamic lifestyle, influence, and you thrive on challenges, accounting could be your pathway to a fulfilling, impactful and epic career.

If you're interested in learning more about careers in accounting, we've teamed up with Year 13 to show you there's more to accounting than meets the eye. Visit year13.com.au/academy/business-class to learn more and consider joining our student membership program at cacanz.com/epic-future.

Until we see you in the accounting profession, continue to be passionate about your studies and dream big!

Samantha Wilson FCA
General Manager, CA Program



Why a career in accounting is the ultimate flex



You're at the heart of every business

Behind every athlete, every business big or small, every brand you love, and every game you lose yourself in, there is a financial expert making epic things possible.

As an accountant, you're the go-to problem solver, using your money smarts and business skills to help your company or clients reach their goals. It's about putting together clues to create a plan for the business, looking at the big picture, and coming up with a clever strategy for success.

You can be whatever you want

Accounting can open the door to just about any industry your heart desires. Imagine being the mastermind behind the next big social media sensation, the genius orchestrating live events and music festivals, or a change-maker in a not-for-profit organisation.

Explore exciting fields like sports, entertainment, gaming and tech. You could even roll with big names like Disney, Nike, and YouTube.

The top 10 perks of accounting

- 1. Job security:** You'll always be hot property.
- 2. Awesome earning opportunities:** Live the good life earning the big bucks.
- 3. Travel the world:** With skills as your passport, the world's your oyster.
- 4. Work in any industry:** Pursue your passions.
- 5. Fresh opportunities:** New gigs are always popping up.
- 6. Varied roles:** On the roles buffet, pick your fave flavour.
- 7. Climb high:** Follow the footsteps of big-shot CEOs.
- 8. Earn respect:** This career's got major street cred.
- 9. Transferable skills:** Pack up your skills and take them to any industry you fancy.
- 10. Life-work balance:** Live your best life while enjoying an awesome career.



Unlock a world of opportunities and skills



Accounting is your ticket to freedom

In Australia and New Zealand, accounting is one of the largest professions and is where the cash is at. Grads pull in an average annual salary* of \$60,000. But CA-certified pros? They're cashing in up to \$175,000 (oh yeah!).** The best part? You can work anywhere in the world – in your dream industry.

Less number crunching, more epic

AI's got your back. It's transforming the way modern accountants work. Now you can focus on the exciting stuff – you're a data wizard, insights detective, and strategic mastermind!

Skills that can take you anywhere!

Do you dream of growing a side hustle, becoming an entrepreneur, or a champion for social justice? Accounting skills can make it happen.

- Be a problem-solving pro
- Hone your decision making game
- Polish your people skills
- Level up on logic and fairness
- Be money wise in business and life

* Indicative average only – exact salary will depend on location, industry, and role. Hays Salary Guide FY23/24 Accounting and Finance.

** Data obtained for senior qualified accountants in managerial roles in Queensland, Australia. Hays Salary Guide FY23/24 Accounting and Finance.

TIP: Accounting skills like *problem-solving, negotiation, and analytical thinking, can help you get ahead both in your career and your life.*

Real accountants (CAs) making epic things happen



Meet Amanda Gore CA

Crime Fighter

Founder and Director of The Centre for Global Advancement (C4GA).

- She's a real-life crime fighter based in Kenya.
- Combats wildlife and environmental crime by following money trails.
- Travels globally training authorities to detect and investigate financial crimes.
- Is passionate about helping the planet.



Meet Rishabh Tandon CA

Business Trailblazer

Music Licensing Expert at YouTube.

- He's Aussie-born, and now lives and works in New York City.
- Collaborates with music artists, songwriters, and creators.
- Ensures musicians get rewarded for their creativity.
- Has turned his passion for music and travel into a career.



Meet Rebecca Glover CA

Community Empowerer

Senior Finance Director at World Vision.

- She works for the world's biggest humanitarian organisation.
- Ensures World Vision's resources are put to their best use.
- Finds working in a not-for-profit to be incredibly fulfilling.
- Is driven by her passion to create a brighter, better world.

What's next? Uncover the steps for an epic future

1

Get a head start

There are no prerequisites you need to study in high school. But diving into subjects like business, enterprise studies, accounting, agriculture, maths, technology, economics, and science, can help you get ahead of the game!

2

Explore your interests

Discover the ins and outs of the businesses, brands and causes you're passionate about.

3

Gain practical experience

Ask to do some interning at a local business. Some places take high school students as 'cadets', so you could kick-start your career right from high school.

4

Complete high school

Do your HSC (AU) or NCEA (NZ).

Study accounting

Apply for and complete an undergraduate qualification, such as a Bachelor of Accounting, Bachelor of Business or Commerce with a major in accounting. Or consider an accounting or business diploma from a Polytech or TAFE, or other government-registered higher education provider.

5

6

Start your career

Make epic things happen in an industry you love.

Boost your career

In today's fast-paced world, professionals need an edge, and the CA Program's globally recognised qualification provides exactly that.

7

TIP: Look into programs like the Year13's Virtual Work Experiences to get a taste of the business world and the skills that'll help you succeed.

Top tips from accounting students



Mitchell

"It's remarkable how many CEOs and directors of large companies are Chartered Accountants. Studying accounting can lead you to incredible opportunities."

Bachelor of Business and Accounting student at Monash University, Australia.

"I understand the pressure of making a career choice in high school. Gather as much information as possible to make an informed decision. Attend information nights or networking events. Now's the best time to explore all your options."

Bachelor of Commerce (Accounting and Finance) student at the University of Auckland, New Zealand.



Kjirsti



Benjamin

"With accounting skills you could work in London in a big corporate firm, or stay local and support small businesses. Clarify your goals, dreams and ambitions, then pursue your degree and work hard. When you look up, you'll find you have all you want and more."

Bachelor of Commerce (Accounting and Taxation) student at the University of Canterbury, New Zealand.



TIP: Have questions? Ask us anything or request a school visit from our awesome speaker squad (CAs and accounting students) to share their real-world stories and insights.

How to become Financially Independent and Retire Early (FIRE) for Essential Insight Accounting and Finance Students



Dave Gow, author of Strong Money Australia.

Who am I?

Hi, my name is Dave Gow from Perth, Western Australia. I became financially independent and retired at the age of 28. My partner and I achieved financial independence whilst working regular jobs with yearly incomes of around \$75,000 and without going to university. What allowed us to achieve FIRE was the application of strong, tried and tested, financial principles. Now that I'm financially independent I have the freedom to pursue my passions such as environmental volunteering and helping others learn about how to use their money to create freedom. I do this through my book, blogs and podcasts, and articles written for leading investment platforms.

Tim Coveney, the author of the ACF ATAR book you are reading, told me that many ACF ATAR students are interested in the idea of becoming financially independent and possibly having the option to retire early. Whilst the ACF ATAR course doesn't specifically teach financial independence, studying financial independence will help build your financial literacy skills and be useful personally and professionally. I have created a range of resources to share with you on the following links which will help bridge the gap between what you learn while studying ACF ATAR and FIRE.

Resource links

The below resources are designed to help you start your journey learning about FIRE. You may enjoy discussing these concepts with your teachers, parents and friends.

	Beginner's Guide to FIRE	Strong Money Australia Book
QR Code		
Link	https://strongmoneyaustralia.com/beginners/	https://strongmoneyaustralia.com/book/
Description	Here you'll find everything you need to know about how to start working towards financial independence. Articles, podcasts, Q&A, and free eBooks.	Dave's book shares the complete roadmap to reaching financial independence in Australia. Available in paperback, eBook, and audiobook.

How can learning about FIRE help high school Accounting and Finance ATAR students?

There are many reasons why Accounting and Finance students should prioritise learning about financial independence. Achieving financial independence is not just about earning, it is about managing resources wisely and creating a sustainable financial future. Financial independence is essentially the ability to cover your living expenses without relying on a regular paycheck. By understanding the principles of financial independence students can develop a roadmap to achieve their own financial goals, such as buying a home, starting a business, and maybe even early retirement. This knowledge empowers you to take control of your financial future and make thoughtful decisions that give you more control over your life.

As accounting and finance students, the skillset you develop uniquely positions you to navigate the complexities of personal finance with precision and essential insight.

We all have to navigate the complexities of finance, such as loans, investments, superannuation, and money management. Learning about financial independence and wealth creation equips you with the mental and practical skills to make better financial decisions that align with your goals and avoid costly mistakes.

Understanding personal finance puts you way ahead of the game. You're able to move forward with confidence, and make informed decisions based on the knowledge you've gained. And as you build that strong foundation, you ensure a bright future in an area that most people struggle with. You can spot opportunities, overcome financial hurdles, and move through life with greater certainty.

As future professionals in finance, you may be entrusted to advise others on similar matters. Acquiring expertise in the growing field of financial independence equips you to provide valuable guidance to clients, colleagues, or businesses.

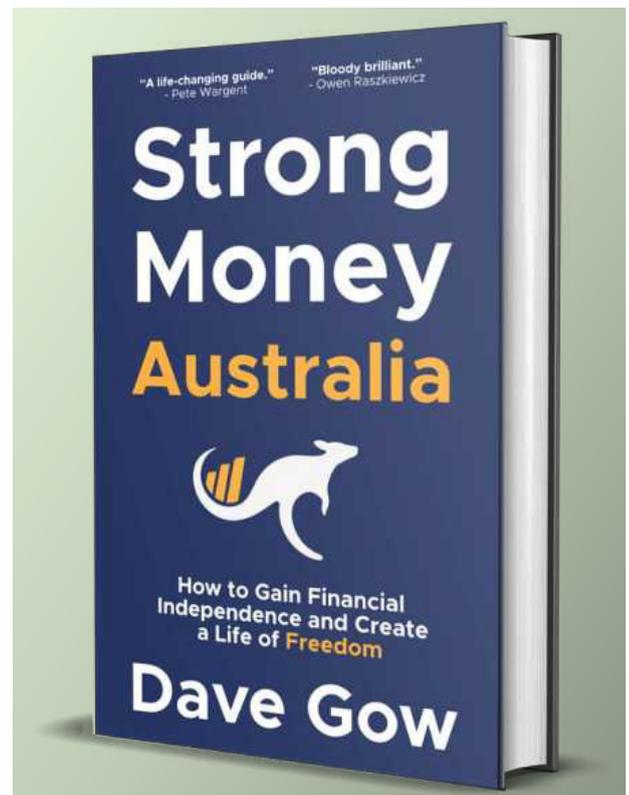
But more than that, pursuing financial independence on a personal level gives you a profound sense of security, enabling you to pursue professional and personal goals with confidence. In essence, Integrating financial independence education into your studies benefits you personally, and also prepares you to be a well-rounded and capable financial professional.

Embrace the journey toward financial independence and let your financial acumen serve as a cornerstone for a secure and fulfilling future.

Wishing you all the best for your future studies,

Dave Gow

Strong Money Australia



Strong Money Australia by Dave Gow.
A book on How to Gain Financial Independence and Create a Life of Freedom.



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Specification Booklet

Practice ACF practical with your specification booklet open where relevant.

Workings

Clearly label all workings to ensure the marker is able to clearly identify the marks you have earned.

Checking answers

After completing questions check your answers so that you can remedy any errors before completing too many questions with the wrong methods.

Using model workings as a guide

It is recommended to have the demonstrated example and solution open during the first question for of each of the practice question sets. This will serve as a reference so you can work backwards from a different solution to find the process needed for the question you are working on. You need to reach a point where you do not need to look at the model answers when completing practice questions. This replicates test conditions. If you still need more practice, potentially re-attempt the questions you have attempted previously once you have attempted all the questions in the problem set. This should help build confidence.

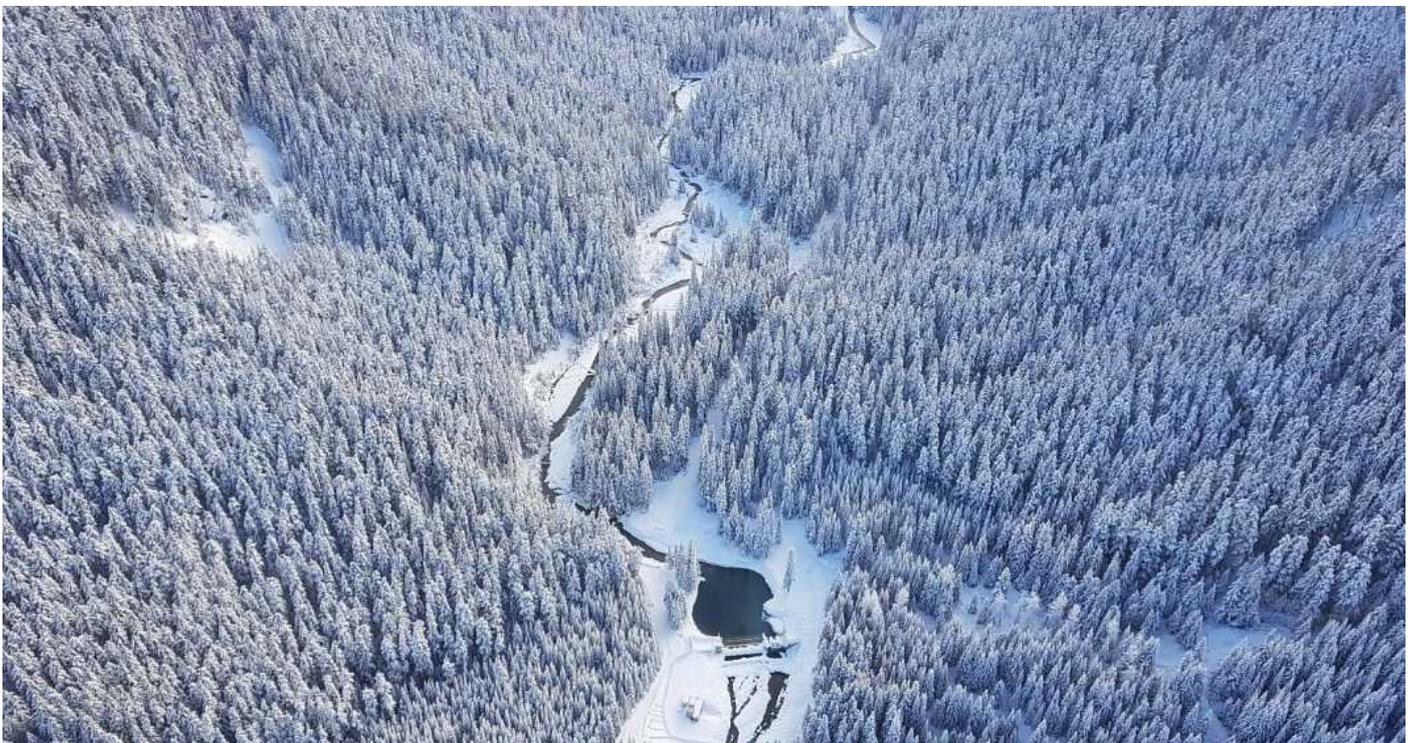
Course Guide

Refer to the Course Guide for support to complete practical questions and revision of theory throughout both theory and practical focused chapters. The Course Guide also teaches the theory focused chapters which are not covered in the Practical Guide.

Exam Guide

At the end of each chapter complete the questions in the Exam Guide to build familiarity and confidence with exam level questions.

Tips



Peak to Peak glass bottom gondola, Whistler, Canada.

Syllabus – Unit 3

Syllabus – Unit 3	
Introduction to Management and Financial Accounting	<p>Financial institutions and systems: Financial systems and fundamental principles</p> <ul style="list-style-type: none"> distinguish between management accounting and financial accounting <p>Recording, using and evaluating financial information: Evaluating financial information for planning, coordinating, controlling and investing</p> <ul style="list-style-type: none"> differences between internal and external reporting, including: <ul style="list-style-type: none"> users: internal and external regulation: accounting standards types of financial statements types of reports the role and function of the accountant in managing business operations
Internal and External Audit	<p><i>Note: External audit is Unit 4 but is included it here given the nature of examination questions to compare 'internal and external audit'.</i></p> <p>Government and the community: The role and influence of governments and other bodies</p> <ul style="list-style-type: none"> the function of the external audit, including: <ul style="list-style-type: none"> protecting external users providing confidence to stakeholders in Australian capital markets the role of the external auditor appointed by the shareholders and reappointed at the annual general meeting (AGM) <ul style="list-style-type: none"> perform an independent audit of the financial statements <p><i>Note: The below syllabus sections are in both 'internal control and asset management' and 'internal and external audit' given the overlap in syllabus but distinctly different content/ examination questions.</i></p> <p>Recording, using and evaluating financial information: Evaluating financial information for planning, coordinating, controlling and investing</p> <ul style="list-style-type: none"> internal audit and control, including: <ul style="list-style-type: none"> purpose of internal audit review of business procedures and policies detection and correction of errors and deficiencies
Internal Control and Asset Management	<p>Financial institutions and systems: Financial systems and fundamental principles</p> <ul style="list-style-type: none"> the important financial principles of asset management <ul style="list-style-type: none"> appropriate levels of investment in non-current assets appropriate management of accounts receivable, inventory and cash appropriate management of short and long term debt appropriate level of equity capital <p><i>Note: The below syllabus sections are in both 'internal control and asset management' and 'internal and external audit' given the overlap in syllabus but distinctly different content/ examination questions.</i></p> <p>Recording, using and evaluating financial information: Evaluating financial information for planning, coordinating, controlling and investing</p> <ul style="list-style-type: none"> internal audit and control, including: <ul style="list-style-type: none"> purpose of internal audit review of business procedures and policies detection and correction of errors and deficiencies <p><i>Note: Internal audit is in a separate chapter but the syllabus point emphasises how these topics are linked.</i></p>
Insolvency	<p>Government and the community: The role and influence of governments and other bodies</p> <ul style="list-style-type: none"> the concept of insolvency as defined by the <i>Corporations Act 2001</i> <ul style="list-style-type: none"> alternative actions for insolvent companies, including: <ul style="list-style-type: none"> voluntary administration liquidation receivership order of priority of the distribution of funds when insolvent
Sources of Finance / Investment Options	<p>Financial institutions and systems: Financial institutions</p> <ul style="list-style-type: none"> role of financial institutions and the management of business finance <ul style="list-style-type: none"> short term: cash management trusts, money market and term deposits long term: shares, debentures, unsecured notes, trusts and term deposits the management of business finance with short term and long term perspectives
Corporate Social Responsibility (CSR)	<p>Government and the community: The influence of social, environmental and ethical factors</p> <ul style="list-style-type: none"> identification of the costs and potential income associated with engaging in socially and environmentally responsible practices the ethical issues encountered in financial dealings between business owners/managers and their employees, clients and investors
Cost Accounting	<p>Financial institutions and systems: Financial systems and fundamental principles</p> <ul style="list-style-type: none"> the nature of cost concepts for materials, labour and overheads classification of cost <ul style="list-style-type: none"> behaviours: fixed, variable and mixed costs relationships to cost objects: direct and indirect costs treatment of costs: product and period time orientation of costs: past and future the concept of mark up and the calculation of the unit price of a product <p>Recording, using and evaluating financial information: Recording, processing and communicating financial information</p> <ul style="list-style-type: none"> cost accounting limited to calculation of the unit price of a product/service using only job order costing processes <ul style="list-style-type: none"> calculation of direct materials, direct labour and overhead costs calculation and application of predetermined overhead recovery rates only using normal capacity calculation of unit cost and the setting of selling/quotation prices for a job costing product/service use of standard costing and variance analysis for: <ul style="list-style-type: none"> materials price and usage labour rate and efficiency

Syllabus – Unit 3

<p>Cost Volume Profit (CVP)</p>	<p>Financial institutions and systems: Financial systems and fundamental principles</p> <ul style="list-style-type: none"> explain the relationship between volume of activity, costs and profit <p>Recording, using and evaluating financial information: Evaluating financial information for planning, coordinating, controlling and investing</p> <ul style="list-style-type: none"> cost-volume-profit (CVP) analysis for decision making purposes <ul style="list-style-type: none"> cost behaviour contribution margin break-even point margin of safety interpretation of CVP results and testing of sensitivity to changing decisions about: <ul style="list-style-type: none"> volumes, product mixes, pricing and costs and the impact of capacity constraints make or buy decisions close down product/business unit decisions accept or reject special orders decisions <p>Recording, using and evaluating financial information: Recording, processing and communicating financial information</p> <ul style="list-style-type: none"> cost-volume-profit (CVP) processing for a single and multi-product (maximum three products) business <ul style="list-style-type: none"> calculation of contribution margin calculation of contribution margin per unit calculation of weighted average contribution per unit calculation of margin of safety calculation of selling price, variable cost, fixed cost, profit or sales volume calculation of break-even point calculation of the effect on profit/loss of make or buy decisions calculation of the effect on profit/loss of closing a department/dropping a segment product decision calculation of the gain or loss on special order decisions
<p>Budgets</p>	<p>Financial institutions and systems: Financial systems and fundamental principles</p> <ul style="list-style-type: none"> the nature and importance of the master budget the components of the master budget <ul style="list-style-type: none"> operating capital expenditure financial <p>Recording, using and evaluating financial information: Evaluating financial information for planning, coordinating, controlling and investing</p> <ul style="list-style-type: none"> purpose and function of cash budgets <ul style="list-style-type: none"> importance of cash to business viability interpretation of cash budgets purpose and function of budgeted income statement interpretation of budgeted income statement difference between cash and accrual performance purpose and function of performance reports interpretation of performance reports for cash budgets and budgeted income statements <p>Recording, using and evaluating financial information: Recording, processing and communicating financial information</p> <ul style="list-style-type: none"> preparation of cash budgets, including debtors' and creditors' schedules preparation of budgeted income statements preparation of performance reports for cash budgets and budgeted income statement <p><i>Note: The below syllabus section is in both 'capital investment' and 'budgets' given the overlap in syllabus but distinctly different content/examination questions.</i></p> <p>Evaluating financial information for planning, coordinating, controlling and investing</p> <ul style="list-style-type: none"> interpretation of capital investment/budgeting techniques to evaluate capital expenditure
<p>Business Planning</p>	<p><i>Note: Some of the below syllabus sections are in both 'business planning' and 'capital investment' given the overlap in syllabus but distinctly different content/ examination questions.</i></p> <p>Recording, using and evaluating financial information: Evaluating financial information for planning, coordinating, controlling and investing</p> <ul style="list-style-type: none"> importance of business planning, including a consideration of: <ul style="list-style-type: none"> goals, objectives and generic business strategies: cost leadership versus differentiation, strategic initiatives and performance management reducing costs and risk
<p>Capital Investment</p>	<p>Recording, using and evaluating financial information: Recording, processing and communicating financial information</p> <ul style="list-style-type: none"> capital investment/budgeting techniques for capital expenditure, limited to calculations for cash flows using straight-line depreciation method only and net of taxation <ul style="list-style-type: none"> discounted cash flows [net present value (NPV) only] payback period <p>Financial institutions and systems: Financial systems and fundamental principles</p> <ul style="list-style-type: none"> nature and importance of capital investment decisions concept of the time value of money factors affecting capital investment decisions, including: <ul style="list-style-type: none"> consumer preferences competition government regulation <p><i>Note: Some of the below syllabus sections are in both 'business planning' and 'capital investment' given the overlap in syllabus but distinctly different content/ examination questions.</i></p> <p>Recording, using and evaluating financial information: Evaluating financial information for planning, coordinating, controlling and investing</p> <ul style="list-style-type: none"> interpretation of capital investment/budgeting techniques to evaluate capital expenditure <ul style="list-style-type: none"> reducing costs and risks <p><i>Note: The below syllabus section is in both 'capital investment' and 'budgets' given the overlap in syllabus but distinctly different content/examination questions.</i></p> <p>Evaluating financial information for planning, coordinating, controlling and investing</p> <ul style="list-style-type: none"> interpretation of capital investment/budgeting techniques to evaluate capital expenditure

School Curriculum and Standards Authority. (2020). Accounting and Finance ATAR course Year 12 syllabus. The School Curriculum and Standards Authority does not endorse this publication or product.

8. Cost Accounting



Activate Prior Knowledge

Respond to the following questions. Discuss your answers with a peer or the class.

<p>How does a business determine the price to sell its goods or services?</p>	
<p>Businesses often have different departments involved with the production of a good or service. Why would a business want to quantify the costs associated with each department?</p>	
<p>When reviewing financial information you discover the cost of materials for producing a good has increased this year compared to last year. What could have caused this? How might you reduce the cost of materials in the future?</p>	

Cost Accounting – Syllabus

Syllabus – Unit 3	
Cost Accounting	<p>Financial institutions and systems: Financial systems and fundamental principles</p> <ul style="list-style-type: none"> • the nature of cost concepts for materials, labour and overheads • classification of cost <ul style="list-style-type: none"> ▪ behaviours: fixed, variable and mixed costs ▪ relationships to cost objects: direct and indirect costs ▪ treatment of costs: product and period ▪ time orientation of costs: past and future • the concept of mark up and the calculation of the unit price of a product <p>Recording, using and evaluating financial information: Recording, processing and communicating financial information</p> <ul style="list-style-type: none"> • cost accounting limited to calculation of the unit price of a product/service using only job order costing processes <ul style="list-style-type: none"> ▪ calculation of direct materials, direct labour and overhead costs ▪ calculation and application of predetermined overhead recovery rates only using normal capacity ▪ calculation of unit cost and the setting of selling/quotation prices for a job costing product/service ▪ use of standard costing and variance analysis for: <ul style="list-style-type: none"> ○ materials price and usage ○ labour rate and efficiency

Cost Accounting – Introduction

During this chapter you will cover a series of processes useful for internal decision making. Calculations and evaluations covered in this chapter are completed in the below steps.

1. Classification of costs based on the:
 - Behaviour of the cost object.
 - Relationship to the cost object.
 - Treatment of the cost object.
 - Time of the cost object.
2. Once costs have been identified, formulas can be applied to calculate things such as:
 - The cost of a job.
 - How much to sell a product for to achieve a desired level of profit.
3. Once a job has been completed, analysis can take place:
 - Calculation of variances between the budgeted costs and actual costs.
 - Reasons for variances identified.

Cost object, cost centre, cost unit

Below is key terminology regarding the scale of costs being analysed.

	Define
Cost object	Anything which costs can be assigned to. E.g., products, departments, locations, processes, projects, customers, locations etc.
Cost centre (Broader object)	Costs allocated to an overhead process not related to a product, but still requires cash flows. E.g., cost centres may be the advertising department, administration department.
Cost unit (More specific object)	Costs allocated to produce one unit of a product.

Tips	<p><u>Specification booklet</u> Have the specification booklet open and refer to this whilst you complete practice questions.</p> <p><u>Label workings</u> Label all workings and steps clearly. Write the relevant formulas down before writing in the numbers.</p>
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Classification of Costs

Costs can be classified based on the following:

- Behaviour of the cost object.
- Relationship to the cost object.
- Treatment of the cost object.
- Time of the cost object.

The following sections will break down each of these classification methods one at a time.

Behaviour classification

Cost classification		Nature / Definition	Examples
Behaviour of cost object:	Fixed	Costs do not change with varied numbers of products produced.	<ul style="list-style-type: none">• Office rent.• Depreciation of NCAs.• Advertising.• Loan interest.
	Variable	Costs change relative to the number of products manufactured.	<ul style="list-style-type: none">• Materials used in production.• Factory labour hours.
	Mixed	Costs contain both a fixed and a variable component.	Usually, expenses with usage that increases when production increases but has a service setup cost. <ul style="list-style-type: none">• Internet.• Electricity.• Phone plan.

Example

Lesmurdie Cabinet Makers produces cabinetry. Examples of business costs include wood, wages of carpenters, advertising, workshop rent, worker phone plans.

Required task:

Classify these costs based on the behaviour of the cost object.

Solution

Fixed costs: Advertising, workshop rent.

- These are costs that do not change with the varied numbers of products produced.

Variable costs: Wood, wages of carpenters.

- These are costs that change relative to the number of products manufactured.

Mixed costs: Worker phone plans.

- These are costs that contain both a fixed and a variable component.

Question 3

Classify the following costs as fixed, variable or mixed costs.

Cost	Fixed, Variable or Mixed
Machine worker hours	
Depreciation of building	
Phone plan	
Glue	
Factory rent	
Internet	
Advertising	
Iron ore	



Basilique du Sacré-Cœur de Montmartre, Paris.

Relationship classification

Cost classification		Nature / Definition	Examples
Relationship to cost object:	Direct	Costs that are easily related to cost object.	<ul style="list-style-type: none"> • Materials used in production. • Factory labour hours.
	Indirect	Costs that are not easily related to cost object (Manufacturing overheads). <ul style="list-style-type: none"> • Allocated to cost objects via direct or machine hours. 	<ul style="list-style-type: none"> • Advertising. • Insurance. • Office supplies. • Materials used in small portions such as paint, staples, glue.

Example

Pear Technologies sells mobile phones. Examples of business costs include online advertising, metal, glass, factory worker hours, office supplies.

Required task:

Classify these costs based on the relationship to the cost object.

Solution

Direct costs: Metal, glass.

- These are costs that are easily related to cost object.

Indirect costs: Factory worker hours, office supplies.

- These are costs that are not easily related to cost object (Manufacturing overheads).

Practice Questions

Questions 4-6: Relationship classification.

Question 4

Classify the following costs as direct or indirect costs.

Cost	Direct or Indirect
Wages of welder	
Wood	
Insurance	
Metal	
Staples	
Rent	
Wages of factory worker	
Wages of supervisor	

Question 5

Describe the nature of:

- a. Direct costs.
- b. Indirect costs.

Question 6

Coo-coo clocks makes replica historical wooden clocks. Below are some of the company's costs. Classify these as either direct or indirect.

Cost	Direct or Indirect
Glue	
Wages of carpenter	
Wages of accountant	
Advertising	
Wages of cleaner	
Rent	
Wood	
Office paper	

Treatment classification

Cost classification		Nature / Definition	Examples
Treatment of cost object:	Product	Costs that are directly related to products produced. <ul style="list-style-type: none"> • Direct materials. • Direct labour. • Factory/manufacturing overhead. 	<ul style="list-style-type: none"> • Materials used in production. • Wages of factory workers. • Factory electricity.
	Period	Costs that are related to a period but not related to any specific product. <ul style="list-style-type: none"> • Can be fixed or variable. 	<ul style="list-style-type: none"> • Insurance. • Advertising. • Electricity.

Example

Fizzy Bubbly sells flavoured soda water. Examples of business costs include water, carbon dioxide, radio advertising, electricity, plastic, factory rent.

Required task:

Classify these costs based on treatment of the cost object.

Solution

Product costs: water, carbon dioxide, plastic.

- These are costs that are directly related to products produced.

Period costs: radio advertising, electricity, factory rent.

- These are costs that are related to a period but not related to any specific product.

Practice Questions

Questions 7-9: Treatment classification.

Question 7

Classify the following costs as product or period costs.

Cost	Product or Period
Steel	
Silk	
Office furniture depreciation	
Electricity of admin office	
Interest expense	
Tailor wages	
Advertising	
Factory worker wages	

Time classification

Cost classification		Nature / Definition	Examples
Time of cost object:	Past (Sunk) costs	Costs that have occurred previously and cannot be changed.	<ul style="list-style-type: none"> Costs from the past that are not related to future investments.
	Future (Relevant) costs	Costs that are related to a future investment proposal.	<ul style="list-style-type: none"> Costs related to the maintenance, security, or storage a future investment.

Note: Future costs are relevant for managerial decision making as they are required for expense control, decisions on new projects and pricing.

Example

Big Bucks Trucks imports and sells trucks. Examples of business costs include previously purchased trucks, planned purchase of trucks, sales staff wages for the past three months, upcoming purchase of land, maintenance costs over the past year.

Required task:

Classify these costs based on the time of the cost object.

Solution

Past (sunk) costs: previously purchased trucks, sales staff wages for the past three months, maintenance costs over the past year.

- These are costs that have occurred previously and cannot be changed.

Future (relevant) costs: planned purchase of trucks, upcoming purchase of land.

- These are costs that are related to a future investment proposal.

Practice Questions

Questions 10-12: Time classification.

Question 10

Classify the following costs as past or future costs.

Cost	Past or Future
A computer to start a new Minecraft Twitch streaming channel	
Rent for the previous year	
A new advertising campaign starting next month	
Wood used to make 120 chairs for a previous order	
A new motor vehicle planned to be purchased	
Paper to print 500 copies of a new book releasing soon	
Upcoming cost to renovate a new showroom	
Rent cost of influencer household last year	

Question 11

Describe the nature of:

- a. Past (sunk) costs.
- b. Future (relevant) costs.

Question 12

Eternal Threads is a clothing company that uses viral marketing techniques to sell its clothing. Classify the following as sunk or relevant costs.

Cost	Sunk or Relevant
Influencer fees for the past year.	
Shirts from China for the next six months.	
Printing press purchased last month.	
Office rent for the next three months.	
Tik Tok advertising fees for an upcoming advert campaign.	

Product costs

Cost classification		Nature / Definition	Examples
Product costs	Direct material	Materials used and able to be linked to a final product.	<ul style="list-style-type: none"> • Fabric. • Timber.
	Direct labour	Employee wages required to produce a good or service.	<ul style="list-style-type: none"> • Factory worker wages. • Painter's wages. • Seamstress wages.
	Factory/ manufacturing overhead	<ul style="list-style-type: none"> • All the costs incurred during the manufacturing process, not including the costs of direct materials or direct labour. • Overheads can include period costs that are linked to product manufacture. • Overheads are assigned to the cost of a product using machine hours or labour hours. 	Indirect material: <ul style="list-style-type: none"> • Disposable gloves. • Machine petrol. Indirect labour: <ul style="list-style-type: none"> • Supervisor wages. • Cleaning of factory. Other overheads: <ul style="list-style-type: none"> • NCA Depreciation and repairs. • Factory rent. • Factory electricity.

Notes:

- Product costs are one component of treatment classification (product and period costs).
- Some period costs may not be considered manufacturing overheads e.g. advertising, office rent, office staff wages.

Example

Margaret River Natural produces and sells free range eggs. Examples of business costs include egg cartons, egg collector wages, chicken feeder wages, depreciation of farm equipment, farm rent.

Required task:

Classify these product costs.

Solution

Direct material: egg cartons.

- These are materials used and able to be linked to a final product.

Direct labour: egg collector wages, chicken feeder wages.

- These are employee wages required to produce a good or service.

Overheads: depreciation of farm equipment, farm rent.

- These are all the costs on an income statement that are not easily linked to a product.

Practice Questions

Questions 13-17: Product costs.

Question 13

Classify the following costs as direct material (DM), direct labour (DL), overheads (OH) or period costs.

Note: The period costs would be the costs that are not product costs. Period costs are not included in the calculation of the cost of a product which occurs later in the chapter.

Cost	DM, DL, OH or Period
Advertising	
Cloth	
Factory electricity	
Welder's wages	
Timber	
Jewellers wages	
Cleaners wages	
Hairdresser wages	
Disposable gloves	
Supervisor wages	
Machine petrol	
Office rent	

Question 14

Describe the nature of:

- a. Direct material.
- b. Direct labour.
- c. Factory overhead.

Question 15

Hardcore Gaming Computers Co makes high tech computers built to play Roblox at maximum graphics. Classify the following as DM, DL, OH or period costs.

Cost	DM, DL, OH or Period
Computer assembler wages	
Cost of RAM cards	
Deodorant for staff	
Roblox installer wages	
Online advertisements	
Fans to help airflow in factory	
Cost of graphics cards	
Cost of feeding staff cheese puffs	
Cost of Monster energy drinks	



Winged Victory of Samothrace, Louvre Museum, Paris.

Question 16

'Mullet Mohawk Poodles 2 U' provides haircuts for dogs. Classify the following as DM, DL, OH or period costs.

Cost	DM, DL or OH
Van electricity	
Dog hairdresser wages	
Telephone operator wages	
Poodle-mobile (motor vehicle) depreciation	
Shampoo	
Dog treats	
Depreciation of office equipment	

Question 17

Big Bang Retailers manufactures science experiment kits for young children to learn science. Classify the following as DM, DL, OH or period costs.

Cost	DM, DL, OH or Period
Chemicals put in each kit	
Insurance	
Factory worker wages	
Glass beakers	
Putty	
Waste disposal costs	
Court case settlement fees	
Accountant fees whose job it is to determine the amount of court cases that can take place and products still be profitable.	
Hospital fees of factory staff	
Advertising campaign to promote it has been 3 months since the last injury	

Job Order Costing

Job order Costing - Nature

- Used to calculate the cost of a specific job.
- Often used to cost a unique item or small quantities.
- E.g., Quotes for photographer, plumber, dress maker, baker.

Pricing strategy – How cost accounting techniques helps develop a pricing strategy

Cost accounting helps to develop a pricing strategy through the:

- Calculation of product costs.
- Calculation of selling price necessary to reflect changes to costs or target profit.
- Selling price set to cover costs plus mark up.

Mark Up – Summary Table

		Mark Up
Nature / Concept		<ul style="list-style-type: none"> • The increase in cost to determine selling price. • Calculated as percentage or in dollars. • Different entities influenced by varied influences when determining mark up.
Calculation	Formula	Selling price (of good or service) = cost + (mark-up % x cost)
	Calculation / Determination considerations	<ul style="list-style-type: none"> • Achievement of target investment return. • Consumers perception of appropriate selling price. • Competitor selling prices – for both cost leadership and differentiation strategy (see business planning chapter). • If cost leadership strategy chosen – selling price should be less than competitors. • All product costs must be covered. • Some period costs may be covered if they are factory/manufacturing overheads. • If markup is too low, business may experience a loss.

Cost of job and selling price calculation in manufacturing and service businesses

Example

Note: the only difference between a manufacturing business or service business question will be the case study in the question. I.e., is the business manufacturing a product or providing a service. The calculation process will be similar.

Air Fry Everything manufacturers air fryers for retail stores. A client has asked for a quote for 50 air fryers.

Air Fry Everything has the following overhead costs:

Cost	\$
Rent	12,000
Insurance	3,200
Advertising	26,000
Office supplies	500

Overheads are allocated on the basis of direct labour hours. Direct labour hours for the year are estimated at 2,400 hours.

The direct material per air fryer is \$6 of plastic, \$3 of metal and \$5 of electronics.

The direct labour hours required per job is 1.4 hours. Labour is paid \$23 per hour.

Air Fry Everything aims to achieve a mark-up of 15%.

Required task:

Calculate the selling price that should be charged to the customer for this job.

Solution

Step 1 – Direct Materials calculation.

It is recommended to draw up three columns and label these DM (direct material), DL (direct labour) and OH (overheads). When solving these problems, you can complete these columns in any order you like. For this example, we are simply working from left to right.

The direct material per air fryer is calculated first. Once this has been calculated the direct material per unit is multiplied by the total number of units produced.

DM	DL	OH
DM per air fryer: $= 6 + 3 + 5$ $= \$14$		
DM for 50 air fryers: $= 14 \times 50$ $= \$700$		

Note: DM could be calculated in one step: $(6 + 3 + 5) \times 50$. However, some exam questions may ask for the cost of producing one item and then separately ask the cost of producing multiple items. It is important to carefully read what a question is asking you to do.

Note: The calculation workings could alternatively be laid out horizontally rather than the vertical method demonstrated in this example.

Step 2 – Direct Labour calculation.

The cost of labour per hour is multiplied by the number of direct labour hours per air fryer. This is then multiplied by the number of air fryers.

DM	DL	OH
DM per air fryer: $= 6 + 3 + 5$ $= \$14$	DL per air fryer: $1.4 \text{ hours} \times \23 per hour $= \$32.2$	
DM for 50 air fryers: $= 14 \times 50$ $= \$700$	DL for 50 air fryers $= 32.2 \times 50$ $= \$,1610$	

This space has been left blank intentionally so the next step can fit on one page.

Step 3 – Factory/manufacturing Overheads calculation.

First, add together all overheads that are linked to manufacturing are added together. The following calculation is also shown in the OH column in the table below.

Rent	12,000
Insurance	3,200
Advertising	26,000
Total overheads =	41,200

Note: As office supplies are not easily linked to the manufacture of products, these are not included in this calculation.

Second, the departmental overhead rate per hour is calculated. Divide the total overheads by an allocation base. In this case the allocation base is direct labour hours. The direct labour hours for the year are estimated at 2,400 hours. I.e. $41,200 / 2,100$.

Third, the departmental overhead rate per hour is multiplied by the number of hours in that department. I.e. Calculate $41,200 / 2,400 \times 1.4$. The 1.4 is the direct labour hours used to produce each air fryer.

Note: the allocation base will be outlined in the question i.e. This could be allocated based on direct labour hours, machine hours, specific department hours etc.

$$\text{Predetermined overhead recovery rate} = \frac{\text{Total estimated (budgeted) manufacturing overheads}}{\text{Total estimated (budgeted) allocation base}}$$

DM	DL	OH
DM per air fryer: = 6 + 3 + 5 = \$14	DL per air fryer: 1.4 hours x \$23 per hour = \$32.2	OH per air fryer: $(12,000 + 3,200 + 26,000) / 2,400$ = $41,200 / 2,400 \times 1.4$ = \$24.03
DM for 50 air fryers: = 14 x 50 = \$700	DL for 50 air fryers = 32.2 x 50 = \$1,610	OH for 50 air fryers: 24.03 x 50 = \$1,201.67

Step 4 – Calculation of cost.

Cost of production/service = Direct Material + Direct labour + Overheads

For simplicity/speed in your workings it is recommended in your workings to write this formula as:
Cost = DM + DL + OH

$$\text{Cost} = 700 + 1,610 + 1,201.67 \\ = \$3,511.67$$

Step 5 – Calculation of profit margin.

The markup was provided in the question: "Air Fry Everything aims to achieve a mark-up of 15%."

$$\text{Profit} = \text{Mark-Up} \times \text{Cost} \\ = 0.15 \times 3,511.67 \\ = 526.75$$

Note: this formula is not given directly in the specification booklet, however, it is seen as part of the selling/quotation price formula which is demonstrated in the next step.

Note: Dividing this answer by the number of units would give the profit per unit.

Step 6 – Calculation of Selling Price / Quote.

$$\text{Selling/quotation price} = \text{Cost} + (\text{Mark-up} \times \text{Cost})$$

$$\begin{aligned}\text{Selling/quotation price} &= 3,511.67 + 526.75 \\ &= \$4,038.42\end{aligned}$$

Therefore, the customer should be charged \$4,038.42 for this job.

Practice Questions

Questions 18-23: Cost of job and selling price calculation in manufacturing and service businesses.

Tips	<u>Specification booklet</u> Have the specification booklet open while you complete the questions from this chapter.
	<u>Reading the question</u> When reading questions, label DM, DL and OH where relevant in the question. This will serve as reminders of what information is considered when calculating each product cost component.
	<u>Organising and labelling workings</u> When calculating DM, DL and OH. Draw three columns and give each a heading of DM, DL and OH. Complete each of these three calculations in the order you feel most confident in based on the given question.
	<u>Factory/manufacturing overheads</u> Not all overheads will always be relevant to the calculation of factory/manufacturing overheads. In cost accounting the emphasis is on product costs. Some period costs may be relevant to factory/manufacturing overheads but not necessarily all of these. It is important to consider the nature of the good or service being produced by a business and considering whether each overhead is relevant to the production of these goods or services.
	<u>Factory/manufacturing overheads and CVP</u> When students study the CVP chapter of this book, particularly calculation of break-even analysis, all costs need to be considered, not just the product costs. This is something students often confuse between cost accounting and CVP analysis.

Relevant Job Order Costing Formulas

Cost of production/service	=	Direct Material + Direct labour + Overheads
Standard cost per unit	=	Standard input quantity allowed per output unit x Standard price per input unit
Selling/quotation price	=	Cost + (Mark-up & x Cost)
Predetermined overhead recovery rate	=	$\frac{\text{Total estimated (budgeted) manufacturing overheads}}{\text{Total estimated (budgeted) allocation base}}$

Question 18

Below is a series of warm up calculations. Calculate the cost of job, mark-up and selling price.

	DM	DL	OH	Cost of job	Profit target	Mark-Up	Selling Price
a	50	25	100	$50 + 25 + 100 = \$175$	15%	$0.15 \times 175 = \$26.25$	$175 + 26.25 = \$201.25$ Or $175 \times 1.15 = \$201.25$
b	280	340	670		22%		
c	600	200	180		43%		
d	380	980	1,500		18%		
e	670	825	265		27%		

Question 19

Office Kings manufactures business chairs. The business has estimated the following manufacturing costs for the next financial year.

Cost	\$
Direct material	18,000
Direct labour (11,200 hours)	253,000
Electricity	8,300
Supervisor wages	76,000
Factory cleaner wages	43,000

A customer has made an order for 56 business chairs.

- Each chair requires \$27 of direct material.
- Each chair requires 1.5 hours of direct labour.
- The manufacturing overhead is allocated to each job based on direct labour hours.
- The business aims to achieve a profit margin of 15%.

Required tasks:

a. Calculate the cost of manufacturing each chair.

DM	DL	OH

b. Calculate the cost of manufacturing 56 chairs.

Workings

c. Calculate the selling price of each chair.

Workings

d. Calculate the total cost charged to the customer for this order.

Workings

Solutions:

a. \$77.95, b. \$4,365, c. \$89.65, d. \$5020.40.

Note: Solutions may be slightly different due to when the rounding of numbers took place in your workings. You should still be awarded full marks as long as your workings are correct and your result is close to the result given.

Question 20

Winter Busters sells thick waterproof shoes for work sites. The business has estimated the following factory costs for the upcoming financial year.

Cost	\$
Premium Rubber	8,000
Direct labour (2,700 hours)	54,000
Insurance of factory	2,100
Advertising	26,000
Factory Rent	9,100

A customer has made an order for 130 pairs of shoes.

- Each pair of shoes requires \$3 of direct material.
- Each pair of shoes requires 6 hours of direct labour.
- The factory overhead is allocated to each job based on direct labour hours.
- The business aims to achieve a profit margin of 25%.

Required tasks:

a. Calculate the cost of manufacturing each pair of shoes.

DM	DL	OH

b. Calculate the cost of 130 pairs of shoes.

Workings

c. Calculate the selling price of each pair of shoes.

Workings

d. Calculate the total cost charged to the customer for this order.

Workings

Solutions: a. \$156.20 b. \$20,306. c. \$157.75 d. \$20,507.50.

Question 21

Larry's Landscaping provides landscaping services to residential clients. A client in Willetton has requested a quote for landscaping a large backyard.

The following expenses are directly related to the job:

Soil	\$260
Plants	\$800
Labour of landscapers (12 hours)	\$300

Overheads for the current financial year are estimated below:

Machinery depreciation	\$6000
Supervisor wages	\$33,000
Petrol	\$5,400
Office supplies	\$480
Insurance	\$1,500

Total labour hours for the next 12 months are estimated to be 7,200 hours.

Overhead expenses are allocated to individual jobs based on direct labour hours.

Larry's Landscaping aims to have a 30% mark-up on each job.

Required task:

a. Provide a quote for carrying out the job.

DM	DL	OH

Workings

Solution: a. \$1867.53.

Question 22

Earthworks Drills provides maintenance on various large drills for mining companies. The following information is related to two jobs for this financial year.

Job C14	Job D12
Metal: 20 kilos	Metal: 36 kilos
Direct labour hours: 14 hours	Direct labour hours: 17 hours
Smithing machine hours: 19 hours	Smithing machine hours: 24 hours

The cost of metal is \$87 per kilo. Direct labour wage rate is \$31.20 per hour. The overhead expenses are allocated to jobs on the basis of labour hours for each job. Total labour hours for the year are estimated at 830 hours. The estimated total overhead costs for this financial year is \$14,940.

The company mark-up's jobs to achieve a profit of 36%.

Required tasks:

a. Calculate the cost of Job C14 and Job D12.

Job C14

DM	DL	OH

Job D12

DM	DL	OH

b. Calculate the cost charged to the customer for each job.

Workings

Solutions: a. Cost of Job C14: \$2428.80 , Job D12: \$3968.40. b. Selling Price Job C14: \$3,303.168, Job D12: \$5,397.04.

Question 23

Rainbow Sparkles bakes cakes delicious cakes with a reputation that the cakes can heal friendship conflict.

Steph's Soiree (Job SS)	Frankie's Fete (Job FF)
Cake mix: 21 kilos	Cake mix: 49 kilos
Direct labour hour: 18 hours	Direct labour hour: 52 hours
Oven hours: 16 hours	Oven hours: 32 hours

The cost of cake mix is \$2.80 per kilo. Direct labour wage rate is \$22.50 per hour. Manufacturing overhead is allocated to jobs on the basis of oven hours for each job. Total oven hours for the year are estimated at 1,600 hours. The estimated total overhead costs for this financial year is \$8,900.

The company mark-up's jobs to achieve a profit of 28%.

Required tasks:

a. Calculate the cost of Job SS and Job FF.

Job SS

DM	DL	OH

Job FF

DM	DL	OH

b. Calculate the cost charged to the customer for each job.

Workings

Solutions: a. Cost of Job SS: \$552.80, Job FF: \$1485.20. b. Selling Price Job SS: \$707.58, Job FF: \$1901.06.

Cost of job with varied departmental overheads

The last component of job order costing covered in this course is where a business may choose to apply a different allocation base for each department of a factory. E.g.:

- Overheads allocated to department A based on direct labour hours and
- Overheads allocated to department B based on machine hours.

Varied departmental overheads are calculated separately and then added together to find the total overheads.

Example

Black Out Curtains manufactures and installs curtains in residential and business settings.

There are two departments in the business, the manufacturing department and the installation department.

	Manufacturing department	Installation department
Estimated overhead cost for each department	\$65,000	\$79,000
Estimated direct labour hours	3,800 hours	5,200 hours
Estimated machine hours	2,100 hours	800 hours

A new apartment block is being built in South Perth, job SP19. This job requires installation of 46 different curtains. The costs for this job are below.

Cost	Total
Direct materials: cost of the curtains	\$2,500
Direct labour costs	\$1,500
Machine hours: manufacturing department	18 hours
Direct labour hours: installation department	24 hours

The business applies overheads to jobs based on:

- Machine hours in the manufacturing department.
- Direct labour hours in the installation department.

Required task:

Calculate the cost of job SP19.

Solution

Step 1 – Calculation of overhead for the manufacturing department.

First, the departmental overhead rate per hour is calculated.

$$\text{Predetermined overhead recovery rate} = \frac{\text{Total estimated (budgeted) manufacturing overheads}}{\text{Total estimated (budgeted) allocation base}}$$

The allocation base for the manufacturing department is machine hours.

$$\begin{aligned} \text{OH rate} &= \text{manufacturing OH} / \text{machine hours} \\ &= 65,000 / 2,100 \\ &= \$30.95 \end{aligned}$$

Second, the departmental overhead rate per hour is multiplied by the number of hours in that department.

$$\begin{aligned} \text{Manufacturing OH rate} \times \text{machine hours for job} \\ &= 30.95 \times 18 \\ &= \$557.10 \end{aligned}$$

Step 2 – Calculation of overhead for the installation department.

First, the departmental overhead rate per hour is calculated.

$$\text{Predetermined overhead recovery rate} = \frac{\text{Total estimated (budgeted) manufacturing overheads}}{\text{Total estimated (budgeted) allocation base}}$$

The allocation base for the installation department is direct labour hours.

$$\begin{aligned} \text{Installation OH rate} &= \text{installation OH} / \text{DL hours} \\ &= 79,000 / 5,200 \\ &= 15.19 \end{aligned}$$

$$\begin{aligned} \text{Installation OH rate} \times \text{machine hours for job} \\ &= 15.19 \times 24 \text{ hours} \\ &= \$364.56 \end{aligned}$$

Step 3 – Calculation of cost of job.

$$\begin{aligned} \text{Cost} &= \text{DM} + \text{DL} + (\text{OH manufacturing} + \text{OH installation}) \\ &= 2,500 + 1,500 + 557.10 + 364.56 \\ &= 4,921.66 \end{aligned}$$

Therefore, the cost of job SP19 is \$4,921.66.

Note: to focus on the varied departmental overheads calculations, the DM and DL was given directly in the question. A more complex question may ask you to calculate the DM and DL in addition to departmental overheads.

Below is an example of how workings can be laid out for questions varied departmental overheads.

DM	DL	OH
DM = 2,500	DL = 1,500	OH M/D (manufacturing department): = 65,000 / 2,100 x 18 = \$557.10
		OH I/D (installation department): = 79,000 / 5,200 x 24 hours = \$364.56
		Total OH = 557.10 + 364.56 = 921.66

An alternate display for this workings is to split the OH column into two columns. One column can be labelled OH M/D (for the manufacturing department) and the other can be labelled OH I/D (for the installation department).

Note: The calculation workings could alternatively be laid out horizontally rather than the vertical method demonstrated in this example.

Note: this type of question could ask you to do job order costing calculations seen in previous steps such as selling price, mark-up etc. This process would be similar to the processes carried out previously for these steps. These other problems were not included in this example to focus on the introduced skill of departmental overhead calculation.

Practice Questions

Questions 24-28: Cost of job with varied departmental overheads.

Exam Questions

See 'Cost Accounting' chapter of the Exam Guide for practice exam questions. The Exam Guide can be found by navigating to the Resource Hub link on the front page.

Note: Standard costing has not been covered yet and you will not be able to complete these questions. You will be able to complete many 'Cost Accounting' exam questions which cover cost classification and job order costing.

Practice Questions

Questions 24-28: Cost of job with varied departmental overheads.

- Question 24: Warm-up
- Question 25-26: Practice of departmental overhead calculation skill in question context
- Question 27-28: Questions at exam level difficulty

$$\text{Predetermined overhead recovery rate} = \frac{\text{Total estimated (budgeted) manufacturing overheads}}{\text{Total estimated (budgeted) allocation base}}$$



Hike to Castelo dos Mouros, Sintra.

Question 24

Below is a 'warm-up' to practice calculating overhead rates for varied departments.

The business applies overheads to jobs based on:

- Department A allocates overheads based on labour hours.
- Department B allocates overheads based on machine hours.

Note: in this question the overheads are applied consistently using the same method. In other questions the overheads will be allocated differently each question. Read questions carefully to determine how the overhead rate is to be calculated.

Required tasks:

a. Calculate the departmental overhead rates per hour, departmental overhead costs for job and total overheads for the job.

Question		a	b	c	d
Estimated annual overheads	Department A	\$90,000	\$45,000	\$128,000	\$18,120
	Department B	\$5,000	\$36,000	\$140,000	\$12,350
Estimated annual hours	Labour hours	300	1,500	3,800	368
	Machine hours	400	1,800	2,750	303
Estimated hours for job	Labour hours	6 hours	4 hours	12.5 hours	2.6 hours
	Machine hours	3 hours	1 hour	15 hours	1.2 hours
Overhead rate per hour	Department A	$90,000 / 300 = \$30$			
	Department B	$5,000 / 400 = \$12.5$			
Overhead cost for job	Department A	$\$30 \times 6 = \180			
	Department B	$\$12.5 \times 3 = \37.5			
Total overheads for job		$180 + 37.5 = \$217.50$			

Question 25

New Beginnings Land is a business that levels earth and the lays foundations for homes or businesses.

There are two departments in the business, the levelling department and the foundation department. The overhead costs for the upcoming financial year are estimated as below.

	Levelling department	Foundation department
Estimated overhead cost for each department	\$77,200	\$50,320
Estimated direct labour hours	3,200 hours	1,480 hours
Estimated machine hours	2,750 hours	920 hours

A new house is being built in the Perth Hills with a granny flat, job 892. The costs for this job are below.

Cost	Total
Direct materials	\$80
Direct labour costs	\$136
Machine hours: levelling department	7 hours
Direct labour hours: foundation department	4 hours

The business applies overheads to jobs based on:

- Direct labour hours in the foundation department.
- Machine hours in the levelling department.

The business aims to achieve a profit margin of 40% on each job.

Required tasks:

a. Calculate the cost of job 892.

DM	DL	OH

b. Calculate the quote to be provided to the customer.

Workings

Solutions: a: \$548.51. b: \$767.91.

Question 26

Coco for Cocoa works with business clients to design intricate chocolate sculptures for business events. There are two departments in the business, the design department and the installation department.

	Design department	Sculpt department
Estimated overhead cost for each department	\$87,300	\$96,500
Estimated direct labour hours	950 hours	2,500 hours
Estimated machine hours	1,200 hours	800 hours

An eccentric CEO has recently passed away and made it clear in his will that he wanted his business to hold a fun-eral for him. The CEO explains in his will video that this is going to be like a funeral but fun. He thought it would be funny if there was a life sized chocolate sculpture made of him for people to eat at the fun-eral. The cost of this job is below.

Cost	Total
Direct materials: cost of chocolate	210 kilos at \$4.50 per kilo
Direct labour costs	14 hours at \$27 per hour
Machine hours: design department	6 hours
Direct labour hours: sculpt department	14 hours

The business applies overheads to jobs based on:

- Machine hours in the design department.
- Direct labour hours in the sculpt department.

Normally, Coco for Cocoa has a 30% mark up, but due to the odd and complicated nature of this complicated job they will double the mark up for this job. The costs for this job are below.

Required tasks:

a. Calculate the cost of this job.

DM	DL	OH

b. Calculate the quote to be provided to the customer.

Workings

Solutions: a: \$2,299.90. b: \$3,679.84.

Question 27

Cutie Patootie makes old fashioned dolls that are ornately presented in decorative boxes. The details of the budgeted overheads for each department for 2015 are detailed below,

	Cutting department	Sewing department	Packaging department
Estimated overheads	\$20,000	\$45,000	\$26,000
Estimated allocation base	400 machine hours	1,000 machine hours	5,000 direct labour hours

One of the old fashioned doll lines is the Mandy Popons doll. The following details relate to the production of a batch of 50 Mandy Popons dolls in 2015.

	Direct materials	Direct labour	Machine hours
Cutting department	\$430	30 hours at \$27.40 per hour	24 hours
Sewing department	\$360	23 hours at \$25.80 per hour	20 hours
Packaging department	\$290	15 hours at \$23.60 per hour	9 hours

The business has set its mark up at 34%.

Required tasks:

a. Calculate the overhead rate for each department.

Workings

b. Calculate the total cost of the batch of Mary Popons dolls.

Hint: For two of the departments the overhead rate is allocated based on machine hours, for the other department the overhead rate is allocated based on the direct labour hours.

DM	DL	OH

c. Calculate the total cost of one Mary Popons doll.

Workings

d. Calculate the selling price of one batch of Mary Popons dolls.

Workings

Solutions: a: \$50 for the cutting department, \$45 for the sewing department and \$5.20 for the packaging department. b: \$5,027.40. c: \$100.55. d: \$6,736.72.

Question 28

Get It On Glass produces customized premium glasses for businesses and special occasions. During the 2027 financial year the business produced 12,000 glasses in batches of 200 glasses. For the 2027 financial year the business had the following costs.

Direct Labour	
Design department	500 hours at \$21.50 per hour
Machinery department	900 hours at \$19.00 per hour

Direct materials	
Design department	\$3800
Machinery department	Raw minerals to make glass purchased and used 2,000 kilos at \$4 per kilo

Other costs	
Advertising	\$2,500
Design department overheads	\$3,200
Machinery department overheads	\$14,000
Electricity	\$3,600
Factory rent	\$18,000

The overheads are allocated to each batch based on the total direct labour hours. Each batch of glasses takes 1 hour of design time and 2.5 hours of machinery time.

The business aims to achieve a profit margin of 18%.

Required tasks:

a. Calculate the total direct labour cost of the total glasses produced in 2027 and the direct labour cost of each batch of 200 glasses.

Workings

b. Calculate the direct material cost of each batch of 200 glasses and the direct material cost of all glasses produced in 2027.

Workings

c. Calculate the total overhead costs and the overhead costs applied to each batch of 200 glasses.

Hint: given the department overheads are given in the other costs table above, you will not need to use the overhead allocation rate information to calculate total overhead costs. You can simply add these given departmental costs with the other values in the other costs table to find the total overhead costs.

Workings

d. Calculate the total cost of producing all the glasses during and the cost of producing one glass.

Workings

e. Calculate the selling price per batch.

Workings

Solutions: a: DL per batch \$464.17, DL per year \$27,850. b: DM per batch \$196.67, total \$11,800. c: OH per batch \$688.33, total \$41,300. d: \$6.75. e: \$1,593.

Standard Costing

Standard costing builds on job order costing through the process of:

- Calculation of the standard (estimated) cost of producing a good or service (similar to job order costing).
- Comparison of the standard costs with actual costs.
- Evaluation of the variance between standard costs and actual costs.
- Identification of reasons for these variances.

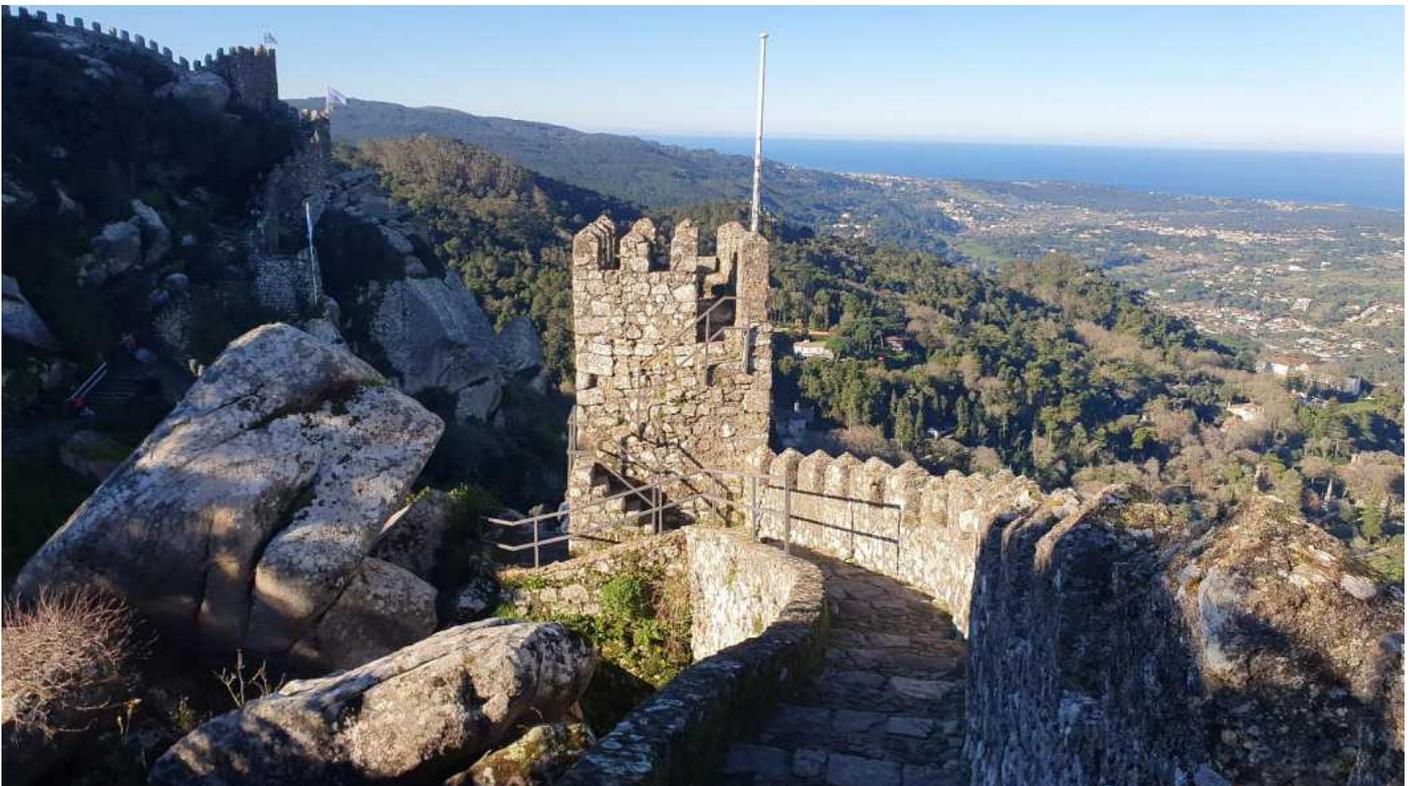
Standard cost of a product

Standard costing questions begin with calculation of the estimated cost of a good or service. This is the same process of job order costing problems. Standard costing questions will usually break down direct material and direct labour into the components that make up the final cost figure.

The factors that make up direct material and direct labour are analysed for variances.

- Direct material is made up of the following.
 - Material price.
 - Material usage.
- Direct labour is made up of:
 - Labour rate.
 - Labour efficiency.

Note: Variances can also be analysed for overheads but is not included in the syllabus. Some standard cost questions may include a component to calculate the overheads or the predetermined overhead rate. This will be the same process as in job order costing.



Castelo dos Mouros, Sintra.

Example

Hand Crafted Classics makes wooden chairs. These chairs are made by specialist carpenters using wood and fabric.

Standard Cost: Direct Material

The business has estimated the standard cost direct material per chair as below.

Item	Material Price	x	Material usage	=	Standard cost per unit
Wood	\$8	x	2 metres	=	\$16
Fabric	\$3	x	0.8 square metres	=	\$2.4

$$\text{DM} = 16 + 2.4 \\ = \$18.40$$

Therefore, the standard cost of direct material per chair is \$18.40.

Standard Cost: Direct Labour

Specially trained carpenters assemble each chair using the direct materials. The business has estimated the standard direct labour hour per chair as below.

Item	Labour efficiency (DL hours to make the product)	x	Labour rate (wage per DL hour)	=	Standard cost per unit
Direct labour	2.5	x	\$35 per hour	=	\$87.50

Therefore, the standard cost of direct labour per chair is \$87.50.

Variance Analysis

At a later point in time once the product has been made, the variance is compared between the standard (estimated) cost and actual cost. This is demonstrated in the next example.

Variance analysis – Nature

Comparison of variances of actual price and usage relative to benchmark price and usage.

- Identifies production area variances as either favourable (positive) or unfavourable (negative)
- Internal control can be applied to remedy unfavourable variances and continue favourable variances.

Direct material variances – Price and Usage

Variance		Material variance	
Definition / Nature		Material price variances	Material usage variances
Causes / Strategies	Favourable More Efficient due to: <i>Note: favourable and unfavourable causes / strategies are opposites</i>	<ul style="list-style-type: none">• Supplier price decrease through negotiation.• Use of a cheaper supplier.• Cheaper material used that may be lower quality.• Market price of material decreased.	<ul style="list-style-type: none">• Improvement in production processes.• Training of staff.• Recruitment of skilled staff.• Higher quality materials used leading to increased usage efficiency.
	Unfavourable More inefficient due to:	<ul style="list-style-type: none">• Supplier negotiates higher price.• Use of a more expensive supplier.• More expensive material used that may be higher quality.• Market price of material increased.	<ul style="list-style-type: none">• Production process setback (increase in waste).• Poor training of staff.• Hire of unskilled staff.• Lower quality materials leading to decreased usage efficiency.

Note: The 'Favourable' row also represents strategies to improve variances.

Note: Calculations are in the Specification book.

Example

Hand Crafted Classics is looking to identify areas to improve business performance and has supplied its accountant with the following information for the 2037 financial year.

	Actual	Standard
Price of wood	\$10	\$8
Quantity of wood to make one chair	2.5 m	2 m

Additional information:

- The quantity wood used was 3,000 metres.
- The number of chairs made was 1,200.

Required task:

Calculate the direct material variances and identify these as favourable or unfavourable.

Solution**Step 1 – Calculation of material price variance.**

Direct material variances		
Price variance	=	$(AP - SP) \times AQP$ i.e. (Actual price of input – Standard price of input) x Actual quantity of input purchased

$$\begin{aligned} \text{Price variance} &= (AP - SP) \times AQP \\ &= (10 - 8) \times 3,000 \\ &= 2 \times 3,000 \end{aligned}$$

Therefore, the direct material price variance is \$6000. As this is a positive figure, this means that there was an unfavourable increase in the cost of direct material.

Step 2 – Calculation of material usage variance.

Direct material variances		
Usage variance	=	$(AQI - SQA) \times SP$ i.e. (Actual quantity of input Issued – Standard quantity of input allowed for actual output) x Standard price of input
Where SQA	=	$SQ \times AO$ i.e. Standard quantity per unit x Actual output in units produced

Firstly, the SQA needs to be calculated. This represents the estimated quantity of direct material that should have been used to make the number of units products.

$$\begin{aligned} \text{SQA} &= \text{SQ} \times \text{AO} \\ &= 2 \times 1,200 \\ &= 2,400 \text{ metres of wood.} \end{aligned}$$

Secondly, the SQA can be used in the calculation of the usage variance.

$$\begin{aligned} \text{Usage variance} &= (AQI - SQA) \times SP \\ &= (3,000 - 2,400) \times \$8 \\ &= \$4,800 \end{aligned}$$

Therefore, the direct material usage variance is \$4,800. As this is a positive figure, this means that there was an unfavourable increase in the usage of direct material.

Practice Questions

Questions 29-33: Direct material variances – Price and Usage.

Direct material variances	
Price variance	= $(AP - SP) \times AQP$ i.e. (Actual price of input – Standard price of input) x Actual quantity of input purchased
Usage variance	= $(AQI - SQA) \times SP$ i.e. (Actual quantity of input issued – Standard quantity of input allowed for actual output) x Standard price of input
Where SQA	= $SQ \times AO$ i.e. Standard quantity per unit x Actual output in units produced

Question 29

Calculate the standard cost of direct material.

Question	Price per unit	Material per unit	Standard Cost of DM
a	\$4	5 sqm	$4 \times 5 = \$20$
b	\$3.50	8 kilos	
c	\$23	2.5 m	
d	\$12.30	0.3 tonnes	
e	\$0.60	8 litres	

Question 30

Calculate the following material price variances and identify them as either favourable or unfavourable.

Question	Actual price of input (AP)	Standard price of input (SP)	Actual quantity of input purchased (AQP)	Price Variance	F / U
a	\$10	\$8	100 kilos	$(10 - 8) \times 100 = \$200$	U
b	\$42	\$41.50	9 litres		
c	\$18	\$20	15 sqm		
d	\$5.40	\$5.50	4.5 m		
e	\$6.70	\$7.30	5 tonnes		

Question 31

a. Describe the nature of material price variances.

b. List causes of unfavourable (inefficient) material price variances.

c. List causes of favourable (efficient) material price variances.

Note: This could also be asked as: list strategies to improve unfavourable material price variances.

Question 32

Calculate the following material usage variances and identify them as either favourable or unfavourable.

Question	Actual quantity of input issued (AQI)	Standard quantity per unit (SQ)	Actual output in units produced (AO)	Standard quantity of input allowed for actual output (SQA) (SQ x AO)	Standard price of input (SP)	Usage variance	F / U
a	90 kilos	20 kilos	5 units	$20 \times 5 = 100$ kilos	\$3	$(90 - 100) \times 3 = -\$30$	F
b	180 sqm	17.5 sq. m	10 dresses		\$6		
c	15 tonnes	1.5 tonnes	9 units		\$250		
d	95 kilos	7.4 kilos	15 cakes		\$4.80		
e	82 m	3.3 m	26 benches		\$9.50		

Question 33

a. Describe the nature of material usage variances.

b. List causes of unfavourable (inefficient) material usage variances.

c. List causes of favourable (efficient) material usage variances.

Note: This could also be asked as: list strategies to improve unfavourable material usage variances.

Direct labour variances - Rate and Efficiency

Variance		Labour variance	
		Labour rate variances	Labour efficiency variances
Definition / Nature		Difference in the labour cost per hour relative to a benchmark.	Difference in the labour hours used to produce an item compared to a benchmark.
Causes / Strategies	Favourable More Efficient due to: <i>Note: favourable and unfavourable causes / strategies are opposites</i>	<ul style="list-style-type: none"> Outsourcing to cheaper labour. Entity negotiates lower wages. Minimum wage decreases. Unskilled workers hired and are paid less per hour. 	<ul style="list-style-type: none"> Higher quality materials used decreases wastage. Improvement in production processes. Hiring skilled workers reduces wastage. Training of workers reduces wastage.
	Unfavourable More inefficient due to:	<ul style="list-style-type: none"> Insourcing more expensive labour. Staff negotiate pay rise. Minimum wage increases. Skilled workers hired are paid more per hour. 	<ul style="list-style-type: none"> Low quality materials used increases wastage. Production process setback (waste). Hiring unskilled workers increases wastage. Poor training of workers increases wastage.

Note: The 'Favourable' row also represents strategies to improve variances.

Note: Calculations are in the Specification book.

Example

Hand Crafted Classics is looking to identify areas to improve business performance and has supplied its accountant with the following information for the 2037 financial year.

	Actual	Standard
Direct labour rate per hour	\$38	\$35
DL hours required to make one chair	2	2.5

Additional information:

- The quantity of direct labour hours worked was 2,400.
- The number of chairs made was 1,200.

Required task:

Calculate the direct labour variances and identify these as favourable or unfavourable.

Solution

Step 1 – Calculation of rate variance.

Direct labour variances	
Rate variance	$= (AR - SR) \times ADLH$ i.e. (Actual rate per direct labour hour worked – Standard rate per direct labour hour worked) x Actual direct labour hours worked

$$\begin{aligned}
 \text{Rate variance} &= (AR - SR) \times ADLH \\
 &= (38 - 35) \times 2,400 \\
 &= \$7,200
 \end{aligned}$$

Therefore, the direct labour rate variance is \$7,200. As this is a positive figure, this means that there was an unfavourable increase in the direct labour rate.

Step 2 – Calculation of efficiency variance.

Direct labour variances	
Efficiency variance =	$(ADLH - SDLHA) \times SR$ i.e. (Actual direct labour hours worked – Standard direct labour hours allowed for actual output) x Standard rate per direct labour hour
Where SDLHA =	$SDLH \times AO$ i.e., Standard direct labour hours allowed per unit x Actual output in units produced

Firstly, the SDLHA needs to be calculated. This represents the estimated quantity of direct labour hours that should have been used to make the number of units products.

$$\begin{aligned} \text{SDLHA} &= \text{SDLH} \times \text{AO} \\ &= 2.5 \times 1,200 \\ &= 3,000 \end{aligned}$$

Secondly, the SLDHA can be used in the calculation of the efficiency variance.

$$\begin{aligned} \text{Efficiency variance} &= (ADLH - \text{SDLHA}) \times SR \\ &= (2,400 - 3,000) \times 35 \\ &= (21,000) \end{aligned}$$

Therefore, the direct labour efficiency variance is (21,000). As this is a negative figure, this means that there was a favourable decrease in the direct labour efficiency.

Practice Questions

Questions 34-40: Direct labour variances - Rate and Efficiency.

Questions 39-40: All variances.

Questions 41-57: Cost Accounting theory review.

Direct labour variances	
Rate variance =	$(AR - SR) \times ADLH$ i.e. (Actual rate per direct labour hour worked – Standard rate per direct labour hour worked) x Actual direct labour hours worked
Efficiency variance =	$(ADLH - \text{SDLHA}) \times SR$ i.e. (Actual direct labour hours worked – Standard direct labour hours allowed for actual output) x Standard rate per direct labour hour
Where SDLHA =	$SDLH \times AO$ i.e., Standard direct labour hours allowed per unit x Actual output in units produced

Question 34

Calculate the standard cost of direct labour.

Question	Labour Rate	Hours per unit	Standard Cost of DL
a	\$23	10 hours	23×10 = \$230
b	\$35	5 hours	
c	\$52.60	16.3 hours	
d	\$13.20	9.5 hours	
e	\$18.25	8.9 hours	

Question 35

Calculate the following labour rate variances and identify them as either favourable or unfavourable.

Question	Actual rate per direct labour hour worked (AR)	Standard rate per direct labour hour worked (SR)	Actual direct labour hours worked (ALDH)	Rate variance	F / U
a	\$18.90	\$18.50	35 hours	$(18.9 - 18.5) \times 35 = \14	U
b	\$28	\$30	100 hours		
c	\$35.40	\$33.20	1,500 hours		
d	\$21.50	\$22.70	835 hours		
e	\$41.50	\$39.50	927.4 hours		

Question 36

a. Describe the nature of labour rate variances.

b. List causes of unfavourable (inefficient) labour rate variances.

c. List causes of favourable (efficient) labour rate variances.

Question 37

Calculate the following labour efficiency variances and identify them as either favourable or unfavourable.

	Actual direct labour hours worked (ADLH)	Standard direct labour hours allowed per unit (SLDH)	Actual output in units produced (AO)	Standard direct labour hours allowed for actual output (SDLHA) (SDLH x AO)	Standard rate per direct labour hour (SR)	Efficiency variance	F / U
a	380 hours	10 hours	40 units	$10 \times 40 = 400$	\$25	$(380 - 400) \times 25 = -500$	F
b	150 hours	4 hours	35 suits		\$13		
c	2,339 hours	3.2 hours	730 couches		\$21.50		
d	10,750 hours	9 hours	1,200 documents		\$33.60		
e	9,080 hours	18.6 hours	490 laptops		\$11.90		

Question 38

a. Describe the nature of labour efficiency variances.

b. List causes of unfavourable (inefficient) labour efficiency variances.

c. List causes of favourable (efficient) labour efficiency variances.

Practice Questions

Questions 39-40: All variances.

Direct material variances	
Price variance	= $(AP - SP) \times AQP$ i.e. (Actual price of input – Standard price of input) x Actual quantity of input purchased
Usage variance	= $(AQI - SQA) \times SP$ i.e. (Actual quantity of input issued – Standard quantity of input allowed for actual output) x Standard price of input
Where SQA	= $SQ \times AO$ i.e. Standard quantity per unit x Actual output in units produced

Direct labour variances	
Rate variance	= $(AR - SR) \times ADLH$ i.e. (Actual rate per direct labour hour worked – Standard rate per direct labour hour worked) x Actual direct labour hours worked
Efficiency variance	= $(ADLH - SDLHA) \times SR$ i.e. (Actual direct labour hours worked – Standard direct labour hours allowed for actual output) x Standard rate per direct labour hour
Where SDLHA	= $SDLH \times AO$ i.e., Standard direct labour hours allowed per unit x Actual output in units produced

Question 39

Lesgo Ltd. manufactures toy building brick playsets for children. In July 2031 they approached their accountant with standard and actual material and labour costs. The intention of this meeting was to identify any variances so that internal controls can be developed to reduce any unfavourable variances.

The following financial information was presented by Lesgo Ltd. for the 2030/2031 financial year.

- 952 playsets manufactured.
- Standard costs for each playset:
 - Direct materials: 0.4 kilos of plastic for \$3 per kilo.
 - Direct labour: 1.2 hours per playset at \$16.50 per hour.
- Actual costs:
 - Direct materials purchased and used were 375 kilos at \$2.85 per kilo.
 - Direct labour hours worked were 1,200 hours at \$15.20 per hour.

Required tasks:

a. Calculate the direct materials price variance.

Workings

b. Calculate the direct material usage variance.

Workings

c. Calculate the direct labour rate variance.

Workings

d. Calculate the Direct labour efficiency variance.

Workings

Solutions: a: -\$56.25 F. b: -17.4 kilos F. c: \$1,560 U. d: 950.4 hours U.

Question 40

Sauvé Dapperman Pty Ltd produces suits for a range of formal occasions.

For the 2046 financial year, the manufacturing overhead costs were estimated to be \$273,000. The estimated direct labour hours for 2046 were 156,000 hours.

Manufacturing overheads are allocated based on the cost of direct labour hours.

At the end of the 2046 financial year the following financial records were presented to an accountant:

- 1,230 suits manufactured.
- Standard cost for each suit:
 - Direct materials: 4.1 square metres for \$9.00 per square metre.
 - Direct labour: 3.7 hours per suit at \$12.10 per direct labour hour.
- Actual costs for the suits produced:
 - Direct materials purchased and used were 4,990 square metres at \$8.10 per square metre.
 - Direct labour hours worked were 4,490 hours at \$12.30 per hour.

Required tasks:

a. Calculate the predetermined overhead rate.

Workings

b. Calculate the standard cost of one suit during any month in the 2046 financial year.

DM	DL	OH

c. Calculate the direct materials price variance in November 2046.

Hint: Based on the information in the question, the standard and actual cost information is for the entire 2046 financial year. Being given a specific month is just a distraction and does not impact the result other than letting you know to calculate the answer within this financial year. This is an interpretation trick that may be used in assessment questions.

Workings

d. Calculate the direct material usage variance December 2046.

Workings

e. Calculate the direct labour rate variance.

Workings

f. Calculate the Direct labour efficiency variance.

Workings

Solutions: a: \$1.75. b: \$88.15. c: -\$4,491 F. d: -477 square metres F. e: \$898 F. f: -738.10 hours F.

Exam Questions

See 'Cost Accounting' chapter of the Exam Guide for practice exam questions. The Exam Guide can be found by navigating to the Resource Hub link on the front page.

Practice Questions

Questions 41-57: Cost Accounting theory review.

Tip

Course Guide

When completing the theory review you may find it useful to refer to the relevant chapter in the Essential Insight Course Guide. The Course Guide summarizes all theory relevant for each practical guide chapter. This saves time flipping through multiple pages in the Practical Guide while revising. The Course Guide can be found by navigating to the Resource Hub link on the front page.

Question 41

Identify which of the following is not considered by a business when determining the mark up of a product.

- a. Avoidance of markup being too low and incurring a loss.
- b. The sales price of an unrelated product line.
- c. Consumers perception of appropriate selling price.
- d. Covering all period costs.

Question 42

A company's previous investment in new machinery is an example of a:

- a. Direct cost.
- b. Relevant cost.
- c. Variable cost.
- d. Sunk cost.

Question 43

A series of costs that related to a product are allocated to a sewing department. The sewing department is an example of:

- a. Cost centre.
- b. Cost object.
- c. Cost unit.
- d. Cost measure.

Question 44

A business experiences an increase in the efficiency of labour rate variance. This could have been caused by:

- a. Training of workers.
- b. Production process improvement.
- c. Increase in the minimum wage.
- d. Outsourcing to cheaper labour.

Question 45

Identify which of the following is not a likely cause of an unfavourable material price variance.

- a. More expensive supplier.
- b. Supplier negotiates a lower price.
- c. Market price of materials increases.
- d. Supplier negotiates higher price.

Question 46

Identify which of the following does not describe the nature of mark up.

- a. Different entities are influenced by varied influences when determining mark up.
- b. The increase in cost to determine selling price.
- c. Calculated as percentage or in dollars.
- d. Used to calculate the cost of a specific job.

Question 47

Which of the following businesses would job order costing be most appropriate for?

- a. A television manufacturer.
- b. An Australian wide fashion manufacturer.
- c. A custom furniture manufacturer.
- d. A manufacturer who supplies large orders of various homewares.

Question 48

Outline the nature of job order costing and identify an example of when this may be appropriate to use.

Question 49

Describe how cost accounting techniques help develop a pricing strategy.

Question 50

Explain the nature of each of the following cost classifications.

- Treatment classification
- Relationship classification

Question 51

Describe the nature of variance analysis.

Question 52

A trainee accountant is having difficulty understanding classification of costs based on behaviour. Distinguish between fixed, variable and mixed costs.

Question 53

A business has historically experienced a trend of unfavourable labour efficiency variances.

- Describe the nature of labour efficiency variances.
- Explain what may be causing the unfavourable variances.
- Describe strategies the business could use to reverse the unfavourable trend.



Taxation

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Accounting firms of every size, whether they are big players, small teams, or even if you are the mastermind behind your very own business.

How do I get there?

You don't need to study anything specific in high school, but business-related subjects can help you get a head start.

Ability to work overseas



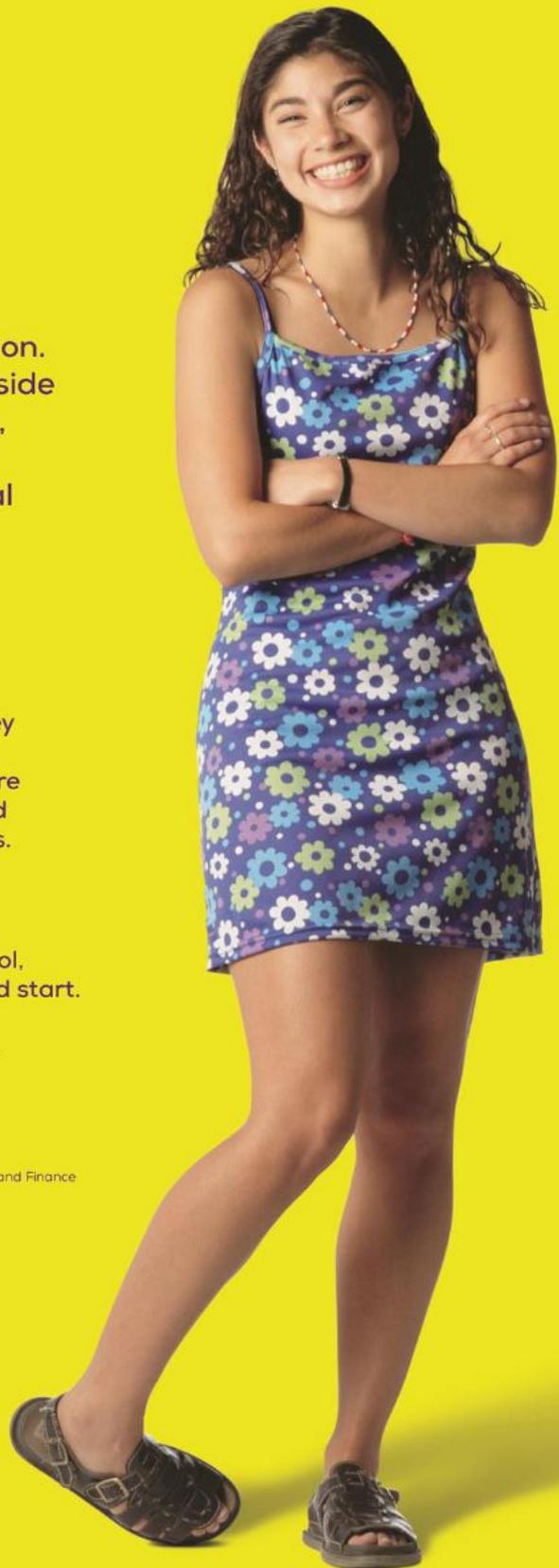
Graduate salary*



*Hays Salary Guide FY23/24 Accounting and Finance

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9. Cost-Volume-Profit Analysis (CVP)



Activate Prior Knowledge

Respond to the following questions. Discuss your answers with a peer or the class.

<p>The selling price of a good or service increases and the cost of a product also increases. How much would the profit of a business increase or decrease? What other information might you need to answer this question?</p>	
<p>What do you think is meant by the term 'margin of safety'? Why would this be important for a business?</p>	
<p>What should a business consider when deciding whether to continue domestic manufacturing or switch to overseas manufacturing?</p>	

CVP – Syllabus

Syllabus – Unit 3	
Cost Volume Profit (CVP)	<p>Financial institutions and systems: Financial systems and fundamental principles</p> <ul style="list-style-type: none"> explain the relationship between volume of activity, costs and profit <p>Recording, using and evaluating financial information: Evaluating financial information for planning, coordinating, controlling and investing</p> <ul style="list-style-type: none"> cost-volume-profit (CVP) analysis for decision making purposes <ul style="list-style-type: none"> cost behaviour contribution margin break-even point margin of safety interpretation of CVP results and testing of sensitivity to changing decisions about: <ul style="list-style-type: none"> volumes, product mixes, pricing and costs and the impact of capacity constraints make or buy decisions close down product/business unit decisions accept or reject special orders decisions <p>Recording, using and evaluating financial information: Recording, processing and communicating financial information</p> <ul style="list-style-type: none"> cost-volume-profit (CVP) processing for a single and multi-product (maximum three products) business <ul style="list-style-type: none"> calculation of contribution margin calculation of contribution margin per unit calculation of weighted average contribution per unit calculation of margin of safety calculation of selling price, variable cost, fixed cost, profit or sales volume calculation of break-even point calculation of the effect on profit/loss of make or buy decisions calculation of the effect on profit/loss of closing a department/dropping a segment product decision calculation of the gain or loss on special order decisions

CVP – Introduction

CVP is a managerial accounting technique that calculates and analyses the relationship between costs, sales volume and profit. CVP is a useful tool for businesses to make informed decisions such as pricing strategies, production levels, and overall business planning.

Below is a theory summary for CVP that will be important to revise for assessments/exams. This theory is covered throughout this chapter and will make more sense once the entire chapter has been covered. For now, this reads as an overview of what will be covered during this chapter.

CVP – Summary Table

	CVP
Nature	Evaluates how changes in selling prices, costs and volume impact entity profit.
Assists in decision making / calculation of	<ul style="list-style-type: none"> Estimate future profits. Selling price of products. Break-even point in units (of production) and dollars. Capacity constraint decisions – prioritising high contribution margin production. Whether to accept a special order or not. Shut down (or Stay Open) decisions. Make or buy decisions.
<i>Note: Make sure you can describe these too.</i>	
Calculations	See Specification Booklet for calculations.

Management Accounting Income Statement, Contribution Margin and Profit

In management (internal) accounting, businesses seek to calculate and understand factors influencing the profit of the entity. This initial section demonstrates.

- Management (internal) income statement format.
- Contribution margin.
- Profit or Loss and Selling Price.

Management Accounting Income Statement

Management accounting refers to financial information prepared and used by internal users. In the following income statement format, profit is calculated through.

- Sales less variable expenses equals the contribution margin.
- Contribution margin less fixed expenses equals the net profit.

Company X Income Statement For the year ended 30 June 2019	
Sales	
Less Variable Expenses	
Contribution Margin	
Less Fixed Expenses	
Net Profit	

Note: Variable expenses and fixed expenses were previously covered in the cost accounting chapter.

Contribution Margin

Contribution margin is the revenue remaining after variable costs are subtracted from sales.

Contribution margin assists decision making through evaluation of:

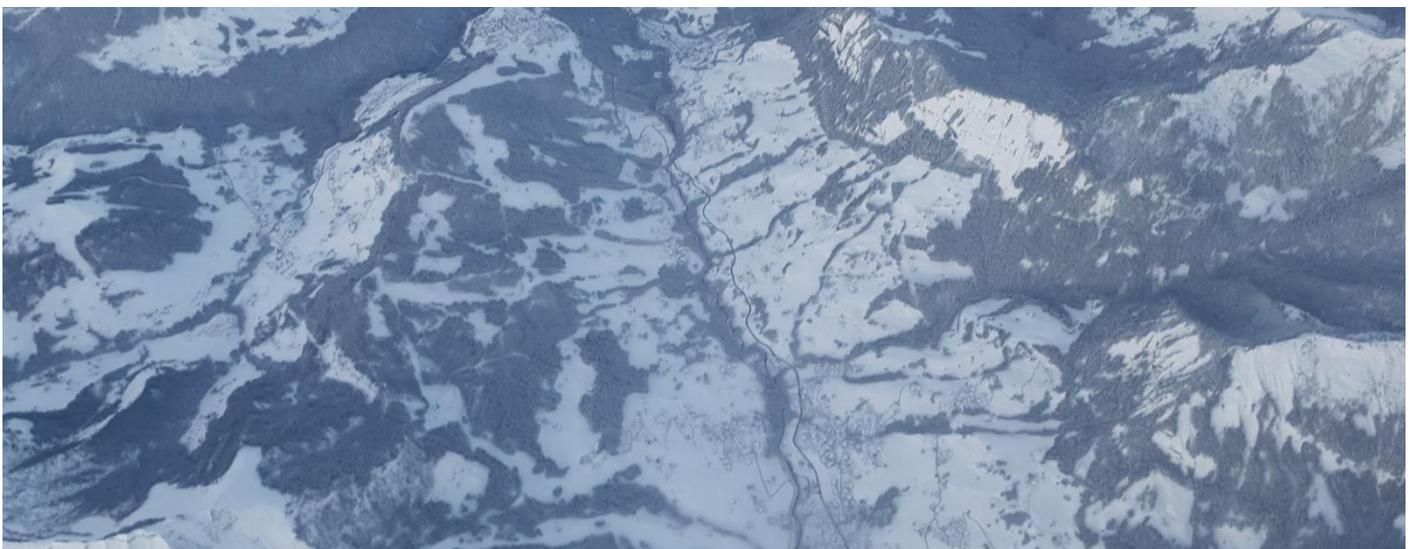
- Profitability/losses of product lines.
- Appropriate sales prices.
- Product mix changes.
- Revenue that covers fixed costs and contributing to profit.

Contribution Margin calculation

The contribution margin can be expressed in three ways.

- Contribution margin per unit.
- Total contribution margin.
- Contribution margin ratio.

These contribution margin expressions are calculated in the following example. The example after this demonstrates how the contribution margin fits into the management accounting income statement.



Flight from Nice to Geneva.

Example

Francine Blue produces water bottles and has given an accountant the following financial information for May 2031.

Selling price per water bottle	\$30 per water bottle
Number of water bottles sold per month	400 water bottles
Variable expenses	\$10 per water bottle
Fixed expenses	\$3100 per month

Required tasks:

- Calculate the contribution margin per unit during May 2031.
- Calculate the total contribution margin during May 2031.
- Calculate the contribution margin ratio during margin 2031.

Solution**Step 1 – Calculate the contribution margin per unit.**

Contribution margin per unit =	SP per unit – VC per unit i.e., Selling price per unit – Variable costs per unit
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$$\text{Contribution margin per unit} = 30 - 10$$

$$= \$20$$

Therefore, the contribution margin per unit is \$20.

Step 2 – Calculate the total contribution margin.

Total contribution margin =	TR – TVC i.e., Total revenue – Total variable costs
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Total contribution margin can be found by multiplying the contribution margin per unit by the number of units sold or calculating the total revenue and total variable costs separately.

Step 2 – Option 1.

Note: TR and TVC formula is not in the specification booklet.

$$\text{Total revenue} = \text{selling price} \times \text{number of units sold}$$

$$= 30 \times 400 = 12,000$$

$$\text{Total variable costs} = \text{variable costs} \times \text{number of units sold}$$

$$= 10 \times 400 = 4000$$

$$\text{Total contribution margin} = 12,000 - 4,000$$

$$= \$8,000$$

Therefore, the total contribution margin is \$8,000.

Step 2 – Option 2.

Note: this formula used in this option is not in the specification booklet.

$$\text{Total contribution margin} = \text{contribution margin per unit} \times \text{number of units sold}$$

$$= 20 \times 400$$

$$= \$8,000$$

Therefore, the total contribution margin is \$8,000.

Step 3 – Calculate the contribution margin ratio.

$$\text{Contribution margin ratio} = \frac{\text{Contribution margin per unit}}{\text{SP per unit}}$$

$$\text{Contribution margin ratio} = 20 / 30 \\ = 0.67$$

Therefore, the contribution margin ratio is 0.67.

Preparation of management accounting income statement

Example

Francine Blue produces water bottles and has given their accountant the following financial information for May 2031.

Selling price per water bottle	\$30 per water bottle
Number of water bottles sold per month	400 water bottles
Variable expenses	\$10 per water bottle
Fixed expenses	\$3100 per month

Required tasks:

- Calculate the profit for May 3031.
- Calculate the unit cost.
- Prepare an income statement for May 3031 showing the contribution margin and net profit.

Solution

Step 1 – Profit calculation.

Profit	=	TR – TC i.e., Total revenue – Total costs
Profit	=	(SP x QS) – [(VC x QS) + TFC] i.e., (Selling price x Quantity sold or budgeted) – [(Variable costs x Quantity sold or budgeted) + Total fixed costs]
Total costs	=	TVC + TFC i.e., Total variable costs + Total fixed costs

$$\begin{aligned} \text{Profit} &= \text{Revenue} && - \text{Costs} \\ &= (\text{SP/unit} \times \text{QS}) && - [(\text{VE/unit} \times \text{QS}) + \text{FE}] \\ &= 30 \times 400 && - [(10 \times 400) + 3,100] \\ &= 12,000 && - (4000 + 3,100) \\ &= 12,000 && - 7,100 \\ &= 4,900 \end{aligned}$$

Therefore, the profit in May 2031 is \$4,900.

Step 2 – Unit Cost.

Unit cost =	$\frac{TC}{\text{Number of units}}$ <p>i.e., Total costs / Number of units</p>
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Unit cost = 7,100 / 400
= \$17.75

Therefore, the unit cost is \$17.75.

Step 3 – Preparation of Management Accounting Income Statement.

Francine Blue Income Statement For the month ended July 2019	
Sales (\$30 per water bottle x 400 water bottles sold)	\$12,000
Less Variable Expenses (\$10 per water bottle x 400 water bottles sold)	\$4,000
Contribution Margin	\$8,000
Less Fixed Expenses	\$3,100
Net Profit	\$4,900

Note: The contribution margin and profit can be calculated directly in this income statement format.

The impact of changes in revenue and expenses on profit

Profit will be influenced by changes in:

- Revenue:
 - Selling price.
 - Volume.
- Expenses:
 - Variable expenses.
 - Volume.
 - Fixed expenses.

Changes may be expressed either as:

- A percentage e.g., increase or decrease of 10%.
- An exact value e.g., increase or decrease of \$25.

Example

Francine Blue produces water bottles and has given their accountant the following financial information for May 2031.

Selling price per water bottle	\$30 per water bottle
Number of water bottles sold per month	400 water bottles
Variable expenses	\$10 per water bottle
Fixed expenses	\$3100 per month

Profit before the below changes was \$3,100.

The following revenue and expense changes are expected for the following month:

- Number of water bottles sold increases by 50.
- Selling price increases by 3%.
- Variable expenses increase by \$10.
- Fixed expenses decrease by 10% due to a decrease in rent.

Required task:

Calculate the change in profit given these changes.

Solution

Step 1 – Calculation of new profit.

The profit for this example can be calculated as demonstrated below.

- Percentage increases are multiplied by 1 + the percentage.
- Percentage decreases are multiplied by 1 subtract the percentage.

Profit =	Revenue	- Costs
=	(SP/unit x QS)	- [(VE/unit x QS) + FE]
=	(30 x 1.03) x (400 + 50)	- [((10 + 10) x (400 + 50)) + (3,100 x 0.9)]
=	30.9 x 450	- [(20 x 450) + 2,790]
=	13,905	- [9,000 + 2,790]
=	2,115	

Therefore, the profit for the following month will be \$2,115.

Step 2 – Calculation of change in profit.

Change in profit = new profit – old profit
= 2,115 – 3,100
= -\$985

Therefore, the change in profit is a decrease of \$985.

Practice Questions

Questions 1-7: Management Accounting Income Statement, Contribution Margin and Profit.

Depreciation revision

Depreciation may need to be calculated as a component of total fixed expenses. The year 11 practical guide chapter on depreciation is available for download on the resource hub as a sample chapter. The resource hub is linked at the front of this book. It may be useful to download and revise this chapter if necessary.

Tips

Specification booklet

Have your specification booklet open whilst completing practice questions. When using various CVP formulas, locate these in the specification booklet. This will help build familiarity with relevant sections.

Formulas in workings

Many students miss important components of formulas that are given in the specification booklet. Before showing your working out in numbers, write down the relevant specification booklet formulas in your workings section to ensure you execute the formulas correctly.

Label workings

Many students miss out on marks because their calculation workings are not clearly labelled. Get in the habit early of labelling all your workings.

Tip

Course Guide

While completing this chapter you may find it useful to refer to the relevant chapter in the Essential Insight Course Guide. The Course Guide summarizes all theory relevant for each practical guide chapter. This saves time flipping through multiple pages in the Practical Guide while revising. The Course Guide can be found by navigating to the Resource Hub link on the front page.

Calculation of contribution margin	
Contribution margin per unit =	SP per unit – VC per unit i.e., Selling price per unit – Variable costs per unit
Or	
Total contribution margin =	TR – TVC i.e., Total revenue – Total variable costs
Or	
Contribution margin ratio =	$\frac{\text{Contribution margin per unit}}{\text{SP per unit}}$

Question 1

Calculate the contribution margin per unit and the total contribution margin.

Question	Selling Price per unit	Variable cost per unit	Contribution margin per unit	Number of units	Total contribution margin
a	\$35	\$15	$35 - 15 = \$20$	20	$(35 - 15) \times 20 = \$400$
b	\$174	\$82		130	
c	\$96	\$16		261	
d	\$118	\$43.20		87	
e	\$604.53	\$434.19		542	

Basic cost profit concepts	
Profit =	TR – TC i.e., Total revenue – Total costs
Profit =	(SP x QS) – [(VC x QS) + TFC] i.e., (Selling price x Quantity sold or budgeted) – [(Variable costs x Quantity sold or budgeted) + Total fixed costs]
Total costs =	TVC + TFC i.e., Total variable costs + Total fixed costs
Unit cost =	$\frac{TC}{\text{Number of units}}$ i.e., Total costs / Number of units

Question 2

Calculate profit in the below scenarios using the profit formula.

	Quantity Sold	Selling Price per unit	Total Revenue	Variable cost per unit	Total Fixed Costs	Total Costs	Profit
a	100	\$80	100 x 80 = \$8,000	\$25	1,500 x 1.05	[(100 x 25) + (1,500 x 1.05)] = 2,500 + 1,575 = \$4,075	8,000 – 4,075 = \$3,925
b	250	\$148		\$13	1,800		
c	430	\$42		\$14 less 6%	800		
d	97	142 x 1.14		\$33.80 + 5	4,500 add 5%		
e	48 + 10	97.20		\$9.30 add 9%	3000 + 200		

Question 3

Baseball Supplies manufactures baseball bats. Baseball Supplies has provided the following financial information for the month ended 31 March 2022.

Selling price of baseball bats	\$14
Baseball bats monthly sales volume	1,800
Variable costs	\$5
Fixed costs	\$3,000

Require tasks:

Calculate profit for this business using:

a. Profit formula method.

Workings

b. Income statement method.

Baseball Supplies Income Statement For the month ended 31 March 2022	
Sales	
Less Variable Expenses	
Contribution Margin	
Less Fixed Expenses	
Net Profit	

Question 4

Ergonomic Office Ltd manufactures desks. The following financial information has been supplied.

Sales volume per year 120 desks.

Selling price \$370.

Expense	Cost	Variable (V) or Fixed (F)
Electricity per year	\$1,600	
Wood per desk	\$60	
Labour of carpenters per desk	\$115	
Other variable expenses per desk	\$10	
Rent per year	\$6,000	
Machinery maintenance per year	\$900	

Required tasks:

- Classify the expenses as variable or fixed.
- Calculate the profit.

Workings

- Calculate the change in profit if selling price increases by \$5.

Workings

- Calculate the change in profit if the selling price from the initial question decreases by 4%

Workings

Question 5

Special Day Bridal manufactures wedding dresses. Special Day Bridal has provided the following information for the month ended 31 July 2028.

Sales volume per month 20 dresses.

Selling price \$900.

Expense	Cost	Variable (V) or Fixed (F)
Wages per dress	\$290	
Insurance per month	\$230	
Depreciation of machinery per month	\$180	
Other fixed expenses	\$900	
Rent per month	\$1,200	
Electricity per month	\$60	
Fabric per dress	\$210	

Required tasks:

a. Classify the expenses as variable or fixed.

b. In August, quantity sold increases by 10%. Calculate contribution and profit using the income statement method.

Workings

Special Day Bridal Income Statement For the month ended 31 August 2028	

Question 6

Green Life Gardening grows tomato seedlings to sell to nurseries. The following financial information has been provided for the month ended 28 February 2041.

Selling price of tomato seedling	\$4.30
Tomato seedling monthly sales volume	12,000
Variable costs	\$1.50
Fixed expenses	\$27,900

Required tasks:

a. Calculate profit using the income statement method.

Workings

Green Life Gardening Income Statement For the month ended 28 February 2041	

b. In two months' time, fixed expenses increase by 6% and quantity sold increases by 13%. Calculate the profit in two months' time using the profit formula.

Workings

Question 7

Moon Bounce produces bouncy balls and has provided the following financial information for the year ended 30 June 2028.

- Sales: 6,100 bouncy balls.
- Selling price: \$1.80 per bouncy ball.
- Fixed expenses per year: \$7,400.
- Variable expenses per bouncy ball: \$0.20.

In the following year

- Selling price is set to decrease by 2%.
- Sales are expected to increase by 2,300 bouncy balls.

Required tasks:

a. Calculate profit for the year ended 30 June 2029 using the income statement method.

Workings

Moon Bounce Income Statement For the month ended 30 June 2039	

b. Calculate profit for the year ended 30 June 2029 using the profit formula.

Workings

c. Calculate the contribution margin per bouncy ball sold on 30 June 2029.

Workings

Selling price calculation

The profit calculation formula can be rearranged to find the selling price. This can be done when the selling price is not listed but the total profit, fixed expenses, variables expenses and sales volume are provided.

Example

The following information has been provided by Super Figurines:

- Quantity of figurines sold per month: 1,200 per month.
- Monthly profit: \$18,000.
- Variable expenses: \$7.
- Fixed expenses: \$4,000 per month.

Required task:

Calculate the selling price of each figurine.

Solution

The known values can be input into the profit calculation. The equation can then be rearranged to find the selling price.

$$\begin{aligned} \text{Profit} &= \text{SP} \times \text{QS} - [(\text{VC}/\text{unit} \times \text{QS}) + \text{FE}] \\ \$18,000 &= \text{SP} \times 1,200 - [(\$7 \times 1,200) + \$4,000] \\ \$18,000 &= 1,200 \text{ SP} - [\$8,400 + \$4,000] \\ \$18,000 &= 1,200 \text{ SP} - 12,400 \\ 1,200\text{SP} &= 12,400 + 18,000 \\ 1,200\text{SP} &= 30,400 \\ 1,200\text{SP} &= 30,400 / 1,200 \\ \text{SP} &= \$25.33 \end{aligned}$$

Therefore, the selling price of each figurine is \$25.33.

Practice Questions

Questions 8-10: Selling price calculation.

Question 8

The following financial information has been provided by United Flags who produces flags for a variety of occasions.

Quantity of flags sold per quarter	2,500 per quarter
Quarterly profit	\$40,000
Variable expenses	\$20
Fixed expenses	\$5,000 per quarter

a. Calculate the selling price of each flag.

Workings

Question 9

New Wave Tech Ltd manufactures tablets. The following information has been provided.

Quantity of tablets sold per month	500 per month
Target profit	\$150,000
Variable expenses	\$180
Fixed expenses	\$70,000 per month

a. Calculate the selling price of each tablet required to achieve the target profit.

Workings

Question 10

Festive Fireworks manufactures a signature big boom firework. The business estimates sales of 3,600 fireworks per year. The business aims to achieve a target profit of \$65,000 per year. Fixed expenses are \$9,000 per year and the variable expenses are made up of \$8 of direct materials and \$10 of direct labour.

a. Calculate the required selling price of each firework.

Workings

Break-even Analysis

The break-even point is where revenue equals costs.

During this chapter we will cover:

- Break-even point and target revenue calculation for a single product business.
- Break-even calculation for a multi-product business.
- The impact of sales mix changes on break-even point and profit.
- Margin of safety.

Break-even is important and assists in decision making through:

- Calculation of unit sales required to cover costs.
- Evaluation of alternative options.
- Setting sales KPIs which can motivate employees.

Components affecting break-even.

- Sales price.
- Number of sales.
- Fixed costs.
- Variable costs.

Break-even point and target revenue

In this first section, we will calculate break-even point and target revenue for a single product business.

Example

A coffee mug photo printing business has provided the following financial information for the month ended 30 September 2039.

Fixed costs during September: \$1,200.

Variable costs: \$5 per mug.

Selling price: \$9 per mug.

Required tasks:

- Calculate the break-even point in units.
- Calculate the break-even point in sales dollars.
- Calculate the unit sales required to achieve a profit of \$10,000.

Solution

Step 1 – Calculation of break-even point in units.

Break-even point (in units) =	$\frac{\text{TFC}}{\text{Contribution margin per unit}}$ <p>i.e., Total fixed costs / Contribution margin per unit</p>
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Contribution margin per unit =	$\text{SP per unit} - \text{VC per unit}$ <p>i.e., Selling price per unit – Variable costs per unit</p>
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$$\begin{aligned} \text{Break-even point in units} &= 1,200 / (9 - 5) \\ &= 300 \text{ mugs} \end{aligned}$$

Therefore, the break-even point in units is 300 mugs sold. In other words, the business will need to sell 300 mugs to cover all its costs. Any units sold above 300 mugs will achieve a profit of the contribution margin per unit sold.

Note: With break-even point, if the result were to not be a whole number, then the result is always rounded up. I.e. if the result was 299.2 or 299.8 the result would be rounded up to 300. This is contrary to other areas of math where rounding is often done up or down to the nearest whole number. This is because once the break-even units is even the slightest portion above a whole number, to meet the break-even point you would need to make the nearest whole number which is above the partial number. I.e. if you were to round down, the break-even would not be met.

Step 2 – Calculation of break-even point in sales dollars.

Break-even point in sales dollars can be calculated either through the specification booklet formula or an alternate formula. Both options are demonstrated below.

Step 2 – Option 1 – Specification booklet formula.

Break-even point (in sales dollars)	=	$\frac{\text{TFC}}{\text{Contribution margin ratio}}$ <p>i.e., Total fixed costs / Contribution margin ratio</p>
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Contribution margin ratio	=	$\frac{\text{Contribution margin per unit}}{\text{SP per unit}}$
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$$\text{Contribution margin ratio} = (9 - 5) / 9 = 0.4444$$

$$\text{Break-even point (in sales dollars)} = 1,200 / 0.44 = \$2,700.$$

Therefore, the break-even point in sales dollars is \$2,700.

Step 2 – Option 2 – Alternate formula.

Break-even point in sales dollars = break-even units x selling price

Note: this formula is not in the specification booklet.

$$\text{Break-even point in sales dollars} = 300 \text{ mugs} \times \$9 = \$2,700$$

Therefore, the break-even point in sales dollars is \$2,700.

Step 3 – Calculation of unit sales required to achieve a target profit.

To calculate the target revenue in units to achieve a certain level of profit – A similar process is used, except target profit is added to the TFC before being divided by the contribution margin per unit.

Forecast target revenue (in units)	=	$\frac{\text{TFC} + \text{Target profit}}{\text{Contribution margin per unit}}$
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$$\begin{aligned} \text{Forecast target revenue (in units)} &= (1,200 + 10,000) / (9 - 5) \\ &= 11,200 / (9 - 5) \\ &= 2,800 \text{ mugs} \end{aligned}$$

Therefore 2,800 mugs must be sold to achieve a target profit of \$10,000.

Note: a similar equation can be used to calculate the number of units sold given the current profit. The below formula is not in the specification booklet.

Current revenue (in units)	=	$\frac{\text{TFC} + \text{Current profit}}{\text{Contribution margin per unit}}$
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Practice Questions

Questions 11-17: Break-even point and target revenue.

Tips

Accrued expenses and prepaid expenses

If calculation of fixed expenses requires calculation of accrued expenses or prepaid expenses the following formulas can be used.

- Expense = Expense paid + accrued expense
- Expense = Expense paid – prepaid expense

All costs

All costs are relevant for CVP analysis, not just product costs. This is different to the calculations used in the cost accounting chapter.

Break-even point for a single product firm	
Break-even point (in units)	= $\frac{\text{TFC}}{\text{Contribution margin per unit}}$ i.e., Total fixed costs / Contribution margin per unit
Or	
Break-even point (in sales dollars)	= $\frac{\text{TFC}}{\text{Contribution margin ratio}}$ i.e., Total fixed costs / Contribution margin ratio



View from Aiguille du Midi gondola, Chamonix.

Question 11

Calculate the break-even point for the following scenarios.

Note: With break-even point, if the result were to not be a whole number, then the result is always rounded up. I.e. if the result was 299.2 or 299.8 the result would be rounded up to 300. This is contrary to other areas of math where rounding is often done up or down to the nearest whole number. This is because once the break-even units is even the slightest portion above a whole number, to meet the break-even point you would need to make the nearest whole number which is above the partial number. I.e. if you were to round down, the break-even would not be met.

	Fixed costs	Contribution Margin = SP - VC		Break-even point	Break-even sales in dollars
		Selling price per unit	Variable expenses per unit		
a	7,500	18	5	$7,500 / (18 - 5)$ $= 576.92$ units This is rounded up to 577 units.	577×18 $= \$10,386$
b	10,000	30	20		
c	9,200	52	28		
d	57,000	12.50	3.75		
e	995	25	16.40		

Forecast revenue for target profit		
Forecast target revenue (in units)	=	$\frac{\text{TFC} + \text{Target profit}}{\text{Contribution margin per unit}}$

Question 12

Calculate the units required to be sold to achieve target profit.

	Fixed costs	Target profit	Contribution Margin = SP - VC		Units required to be sold to achieve target profit
			Selling price per unit	Variable expenses per unit	
a	3,700	12,000	27	13	$(3,700 + 12,000) / (27-13)$ = 1,121.43 This is rounded up to 1,122 units.
b	5,000	2,000	15	10	
c	16,500	92,800	21.50	5.90	
d	34,000	50,000	45	17.60	
e	15,300	153,000	14.80	3.87	

Question 13

Coogee Towels sells towels at a beach market at each week. The business has the following expenses.

Expense	Cost	Variable (V) or Fixed (F)
Import costs per scarf	\$3	
Cost per scarf	\$12	
Wages sales staff per week	\$300	
Petrol per week	\$20	
Rent per week	\$160	
Packaging costs per scarf	\$4	

The selling price per scarf is \$37.

Required tasks:

- Classify and calculate the fixed and variable expenses.
- Calculate the break-even point in number of scarves sold.

Workings

- Calculate the break-even point in dollars.

Workings

- Calculate the number of scarves required to be sold to earn a profit of \$2,500 per week.

Workings

- Last week, the business made a profit of \$960. Calculate the number of scarves sold last week.

Workings

Question 14

Dave's Dreamcatchers sells dreamcatchers and has provided the following information for the month ended 31 March 2031.

- The selling price per dream catcher is \$23.50.
- Wages are \$1,200 per month.
- Rent paid should be \$1,900. Accrued rent on 31 March should be \$450.
- Prepaid advertising on 31 March 2031 should be \$200. Advertising paid should be \$600.
- Furniture with an original cost of \$6,000 is depreciated at 15% per annum using the straight line method.
- Direct material per dreamcatcher is \$6.
- Direct labour is \$12 per dream catcher.

Required task:

a. Calculate the fixed and variable expenses during the month ended 31 March 2031.

Workings

b. Calculate the break-even point in units during the month ended 31 March 2031.

Workings

c. The business makes a profit of \$1,821.5 per month for the month ended 31 March 2031. Calculate the number of dream catchers the business sold.

Workings

Question 15

Cool Wave makes and sells ceiling fans. Cool wave has provided the following information for the year ended 30 June 2024:

The selling price per ceiling fan is \$180.

Direct labour per fan: 2 hours at \$15 per hour.

Direct materials per fan: \$19.

Accrued wages at 30 June 2024 should be \$400. Wages paid during the year should be \$21,500.

Rent paid during the year is estimated to be \$6,100. Prepaid rent at the end of the year is budgeted at \$450.

Insurance expense for the year is budgeted at \$700.

The carrying value of machinery was \$7900 at 30 June 2024. Non-current assets are depreciated using the reducing balance method at a rate of 20% per annum.

Required task:

a. Calculate the fixed and variable expenses for the year ended 30 June 2025.

Workings

b. Calculate the break-even point in units for the year ended 30 June 2024.

Workings

Question 16

Glide Kicks sells slides shoes decorated in glitter. The following information has been provided.

- Fixed expenses: \$2,900.
- Contribution margin per unit: \$13.
- Variable expenses: \$5.

Required tasks:

a. Calculate the break-even point in units.

Workings

b. Calculate the break-even point in dollars.

Workings

c. The business is considering moving to a new store location with increased rent of \$700 per month and increasing the selling price by \$1.50. Calculate the new break-even units and dollars.

Workings

d. Comment on how the change outlined in part 'c' change would impact risk for the business.

Question 17

Macro Micro manufactures microscopes. The following financial information has been provided.

The following financial information is budgeted for the month ended 30 November 2029.

- Variable costs: \$290.
- Fixed costs: \$15,200.
- Selling price: \$718.
- Predicted number of microscopes sold: 92.

Required tasks:

a. Calculate profit for the month ended 30 November 2029.

Workings

b. Calculate the break-even point in units.

Workings

c. Calculate the break-even point in dollars.

Workings

d. The business is proposing changes that would result in variable costs decreasing by \$5 per unit and fixed costs increasing by \$3,000. Calculate the change in profit if the number of units sold remains the same. Evaluate whether these changes should proceed.

Workings

[Graphing CVP and Break-even](#)

Cost-Volume-Profit Analysis information can be presented on graphs. Graphing CVP is not explicitly in the syllabus but may be taught by your teacher and can help you understand some concepts relevant to CVP Analysis.

Graphing fixed costs and variable costs.

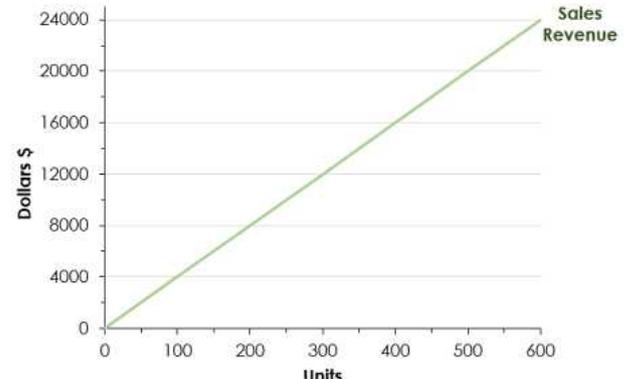
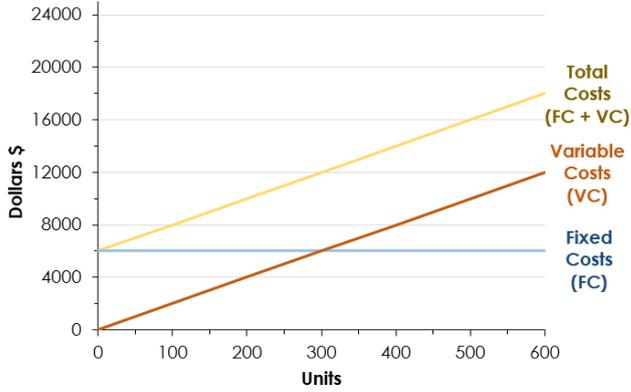
In the Cost Accounting chapter, the concept of variable costs and fixed costs was covered. Below is a recap.

Behaviour cost classification	Nature / Definition	Examples	Graph
Fixed	Costs that do not change with varied numbers of products produced.	<ul style="list-style-type: none"> Office rent. Depreciation of NCAs. Advertising. Loan interest. 	<p>The graph for Fixed Costs (FC) shows a horizontal blue line at a value of \$6,000 on the y-axis (Dollars \$) across the entire x-axis (Units) from 0 to 600. The y-axis has major grid lines every 4,000 units, and the x-axis has major grid lines every 100 units.</p>
Variable	Costs that change relative to the number of products manufactured.	<ul style="list-style-type: none"> Materials used in production. Factory labour hours. 	<p>The graph for Variable Costs (VC) shows a straight orange line starting at the origin (0,0) and increasing linearly to a value of \$12,000 on the y-axis (Dollars \$) at 600 units on the x-axis (Units). The y-axis has major grid lines every 4,000 units, and the x-axis has major grid lines every 100 units.</p>

Note: Mixed costs have not been included here as the impact of mixed costs on CVP analysis is not relevant to the syllabus.

Information relevant to CVP Analysis

When analysing break-even as part of CVP we must find the point where sales revenue covers the total costs.

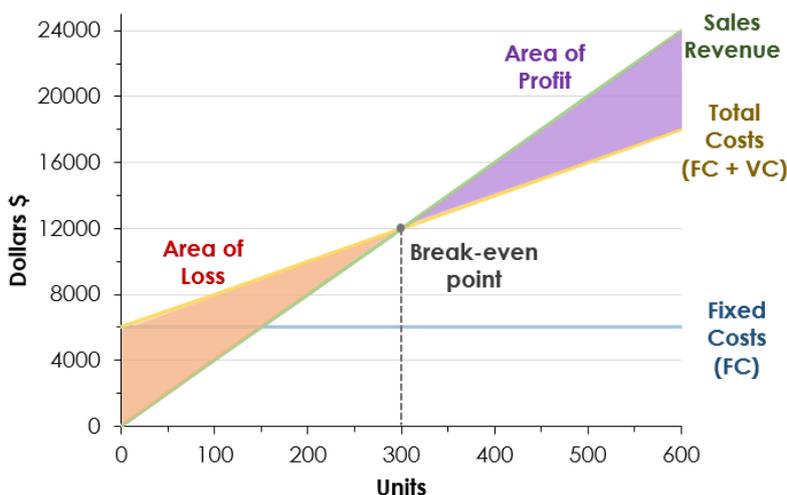
Information relevant to CVP Analysis	Description	Graph
<p>Sales Revenue</p>	<p>Sales revenue is income received from each sale. Sales revenue will be \$0 when 0 units are sold and increase each time an additional unit is sold.</p>	
<p>Total Costs</p>	<p>Total costs are determined by adding fixed costs and variable costs. At 0 units produced the value of total costs is not \$0. This is because at 0 units of production the total costs will be made up of the fixed costs that occur regardless of how many units are produced. Fixed costs and variable costs have also been shown on this graph to highlight how the total costs is the fixed costs and variable costs added together.</p>	

Graphing Break-even analysis

The break-even point is where revenue equals costs. On the graph this is seen as the point where sales revenue and total costs are equal.

The area of loss is the area highlighted in orange to the left of the break-even point. This is where the units sold does not cover total costs and the business loses money.

The area of profit is the area highlighted in purple to the right of the break-even point. This is where the units sold more than covers the total costs and generates a profit.

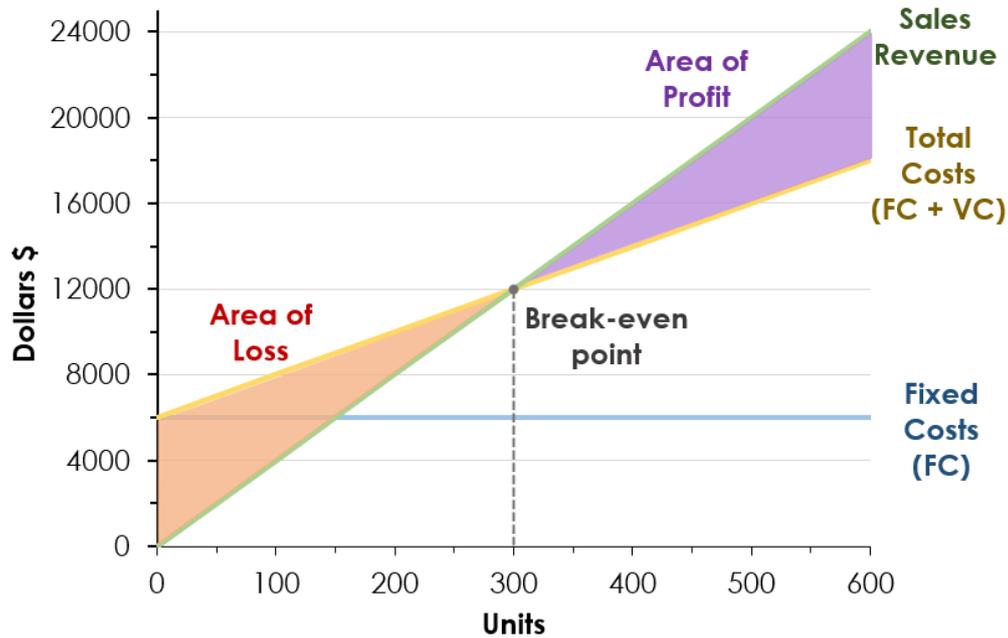


Practice Questions

Questions 18-19: Graphing CVP and break-even analysis.

Question 18

The following information has been provided by a business.

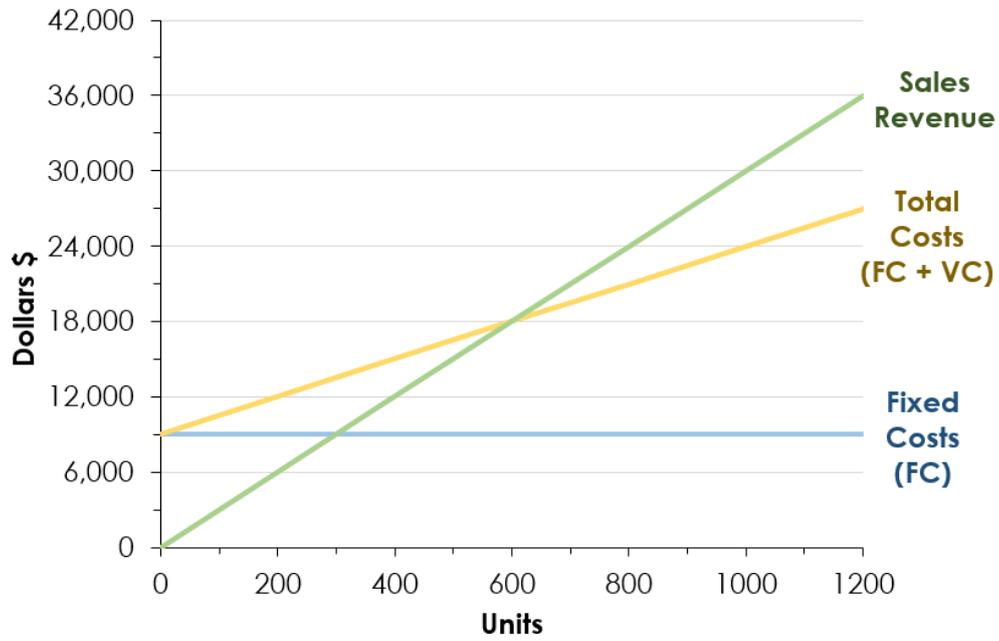


Required tasks

- Identify the total costs at 200 units sold.
- Identify the sales revenue at 200 units sold.
- Identify the fixed costs at 550 units sold.
- Calculate the profit or loss at 200 units sold.
- Identify the break-even point in units.
- Identify the break-even point in sales dollars.
- Calculate the profit or loss at 500 units sold.

Question 19

A business has provided the following financial information.



Required tasks:

- a. Identify the total costs at 300 units sold.

- b. Identify the sales revenue at 300 units sold.

- c. Identify the fixed costs at 1,000 units sold.

- d. Calculate the profit or loss at 300 units sold.

- e. Identify the break-even point in units.

- f. Identify the break-even point in sales dollars.

- g. Calculate the profit or loss at 1,200 units sold.

Break-even calculation for multi-product businesses

The examples demonstrated so far have only conducted break-even analysis for businesses that produces a single type of product. In reality businesses often produce multiple products. The section will demonstrate how break-even analysis can be applied for businesses that produces more than one product line.

CVP – How to tell which product will maximize profit

CVP can calculate:

- Product sales mix to maximize profit.
- Weighted average contribution margin.
 - This helps calculate break-even unit sales – portion of products to produce to maximize profit.
 - This is done by adding together each products contribution margin multiplied by each products sales mix percentage.

Example

Bundle of Joy manufactures and sells three different types of prams for babies. The business has provided the following information for the year ended 30 June 2053.

	Solo Rida (SR)	Off-road extreme (ORX)	Dual Wield (DW)
Selling price per unit	\$480	\$650	\$720
Variable expense per unit	\$220	\$300	\$280
Number of units sold per year	3,200	900	1,300
Fixed expenses per year	\$36,300		

Required task:

Calculate the break-even point for Bundle of Joy.

Calculate how many of each type of pram must be sold to achieve a profit of \$180,000.

Solution

Prior to calculation of the break-even calculation, it is necessary to calculate the:

- Sales mix.
- Contribution margin per unit.
- Weighted average contribution margin.

Step 1 - Sales mix calculation.

Sales mix is the percentage of total sales made up by each product line.

$$\text{Sales mix \%} = \frac{\text{Number of units sold of a given product}}{\text{Total units sold of all products}} \times 100$$

Total units sold of all products = 3,200 + 900 + 1,300
= 5,400

SR sales mix = 3,200 / 5,400
= 59%

ORX sales mix = 900 / 5,400
= 17%

DW sales mix = 1,300 / 5,400
= 24%

Step 2 – Contribution margin per unit.

The contribution margin for product line is found using the same process as before and is calculated for each product line.

	Solo Rida (SR)	Off-road extreme (ORX)	Dual Wield (DW)
Selling price per unit	\$480	\$650	\$720
Variable expense per unit	\$220	\$300	\$280
Contribution margin per unit	= 480 – 220 = \$260	= 650 – 300 = \$350	= 720 – 280 = \$440

Step 2 – Weighted average contribution margin calculation.

$$\text{Weighted average contribution margin per unit} = \frac{\sum (\text{Contribution margin per unit} \times \text{Sales mix \%})}{\sum \text{Sales mix \%}}$$

Where \sum means the sum of a set of numbers

	Solo Rida (SR)	Off-road extreme (ORX)	Dual Wield (DW)
Contribution margin per unit	\$260	\$350	\$440
Sales mix %	59%	16%	24%
Weighted average contribution margin for each product line	260 x 0.59 = \$153.4	350 x 0.17 = \$59.5	440 x 0.24 = \$105.6
Weighted average contribution margin per unit	153.4 + 59.5 + 105.6 = \$318.50		

Therefore, the weighted average contribution margin per unit is \$318.50.

Step 3 – Break-even calculation for multiple products.

A similar break-even calculation formula is used for multi-product businesses. The only difference is that the instead of contribution margin per unit, weighted average contribution margin per unit is used instead. Once the break-even point in units has been calculated, this is multiplied by the sales mix for each product.

$$\text{Break-even point (in units)} = \frac{\text{TFC}}{\text{Weighted average contribution margin per unit}}$$

i.e., Total fixed costs / Weighted average contribution margin per unit

$$\text{Break-even point (in units)} = 36,300 / 318.50$$

$$= 113.97$$

This is rounded up to 114.

Once the break-even point in units has been calculated, this is multiplied by the sales mix for each product line.

Break-even point for each product line = Break-even point in units x sales mix

Note: this formula is not in the specification booklet.

SR break-even point

$$= 114 \times 0.59\%$$

$$= 67.26$$

This is rounded up to 68 SR prams.

ORX break-even point

$$= 114 \times 0.17\%$$

$$= 19.38$$

This is rounded up to 20 ORX prams.

DW break-even point

$$= 114 \times 0.24\%$$

$$= 27.36$$

This is rounded up to 28 DW prams.

Therefore, the break-even point in is 68 SR prams, 20 ORX prams and 28 DW prams.

Step 4 – Total sales required to achieve target profit calculation.

The forecast target revenue in units formula can be used, except contribution margin per unit is substituted for the weighted average contribution margin per unit.

$$\text{Forecast target revenue (in units)} = \frac{\text{TFC} + \text{Target profit}}{\text{Contribution margin per unit}}$$

= 36,300 + 180,000 / 318.50
= 679.12 units
This is rounded up to 680 units.

Step 5 – Number of each type of product that must be sold to achieve a target profit calculation.

The forecast target revenue in units is multiplied by the sales mix for each product.

SR units to achieve target profit:
= 680 x 0.59%
= 401.2
This is rounded up to 402 SR prams.

ORX units to achieve target profit:
= 680 x 0.17%
= 115.6
This is rounded up to 116 ORX prams.

DW units to achieve target profit:
= 680 x 0.24%
= 163.2
This is rounded up to 164 DW prams.

Therefore, 402 SR prams, 116 ORX prams and 164 DW prams must be sold to achieve the profit target of \$180,000.



Annecy, France.

Practice Questions

Questions 20-25: Break-even calculation for multi-product businesses.

Tip Complete all steps
Don't forget the step of multiplying the break-even point in units by the sales mix values to find the break-even point for each product line.

Break-even point in total unit in multi-product firm

Break-even point (in units)	=	$\frac{\text{TFC}}{\text{Weighted average contribution margin per unit}}$ <p>i.e., Total fixed costs / Weighted average contribution margin per unit</p>
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Weighted average contribution margin

Weighted average contribution margin per unit	=	$\frac{\sum (\text{Contribution margin per unit} \times \text{Sales mix \%})}{\text{Where } \sum \text{ means the sum of a set of numbers}}$
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Sales mix %	=	$\frac{\text{Number of units sold of a given product}}{\text{Total units sold of all products}} \times 100$
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Question 20

Calculate the sales mix for each of the following scenarios.

	Number of units sold			Total units sold	Sales mix %		
	X	Y	Z		X	Y	Z
a	50	100	70	50 + 100 + 70 = 220	50 / 220 = 23%	100 / 220 = 45%	70 / 220 = 32%
b	95	16	84				
c	13	9	-				
d	30	14	180				
e	65	231	316				

Question 21

Calculate the weighted average contribution margin per unit for each of the following scenarios.

	Contribution margin per unit			Sales mix %			Weighted average contribution margin per product line			Weighted average contribution margin per unit
	X	Y	Z	X	Y	Z	X	Y	Z	
a	\$4	\$11	\$3	30%	45%	25%	$4 \times 0.3 = 1.2$	$11 \times 0.45 = 4.95$	$3 \times 0.25 = 0.75$	$1.2 + 4.95 + 0.75 = \$6.90$
b	\$9.20	\$13	\$3.50	10%	10%	80%				
c	\$27	\$19	\$21	30%	20%	50%				
d	\$1.50	\$2.1	\$4	77%	18%	5%				
e	\$10	\$9	-	34%	66%	-				

Question 22

Calculate the break-even point per product line.

	Weighted average contribution margin per unit	Total fixed costs	Break-even point in units	Sales mix			Break-even point per product line		
				X	Y	Z	X	Y	Z
a	\$50	\$10,000	$10,000 / 50 = 200$	50%	40%	10%	$200 \times 0.5 = 100$	$200 \times 0.4 = 80$	$200 \times 0.1 = 20$
b	\$15	\$3,750		13%	25%	62%			
c	\$17.80	\$5,400		40%	40%	20%			
d	\$24	\$21,000		18%	37%	45%			
e	\$3.50	\$1,290		12%	68%	20%			

Question 23

Eden Garden Juice manufacturers three flavours of fruit juice sold in one litre bottles.

	Tropical (TJ)	Orange (OJ)	Pear (PJ)
Selling price per bottle	\$8	\$5	\$6
Variable costs per bottle	\$3	\$1	\$3
Annual sales volume for 2041	3,200	4,000	1,500
Annual fixed costs	\$150,000		

Required tasks:

a. Calculate the contribution margin per unit for each juice flavour.

Workings

b. Calculate the sales mix during 2041.

Workings

c. Calculate the weighted average contribution margin for Eden Garden Juice.

Workings

d. Calculate the break-even number of bottles during 2041. Is the business currently selling enough bottles to achieve break-even?

Workings

e. Calculate the number of Pear Juice bottles required for break-even during 2041.

Workings

Question 24

Saucin You makes two types of traditional sauces.

	Pesto Sauce (PS)	Tomato Sauce (TS)
Annual sales volume for 2041	85,000	36,000
Selling price per jar	\$5	\$3
Variable costs per jar	\$2.70	\$1.80
Annual fixed costs	25,000	

Required tasks:

a. Calculate the break-even number of jars during 2041.

Workings

b. Calculate the break-even number of each type of sauce that must be sold to achieve a profit of \$85,000.

Workings

Question 25

Classic Caps Ltd manufactures three types of hats, gladiator hats, bucket hats and top hats.

	Gladiator hats (GH)	Bucket hats (BH)	Top hats (TH)
Selling price per hat	\$25	\$30	\$50
Annual sales volume for 2033 (hats)	6,000	7,500	4,000
Variable manufacturing cost/hat	\$4	\$5	\$7
Variable labour cost/hat	\$8	\$8	\$10
Annual fixed manufacturing costs	\$40,000		
Annual fixed non-manufacturing costs	\$32,000		

Required tasks:

a. Calculate the contribution margin per unit for each type of hat.

Workings

b. Calculate the sales mix during 2033.

Workings

c. Calculate the weighted average contribution margin for Classic Caps Ltd.

Workings

d. Calculate the break-even number of hats for Classic Caps Ltd during 2033.

Workings

e. Calculate the number of Bucket hats required for break-even.

Workings

The impact of sales mix changes on break-even point and profit

If the sales mix of a multi-product business changes, then the break-even point and profit will change also.

Example

Stress Less sells fidget spinners and stress balls. For the month ended 30 April 2031 the profit was \$3,500. The business is evaluating potential changes to the sales mix for the month ended 30 May 2031.

Existing	Fidget spinners	Stress Balls
Selling price per unit	\$7	\$5
Variable expenses per unit	\$4	\$1
Fixed expenses	\$1 600	
Sales mix	45%	55%

Proposed	Fidget spinners	Stress Balls
Sales mix	30%	70%
Sales volume	540 per month	1,260 per month

The business will influence the sales mix through increasing shelf space allocated to the stress balls and increasing advertising of stress balls relative to fidget spinners.

The selling price, variable expenses and total fixed expenses will remain unchanged.

Required task:

Calculate the effect of this change in sales mix to the break-even point and profit made by the business.

Solution

Step 1 – Weighted Average Contribution Margin calculation.

The new weighted average contribution margin is found by multiplying the existing contribution margin by the proposed sales mix for each product line.

Weighted average contribution margin per unit	=	$\sum (\text{Contribution margin per unit} \times \text{Sales mix \%})$ Where \sum means the sum of a set of numbers
---	---	---

$$\begin{aligned} \text{FS CM per unit} &= (7 - 4) \times 0.3 \\ &= 0.9 \text{ per unit} \end{aligned}$$

$$\begin{aligned} \text{SB CM per unit} &= (5 - 1) \times 0.7 \\ &= 2.8 \text{ per unit} \end{aligned}$$

$$\begin{aligned} \text{Weighted average CM} &= \text{FS Weighted CM} + \text{SB Weighted CM} \\ &= 0.9 + 2.8 \\ &= \$3.7 \text{ per unit} \end{aligned}$$

Therefore, the weighted average contribution margin per unit is \$3.7.

Step 2 – Break-even point in units calculation.

The proposed break-even point in units is calculated using the weighted average contribution margin calculated in the previous step.

Break-even point (in units)	=	$\frac{\text{TFC}}{\text{Weighted average contribution margin per unit}}$ i.e., Total fixed costs / Weighted average contribution margin per unit
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$$\begin{aligned} \text{Break-even point in units} &= 1,600 / 3.7 \\ &= 432.43 \end{aligned}$$

This is rounded up to 433 units.

Therefore, the break-even point in units is 433 units.

Step 3 – Break-even point per product line calculation.

The proposed break-even point per product line is calculated using the break-even point in units calculated in the previous step and the proposed sales mix from the question.

Break-even point per product line = Break-even point in units x sales mix

FS Break-even point

$$= 433 \times 0.3$$

$$= 129.9 \text{ units}$$

This is rounded up to 130 units.

SB Break-even point

$$= 433 \times 0.7$$

$$= 303.1 \text{ units}$$

This is rounded up to 304 units.

Therefore, the new break-even point is 130 fidget spinners and 304 stress balls.

Step 4 – Expected revenue and variable cost calculation.

The proposed expected sales of each product is multiplied by the selling price of each product.

Revenue = Selling Price x Quantity Sold

$$\text{FS revenue} = 7 \times 540$$

$$= 3,780$$

$$\text{SB revenue} = 5 \times 1,260$$

$$= 6,300$$

$$\text{Total revenue} = 3,780 + 6,300$$

$$\text{\$10,080}$$

Variable costs = Variable costs x Quantity sold

$$\text{FS VC} = 4 \times 540$$

$$= 2,160$$

$$\text{SB VC} = 1 \times 1,260$$

$$= 1,260$$

$$\text{Total VC} = \text{\$3,420}$$

Step 5 – New profit calculation.

The revenue and variable expenses calculated in the previous step can be used in the following profit formula.

Profit	=	$(\text{SP} \times \text{QS}) - [(\text{VC} \times \text{QS}) + \text{TFC}]$ i.e. (Selling price x Quantity sold or budgeted) – [(Variable costs x Quantity sold or budgeted) + Total fixed costs]
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$$\text{Profit} = 10,080 - (3,420 + 1,600)$$

$$= 5,060$$

Therefore, the new profit is \$5,060.

Step 5 – Change in profit calculation.

The existing profit was given in the question and can be used to calculate the change in profit.

Change in profit = New profit – old profit

$$= 5,060 - 3,500$$

$$= 1,560$$

Therefore, the change in profit is an increase of \$1,560. This increase has been caused by the increase in sales of a product with a higher contribution margin per unit.

Practice Questions

Questions 26-28: The impact of sales mix changes on break-even point and profit.

Weighted average contribution margin	
Weighted average contribution margin per unit =	$\frac{\sum (\text{Contribution margin per unit} \times \text{Sales mix \%})}{\text{Where } \sum \text{ means the sum of a set of numbers}}$
Sales mix % =	$\frac{\text{Number of units sold of a given product}}{\text{Total units sold of all products}} \times 100$

Question 26

Chill Max sells outdoor dining sets and lounge sets. For the year ended 30 June 2029 profit was \$650,000. The business is evaluating potential changes to the sales mix for the year ended 30 June 2030.

Existing	Dining Set	Lounge Set
Selling price per unit	\$1,200	\$1,400
Variable expenses per unit	\$300	\$600
Fixed expenses	\$560,000	
Sales mix	65%	35%

The proposed sales mix for the year ended 30 June 2030 is as follows:

Proposed	Dining Set (DS)	Lounge Set (LS)
Sales mix	80%	20%
Sales volume	800 per year	200 per year

The selling price, variable expenses and total fixed expenses will remain unchanged.

Required task:

a. Calculate the effect of this change in sales mix to the break-even point.

Workings

b. Calculate the effect of this change in sales mix to the profit made by the business.

Workings

Question 27

Vego-go makes plant based alternative fast food. Profit for the year ended 30 June 2052 the profit was \$25,000. The business is evaluating potential changes to the sales mix for the year ended 30 June 2053.

Existing	Vegan Chicken Wings	Vegan Burger
Selling price per serve	\$8	\$10
Variable expenses per serve	\$2	\$3
Fixed expenses	\$12,000	
Sales mix	50%	50%

The proposed sales mix for the year ended 30 June 2052 is as follows:

Proposed	Vegan Chicken Wings	Vegan Burger
Sales mix	40%	60%
Sales volume	4,000 per year	6,000 per year

The selling price, variable expenses and total fixed expenses will remain unchanged.

Required task:

a. Calculate the effect of this change in sales mix to the break-even point.

Workings

b. Calculate the effect of this change in sales mix to the profit made by the business.

Workings

Question 28

Study Stylish Ltd sells wooden desks and glass desks. For the month ended 30 September 2037 the profit was \$13,500. The business is evaluating potential changes to the sales mix for the month ended 31 October 2037.

Existing	Wooden Desk (WD)	Glass Desk (GD)
Selling price per unit	\$600	\$800
Variable expenses per unit	\$250	\$500
Fixed expenses	\$26,000	
Sales mix	63%	37%

Proposed	Wooden Desk (WD)	Glass Desk (GD)
Sales mix	69%	31%
Sales volume	90 per month	40 per month

The business will influence the sales mix through increasing shelf space allocated to the stress balls and increasing advertising of stress balls relative to fidget spinners.

The selling price, variable expenses and total fixed expenses will remain unchanged.

Required task:

a. Calculate the effect of this change in sales mix to the break-even point.

Workings

b. Calculate the effect of this change in sales mix to the profit made by the business.

Workings

Margin of safety

The margin of safety is the value of sales over break-even point. Margin of safety is important as assists decisions making through:

- Calculation of level sales can decrease before the entity:
 - Operates at a loss.
 - Revenue does not cover costs.
- Assessment of risk level:
 - Lower margin of safety equals higher risk.
- Calculation of discounts that can be given to customers.

Example

Boom Bap Speakers has provided the following financial information.

- Budgeted sales per week \$36,000
- Break-even sales in dollars per week \$21,000

Required task:

Calculate the margin of safety.
Calculate the margin of safety percentage.

Solution

Step 1 – Calculation of margin of safety.

Margin of safety	=	Actual or budgeted sales – break-even sales
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Margin of safety = 36,000 – 21,000
= \$15,000

Therefore, the margin of safety is \$15,000 per week. In other words, sales could fall by \$15,000 per week before the business operates at a loss.

Step 2 – Calculation of margin of safety percentage.

Margin of safety %	=	$\frac{\text{Margin of safety in dollars}}{\text{Total actual/budgeted sales}} \times 100$
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Margin of safety % = 15,000 / 36,000
= 41.67%

Therefore, the margin of safety percentage is 41.67%. In other words, sales could fall 41.67% before the business operates at a loss.

Practice Questions

Questions 29-34: Margin of safety.

Tips	<p><u>Margin of safety in assessment questions</u> Given margin of safety is a relatively brief calculation, there is possibility that assessments will ask you to calculate this as part of a bigger question. E.g., you may be asked to: calculate break-even units and sales and use these figures to calculate margin of safety, or; calculate predicted revenue as a reference for margin of safety. These types of questions are demonstrated in the practice questions.</p>
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Margin of safety	=	Actual or budgeted sales – break-even sales
Margin of safety %	=	$\frac{\text{Margin of safety in dollars}}{\text{Total actual/budgeted sales}} \times 100$

Question 29

Calculate the margin of safety and margin of safety percentage.

	Actual or budgeted sales	Break-even sales in dollars	Margin of safety	Margin of safety %
a	\$20,000	\$5,000	$20,000 - 5,000 = \$15,000$	$15,000 / 20,000 = 75.00\%$
b	\$3,900	\$2,700		
c	\$27,600	\$16,300		
d	\$147,000	\$83,210		
e	\$52,400	\$37,500		

Question 30

Ear Lobe Candles has provided the following information:

- Actual sales: \$53,000.
- Break-even sales: \$14,000.

Required tasks:

a. Calculate the margin of safety in sales dollars and as a percentage.

Workings

b. Describe the nature of the margin of safety.

c. Describe the importance of margin of safety.

Note: This could also be asked as: 'describe how margin of safety assists in making business decisions.'

Question 31

Rock Solid Limited sells cement mixers. The average cement mixer sells for \$1,800 and has total variable costs of \$360. Fixed costs are \$65,000 per year.

Required tasks:

a. Calculate the break-even point in cement mixers and dollars.

Workings

b. Rock Solid Limited have an aspirational goal to achieve a profit of \$900,000. Calculate the required target sales in units and dollars to achieve this level of profit.

Workings

c. Rock Solid Limited believes the revenue required to achieve a profit of \$900,000 is a near certainty. Calculate the margin of safety percentage if this level of profit is achieved.

Workings

Question 32

McClare's Chairs has provided the following information.

	Rocking chair (RC)	Highchair (HC)	Dining chair (DC)
Budgeted sales per week in units	200	350	500
Break-even point for each product line	50	250	300
Break-even point in units	600		

Required task:

a. A new competitor has opened in the same shopping complex and the business is concerned that sales may fall by as much as 50%. Using the current sales mix calculate the margin of safety. Comment on whether this margin of safety is enough to cover a 50% fall in sales.

Tip: You need to calculate the margin of safety in units and then calculate the margin of safety %. The break-even point in units is the sum of the break-even point for each product line.

Workings**Question 33**

Billy Bob's Bobcats has provided the following information.

	Green Machine (GM)	Blue Bandit (BB)	Purple Power (PP)
Budgeted sales per week in units	1,200	700	900
Break-even point for each product line	1,000	400	600
Break-even point in units	2,000		

Required task:

a. A trade agreement between Australia and China has allowed free trade of bobcats between the countries without trade tariffs (taxes). Billy Bob's Bobcats is concerned these cheaper models may reduce sales by 25%. Calculate the margin of safety using the current margin of safety. Comment on whether this margin of safety is enough to cover a 25% reduction in sales.

Question 34

Doomsday Prep Pty Ltd has variable costs per unit of \$3 and a selling price of \$12. Fixed costs are \$450. Doomsday Prep Pty Ltd has forecast sales of 80 units.

Required tasks:

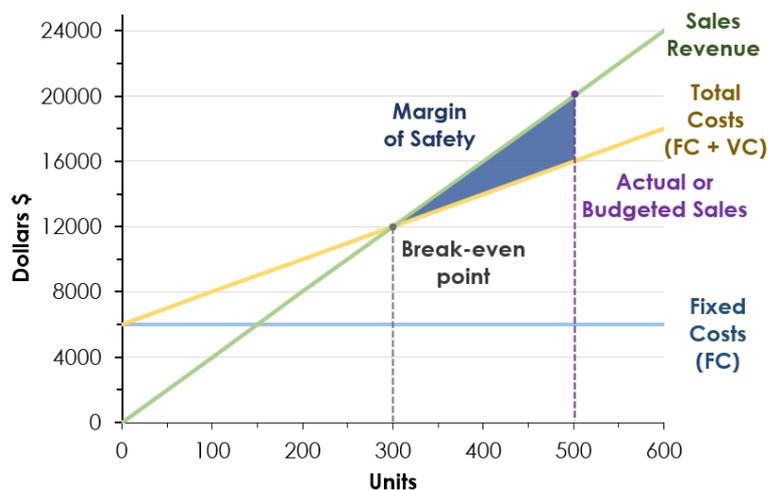
a. Calculate the margin of safety in units.

b. Calculate the margin of safety as a percentage.

c. Calculate the margin of safety in dollars.

Graphing Margin of Safety

The margin of safety can be shown using a graph. The margin of safety is the value of sales over break-even point. This can be seen as the blue shaded area in the graph. This is the area between sales revenue and total costs between the actual or budgeted sales and the break-even point.

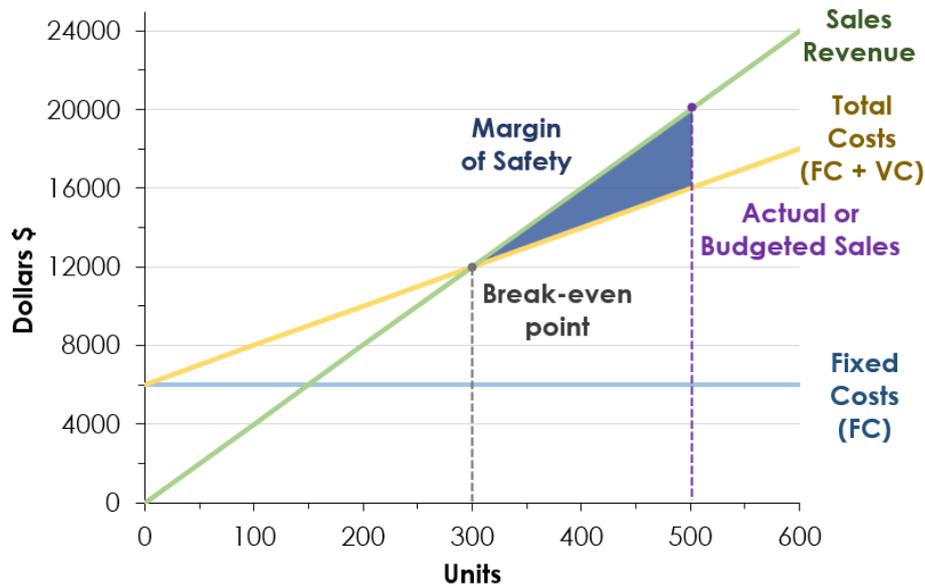


Practice Questions

Questions 35-36: Graphing Margin of Safety.

Question 35

The following information has been provided by a business.

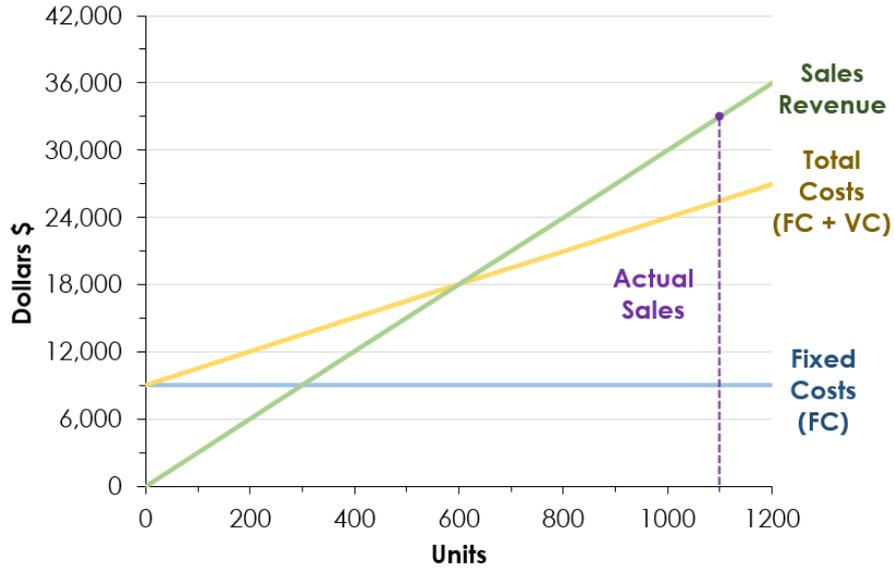


Required tasks

- Identify the budgeted sales in units.
- Identify the budgeted sales in sales dollars.
- Identify the break-even point in units.
- Identify the break-even point in sales dollars.
- Calculate the margin of safety in units.
- Calculate the margin of safety in sales dollars.
- Calculate the margin of safety as a percentage.

Question 36

The following information has been provided by a business.



Required tasks:

- a. Identify the budgeted sales in units.
- b. Identify the budgeted sales in sales dollars.
- c. Identify the break-even point in units.
- d. Identify the break-even point in sales dollars.
- e. Calculate the margin of safety in units.
- f. Calculate the margin of safety in sales dollars.
- g. Calculate the margin of safety as a percentage.

Capacity Constraints

Businesses have limited resources with many options of how to use these resources. Businesses selling more than one product can calculate how much of each product line to produce in order to maximise profit. Constraints that may limit the amount of each product line to produce include:

- Machine hours i.e. A machine can only operate for a maximum number of hours per month to produce all product lines.
- Labour hours i.e., there is a limit to how many labour hours are available to make all product lines.

Example

Soul Kitchen manufactures a range of cooking trays and has provided the following information.

	Pizza tray (PT)	Baking tray (BT)	Loaf tray (LT)
Selling price per unit	\$10	\$12	\$6
Variable expense per unit	\$3	\$4	\$2
Sales volume	400	300	600
Machine hours to make each unit	2 hours	3 hours	2 hours

The maximum machine hours per month is 2,000 machine hours. To manufacture 400 pizza trays, 300 baking trays and 600 loaf trays would require 2,900 machine hours.

Required task:

Calculate the combination of products that should be sold to maximize profits.

Solution

Step 1 – Calculate the contribution margin for each product line.

Contribution margin per unit	=	SP per unit – VC per unit i.e., Selling price per unit – Variable costs per unit
------------------------------	---	---

	Pizza tray (PT)	Baking tray (BT)	Loaf tray (LT)
Selling price per unit	\$10	\$12	\$6
Variable expense per unit	\$3	\$4	\$2
CM per unit	10 – 3 = \$7	12 – 4 = \$8	6 – 2 = \$4

The contribution margin formula is in the specification booklet. The formulas for the following steps are not in the specification booklet.

Step 2 – Calculate the contribution margin per machine hour.

The contribution margin is highest for the baking trays. However, these also require the most machine hours. To include the machine hours per unit in this solving this problem, the contribution margin per machine hour must be calculated.

	Pizza tray (PT)	Baking tray (BT)	Loaf tray (LT)
Selling price per unit	\$10	\$12	\$6
Variable expense per unit	\$3	\$4	\$2
CM per unit	\$7	\$8	\$4
Machine hours to make each unit	2 hours	3 hours	2 hours
CM per machine hour	7 / 2 = \$3.5	8 / 3 = \$2.67	4 / 2 = \$2

Therefore, per machine hour the pizza tray contributes \$3.50, the baking tray \$2.67 and the loaf tray \$2.

Step 3 – Profit maximization decision.

The product line with the highest contribution margin per machine hour should be produced to the maximum number of units the business can sell. Followed by the second highest contribution margin per machine hour followed by the third. The number of units produced will stop when there are no more machine hours available.

Available machine hours = 2,000 hours

Pizza tray used = 400 units x 2 hours per unit = 800 hours

Remaining available machine hours – PT hours = 2,000 – 800
= 1,200 hours

Baking tray machine hours used = 300 units x 3 hours per unit = 900 hours

Remaining available machine hours – BT hours = 1,200 – 900
= 300 hours

The amount of loaf trays that should be produced can be found by dividing the remaining machine hours after producing the maximum sales amount of the first two products lines, by the hours it takes to produce each loaf tray.

Loaf trays to produce = 300 hours remaining / 2 hours per unit = 150 units.

Therefore, to maximize profit the business should produce 400 pizza trays, 300 baking trays and 150 loaf trays.



Mosque-Cathedral of Córdoba, Córdoba.

Practice Questions

Questions 37-40: Capacity Constraints.

TipsResult figures

The result of capacity constraints should be that the products with the highest contribution margin per machine hour are produced to the sales limit and any remaining machine hours are used on the to make the remaining product.

Contribution margin per unit =	SP per unit – VC per unit i.e., Selling price per unit – Variable costs per unit
--------------------------------	---

Note: Only the contribution margin per unit formula is in the specification booklet, the remaining formulas needed to calculate capacity constraint questions are not in the specification booklet.

Question 37

Yaya Yoyo Ltd had provided the following information regarding the two products it produces.

	X Blade	Spin Flow
Selling price per unit	\$23	\$18
Variable expense per unit	\$7	\$3
Sales volume	250	400
Machine hours to make each unit	2 hours	1.5 hours

The maximum machine hours per month is 700 machine hours.

Required tasks:

a. Calculate the contribution margin per unit for each product line.

Workings

b. Calculate the contribution margin per machine hour for each product line.

Workings

c. Calculate the combination of products that should be produced to maximize profit.

Workings

Question 38

Bird Homes manufactures three types of bird houses that require specialist carpenters to make. The following information has been supplied.

	Bird-ely Hills Style (BHS)	Bird-Bronx Style (BBS)	Su-Birds Stye (SBS)
Selling price per unit	\$280	\$40	\$130
Variable expense per unit	\$90	\$20	\$80
Sales volume	400	250	500
Direct labour hours to make each unit	4 hours	1 hours	2 hours

The maximum direct labour hours per year is 1,800. To manufacture 400 BHS, 250 BBS and 600 SBS would require 2,850 machine hours.

Required tasks:

a. Calculate the combination of products that should be produced to maximize profit.

Workings

Question 39

Huff Puff Construction Ltd has provided the following information about the three products it produces.

	Granny flat	Shed	House
Selling price per unit	\$40,000	\$12,000	\$130,000
Variable expense per unit	\$20,000	\$3,000	\$50,000
Sales volume	40	20	80
Brick layer hours to make each unit	60 hours	5 hours	200 hours

There is a brick layer shortage and there is only 16,400 brick layer hours available each month. To build the number of buildings in demand would require 18,500 brick layer hours.

Required task:

a. Calculate the combination of products that should be produced to maximize profit.

Workings

Question 40

Medieval Relics manufactures three types of sword replicas for use by LARPer. The following information has been provided.

	Battle Axe	Long Sword	Scimitar
Selling price per unit	\$290	\$300	\$150
Variable expense per unit	\$100	\$172.5	\$70
Sales volume	40	80	110
Machine hours to make each unit	2 hours	3 hours	1 hours

The maximum available machine hours are 360 hours.

Required task:

a. Calculate the combination of products that should be produced to maximize profit.

Workings

Other Business Decisions related to CVP

This section will focus on other business decisions that are assisted by CVP analysis including:

- Special order decisions.
- Shut down (or stay open) decisions.
- Make or buy decisions.

Special order decisions

Special orders are usually once off orders with pricing that varies compared to the regular pricing. For example, a customer may make a large order and ask for a discount. The business must decide whether it is profitable to accept this decision using analysis of costs, volume and profit.

CVP – Qualitative factors to consider when making special order decisions

The profit (or loss) of a special order decision is a quantitative consideration. The following qualitative factors should also be considered when deciding whether or not to accept a special order.

List	Describe
Price competition	Price relative to competitor prices.
Future business	Special order might attract repeat business in future.
Customer loyalty – reduced price	Customer loyalty may be impacted if customers hear about the reduced selling price another customer receives for their special order.
Customer loyalty – current orders	Customer loyalty may be impacted if the business ceases production of current customer orders to fulfil special order. I.e., delayed order fulfilment.
Quality changes	Price reduction may be linked to quality changes causing customers to be unhappy.
Shareholder demands	Shareholders may have expectations of returns that are required to be met.

Example

Break Tech manufactures several products for emerging markets including A1 Tablets and B7 phones.

	A1 Tablets	B7 Phones
Selling price per unit	\$450	\$400
Variable expenses per unit	\$200	\$160
Sales volume in units per year	300	240
Number of machine hours required to make each unit	2 hours per unit	4 hours per unit

Fixed costs are \$27,000 per year.

A special order has been requested by a customer with the following details:

- 50 B7 phones for \$300 per phone.
- Each phone to be laser engraved with a business logo.

The business notes that accepting this special order will not impact variable costs but will require purchase of laser engraving equipment valued at \$3,000.

Required task:

- a. Scenario 1: Should the special order decision be accepted?
- b. Scenario 2: Accepting this special order will reduce the number of A1 tablets produced and sold by 30 during the month ended 31 March 2028. Should the special order be accepted in these circumstances?

Solution

Step 1 – Calculation of gain / loss of special order.

Special order decisions consider the change in contribution margin and fixed costs. If there is no change in variable or fixed costs, then this is ignored during calculation.

Only the additional fixed costs are relevant during calculation as pre-existing fixed costs would have occurred regardless of whether the special order takes place or not.

Special order	
Gain/Loss =	$(SP \times QS) - (VC \times QS) - \text{new FC} - OC$ i.e., Special order income – Special order variable costs – New or additional fixed costs – Opportunity costs
where OC =	Units forgone in usual production x Usual contribution margin

Note: the above equation refers to opportunity cost which is not relevant to this scenario but will be relevant to scenario 2.

$$\begin{aligned} \text{Gain/loss} &= (SP \times QS) - (VC \times QS) - \text{new FC} - OC \\ &= (300 \times 50) - (160 \times 50) - 3000 \\ &= 15,000 - 8,000 - 3,000 \\ &= 4,000 \text{ gain} \end{aligned}$$

Therefore, the special order decision results in a gain of \$4,000 and should be accepted.

Step 2 – Calculation of gain/loss including opportunity cost.

In scenario 2, the concept of opportunity cost is a factor in the decision. Opportunity cost is the value of the option lost when choosing an alternate option.

Special order	
Gain/Loss =	$(SP \times QS) - (VC \times QS) - \text{new FC} - OC$ i.e., Special order income – Special order variable costs – New or additional fixed costs – Opportunity costs
where OC =	Units forgone in usual production x Usual contribution margin

$$\begin{aligned} OC &= \text{Units forgone in usual production} \times \text{Usual contribution margin} \\ &= 30 \times (450 - 200) \\ &= 7,500 \end{aligned}$$

$$\begin{aligned} \text{Gain/loss} &= (SP \times QS) - (VC \times QS) - \text{new FC} - OC \\ &= (300 \times 50) - (160 \times 50) - 3000 - 7,500 \\ &= 15,000 - 8,000 \\ &= -\$3,500 \text{ loss} \end{aligned}$$

Therefore, the special order will result in a loss of \$3,500 and should not be accepted.

Note: In this scenario the opportunity cost was a different product line. Questions may involve the opportunity cost being the same product line at regular prices.

Practice Questions

Questions 41-46: Special Order Decisions.

Special order	
Gain/Loss	= (SP x QS) – (VC x QS) – new FC – OC i.e., Special order income – Special order variable costs – New or additional fixed costs – Opportunity costs
where OC	= Units forgone in usual production x Usual contribution margin

Question 41

Calculate whether the following special orders should be accepted or rejected.

	SP	VC	QS	New FC	Opportunity cost		Gain / Loss	Accept or Reject
					Units forgone	Usual CM		
a	50	30	300	2000	30	20	$(50 \times 300) - (30 \times 300) - 2,000 - (30 \times 20)$ $= 15,000 - 9,000 - 2,000 - 600$ $= 3,400 \text{ Gain}$	A
b	100	80	60	-	-	-		
c	14	9	500	-	350	8		
d	56	30	200	1,500	120	35		
e	87	42	80	3,100	-	-		

Question 42

Big Fluff manufactures what they claim to be the fluffiest coats in Malaga. The business has provided the following information:

	Fluffy Jacket
Selling price per unit	\$180
Variable expenses per unit	\$45
Sales volume per jack each month	300
Number of labour hours required to make each unit	3 hours per unit

Big Fluff has received a special order for 40 jackets and the client has offered \$4,000.

Required task:

a. Should the special order be accepted?

Workings

b. If this special order is accepted, this will reduce the number of jackets produced by 20 units. Should this special order be accepted?

Workings

Question 43

Rat Tech manufactures computer mice. The business has provided the following information.

The selling price per mouse is \$28, the variable costs are \$15 per mouse. Fixed expenses each month are \$5000. The business currently manufactures 1,500 mice per month.

The business has received a special order for 500 mice to a regional customer for \$23 per mouse. This order will have a cost of shipping of \$180.

The maximum production of mice is 1,800 per month.

Required task:

a. Calculate the opportunity cost of this order.

Workings

b. Should the special order be accepted?

Workings

Question 46

Flippity Floopity Pty Ltd produces flip flops. The business currently produces 12,000 flip flops per year at a selling price of \$31. The variable costs are \$15. The total fixed costs are \$21,000. The maximum capacity of the warehouse is 13,000 flip flops per year.

A famous DJ has requested to purchase 2,000 flip flops with his DJ name on the flip flops at a price of \$20 per flip flop. There will be no need for new machinery to add the DJ's name to the flip flops.

Tip: The decrease in usual production = current production units + special order units – maximum production units. This formula is not in the specification booklet.

Required tasks:

a. Calculate the opportunity cost of accepting this special order.

b. Calculate the gain or loss if the order is accepted.

Question 47

Rackety Smackety manufactures elite tennis rackets. The fixed costs are \$60,000 and the variable expenses per racket are \$25. The selling price is \$88 and the business currently manufactures 100,000 tennis rackets per year. The maximum production capacity of the factory is 120,000 tennis rackets per year.

An international sporting goods store has requested a special order of 42,000 tennis rackets at a price of \$60 per tennis racket. The sporting goods store has requested the items are produced in different colours that will require Rackety Smackety to purchase new machinery. This new machinery will increase fixed costs by \$16,000.

Required tasks:

a. Calculate whether the business should the business accept this special order?

Shut down (or stay open) decisions

Businesses often have several departments as part of a larger business structure. Businesses reflect on the profit of each these departments and make decisions as to whether these varied departments should stay open or shut down. Examples of business departments:

- Stores in different areas.
- Varied products.
- Varied opening hours.

CVP – Qualitative factors to consider when making shut down decisions

List	Describe
Investor interest	<ul style="list-style-type: none">• Investors may view the shut down as a sign business is contracting, not expanding.• This reduces investor perception of future growth and therefore share price.
Existing customers	<ul style="list-style-type: none">• Shutdown of a store or product may reduce customers loyalty.• Loyalty may be lost due to customers inability to access previously available product.
Employee impact	<ul style="list-style-type: none">• Store closure may result in employee redundancy or relocation.• This could negatively impact company morale and culture, reducing productivity.
Competition	<ul style="list-style-type: none">• Shut down could give competitors increased competitive advantage.• This competitor competitive advantage could lead to future losses.

Example

Rottnest Kayak Tours offers kayak tours around the island during Summer and Spring.

Estimated average per tour	Summer	Spring
Selling price	\$120	\$110
Variable costs	\$50	\$45
Number of tour tickets sold	1,620	480
Fixed expenses	\$50,000	\$35,000
Profit (Loss)	\$63,400	(3,800)

The fixed expenses occur over the year but have been allocated to each operating season.

Required task:

- Calculate whether Rottnest Kayak Tours should continue to operate in Spring.

Solution

Step 1 – Calculate the contribution margin.

$$\begin{aligned}\text{Spring CM} &= (\text{Selling Price} - \text{Variable costs}) \times \text{Quantity Sold} \\ &= (110 - 45) \times 480 \\ &= \$31,200\end{aligned}$$

Step 2 – Should the Spring Tours continue.

The fixed expenses occur over the course of the entire year and have been allocated to each season. Therefore, the fixed expenses are not relevant to this issue as they will occur regardless of whether tours operate in Spring.

The Spring tours contribute \$31,200 in profit which is useful to cover fixed expenses. If the Spring tours were cancelled, this \$31,200 would be lost.

Therefore, the Spring tours should continue to operate.

Practice Questions

Questions 48-49: Shut Down (or Stay Open) decisions.

Tip	Decision making pattern for shut down (or stay open) decisions
	The main pattern in these questions to look for is whether the department that is being considered for shut down has a positive contribution margin. If the CM is positive, then the department should stay open, even if the fixed expenses allocated to the period result in a loss. This is because the positive contribution margin helps pay for the unavoidable fixed expenses.

Question 48

Potato King runs three supermarkets. Store X has poor performance and is being considered for shut down. The following financial information for the past month has been provided.

	Store X	Store Y	Store Z
Sales	50,000	80,000	120,000
Variable Costs	25,000	40,000	60,000
Contribution Margin	25,000	40,000	60,000
Fixed Costs	30,000	30,000	30,000
Net Profit	(5,000)	10,000	30,000

Additional information:

- \$2,500 of fixed costs could be saved by shutting down Store X
- Fixed costs cover items such as insurance, advertising, rent, distribution centre costs, electricity etc.

Required task:

a. Should Potato King shut down Store X?

Tip: Fixed costs (of \$30,000 per store) in the initial part of the question have been allocated arbitrarily by the business and do not reflect the actual fixed costs associated with each store. I.e. the business may have just allocated all fixed costs for the business evenly between each store even though only a smaller portion of fixed costs is directly linked to the operation of any given store (\$2,500 for Store X is given in the additional information). This kind of tip will usually not be given in an assessment and it would be up to you to read the question carefully.

Workings

[Make or buy decisions](#)

Businesses have the choice to make products, or components of products themselves or buy these from a supplier. This decision is based on both price and qualitative considerations.

CVP – Make or buy qualitative considerations

	Make	Buy
Reasons for	<ul style="list-style-type: none"> • Lower shipping times. • Better quality oversight. • Can market as 'locally manufactured'. • Use of NCAs already purchased. 	<ul style="list-style-type: none"> • Cost control. • Lower labour costs. • Lower production costs.
Reasons against	<ul style="list-style-type: none"> • Higher labour costs. • Higher production costs. 	<ul style="list-style-type: none"> • Increased shipping times. • Lower quality oversight. • Cannot market as 'locally manufactured'. • NCA's already owned not utilized.

Notes:

- A question could be worded as 'Reasons for/against making product when buying is cheaper' or vice versa.
- These considerations have only been listed and not described. If a question asks you to describe these considerations, make sure you can provide an elaborated description of these reasons.
- If a make or buy decision question is given as part of a case study, reference details from case study.

Example

Fortday Gaming Ltd sells gaming servers. Fortday current makes its own servers but is considering buying servers from overseas and then on selling these to customers. Fortday Gaming Ltd has provided the following information.

Cost to make servers:

- Variable expenses \$480 per server.
- Fixed expenses \$200 per server. (Note: Fixed expenses per server has been calculated by dividing the fixed expenses in a period by the number of units produced.)

Cost to buy:

- \$560 per server.

If Fortday Gaming Ltd buys the servers, the lead engineer would become redundant and result in a fixed cost saving of \$40 per server.

Required task:

Should Fortday make or buy the gaming servers?

Solution

Step 1 – Cost to make calculation.

Note: the formulas for calculating make or buy decisions are not included in the specification booklet.

Cost of making	=	Variable expense per unit + Fixed expense per unit
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Cost of making = 480 + 200
= 680

Therefore, the cost of making is \$680.

Step 2 – Cost to buy calculation.

The cost of buying is calculated by adding the purchase price to the unavoidable fixed expenses.

$$\text{Unavoidable fixed expenses} = \text{Fixed expenses} - \text{Avoidable fixed expenses}$$

$$\begin{aligned}\text{Unavoidable fixed expenses} &= 200 - 40 \\ &= \$160\end{aligned}$$

$$\text{Cost of buying} = \text{Purchase price} + \text{Unavoidable fixed expenses}$$

$$\begin{aligned}\text{Cost of buying} &= \text{Purchase price} + \text{Unavoidable fixed expenses} \\ &= 560 + 160 \\ &= \$720\end{aligned}$$

Therefore, the cost of buying is \$720.

Step 3 – Make or Buy Decision.

Therefore, the cost to make is \$680 per server and the cost to buy is \$720 per server. It is \$40 cheaper to make compared to buying the server. Based on price, the business should continue to make the servers as it is \$40 cheaper per server.

Practice Questions

Questions 50-52: Make or Buy decisions.

Questions 53-68: Cost-Volume Profit theory review.

Exam Questions

See 'CVP' chapter of the Exam Guide for practice exam questions. The Exam Guide can be found by navigating to the Resource Hub link on the front page.

Question 50

KD Ny Ty manufactures a range of electronic goods domestically in Australia. A recent business trip to China has resulted in a quote from a prospective manufacturers of phone cables.

The supplier has offered to sell 3,000 cables for \$2.50 per cable.

The cost to domestically manufacture the phone cables is:

- Variable expenses per unit: \$1.20
- Fixed expenses per unit: \$2.10

Given a large component of the manufacturing of other products would continue domestically, the fixed expenses per unit would remain the same.

Required tasks:

a. Should KD Ny Ty buy the phone cables?

Workings

b. List reasons for and against 'make' decisions.

Workings

Question 51

So Fly Suits currently makes suits and sells these at their retail store. The store is considering outsourcing the manufacture of these suits to Indonesia.

The supplier has offered the below terms:

- \$140 per suit.

The current cost to make is:

- Variable expenses per suit \$120.
- Fixed expenses per suit \$230.

If the business were to buy the suits, this would make the current tailors redundant and the business would save rent costs for the current sewing warehouse. The net savings in fixed costs would be \$180 per suit.

Required task:

a. Should So Fly Suits make or buy the suits.

Workings

Question 52

Big Ouchie Insurance head office is currently located in Perth. The company has a policy that all jobs for the company are located in Australia. A call centre operator in Australia has offered to run the call centre component of the business. The business has provided the following information:

Current call volume per week 1,850.

Cost to run call centre:

- Variable costs per call: \$5.
- Fixed costs per call \$3.

Cost to outsource call centre:

- \$4 per call.

Outsourcing the phone calls would result in call centre staff wage savings of \$2.50 per call which is a fixed cost.

Required tasks:

a. Should Big Ouchie make or buy the call centre.

Workings

b. List reasons for and against 'buy' decisions.

Practice Questions

Questions 53-68: Cost-Volume Profit theory review.

Tip

Course Guide

When completing the theory review you may find it useful to refer to the relevant chapter in the Essential Insight Course Guide. The Course Guide summarizes all theory relevant for each practical guide chapter. This saves time flipping through multiple pages in the Practical Guide while revising. The Course Guide can be found by navigating to the Resource Hub link on the front page.

Question 53

A business may choose to make a product rather than purchase it due to:

- High labour costs.
- High shipping times from suppliers.
- Cheap cost from suppliers.
- Better quality oversight.

Question 54

Identify which of the following is not a qualitative factor to consider when making a special-order decision.

- Price relative to competitor prices.
- Negative impact on company morale and culture.
- Shareholders may have expectations of returns that are required to be met.
- Price reduction may be linked to quality changes causing customers to be unhappy.

Question 55

Regarding cost-volume-profit analysis, a decrease in the total number of units sold will decrease the:

- Margin on safety.
- Contribution margin.
- Fixed costs.
- Break-even point.

Question 56

The break-even point occurs where:

- Sales are higher than costs.
- Costs and revenue are equal.
- Revenue and fixed costs are equal.
- Sales is equal to variable costs.

Question 57

In terms of cost-volume-profit analysis, if production decreases, the impact on margin of safety be:

- Margin of safety will remain constant if contribution margin and fixed costs remain constant.
- Margin of safety will increase if contribution margin and fixed costs increase.
- Margin of safety will decrease if contribution margin and fixed costs remain constant.
- Margin of safety will remain constant if contribution margin and fixed costs decrease.

Question 58

Break-even point assists decision making through:

- Evaluation of alternative options.
- Evaluation of product mix changes.
- Calculation of discounts that can be given to customers.
- Calculation of the level that sales can decrease before the business operates at a loss.

Question 62

Describe the nature of cost volume profit analysis and how this can assist the decision making of management.

Question 63

List and describe three non-financial factors a business may consider when making special order decisions.

Question 64

Outline three qualitative factors a business should consider when making shut down decisions.

10. Budgets



Activate Prior Knowledge

Respond to the following questions. Discuss your answers with a peer or the class.

<p>What is a budget?</p>	
<p>Why do you think businesses would want to create budgets?</p>	
<p>Why would a business want to compare budgeted performance to actual performance?</p>	

Syllabus – Unit 3	
Budgets	<p>Financial institutions and systems: Financial systems and fundamental principles</p> <ul style="list-style-type: none"> • the nature and importance of the master budget • the components of the master budget <ul style="list-style-type: none"> ▪ operating ▪ capital expenditure ▪ financial <p>Recording, using and evaluating financial information: Evaluating financial information for planning, coordinating, controlling and investing</p> <ul style="list-style-type: none"> • purpose and function of cash budgets <ul style="list-style-type: none"> ▪ importance of cash to business viability ▪ interpretation of cash budgets • purpose and function of budgeted income statement • interpretation of budgeted income statement • difference between cash and accrual performance • purpose and function of performance reports • interpretation of performance reports for cash budgets and budgeted income statements <p>Recording, using and evaluating financial information: Recording, processing and communicating financial information</p> <ul style="list-style-type: none"> • preparation of cash budgets, including debtors' and creditors' schedules • preparation of budgeted income statements • preparation of performance reports for cash budgets and budgeted income statement <p><i>Note: The below syllabus section is in both 'capital investment' and 'budgets' given the overlap in syllabus but distinctly different content/examination questions.</i></p> <p>Evaluating financial information for planning, coordinating, controlling and investing</p> <ul style="list-style-type: none"> • interpretation of capital investment/budgeting techniques to evaluate capital expenditure



Calleja de las Flores, Córdoba.

Budgets – Introduction

Budgets are management’s financial record of goals for a period. The diagram below shows that the master budget has two main subcomponents, the operating and financial budget. These two subcomponents have many subcomponents again. This course only requires practical preparation for the Cash Budget and Budgeted Income Statement. However, you must understand the theory of the budget components outlined on the following table. A performance report is prepared for the Cash Budget and Budgeted Income Statement to evaluate business performance estimates (budgets) to actual results and analyse the reasons for variances.

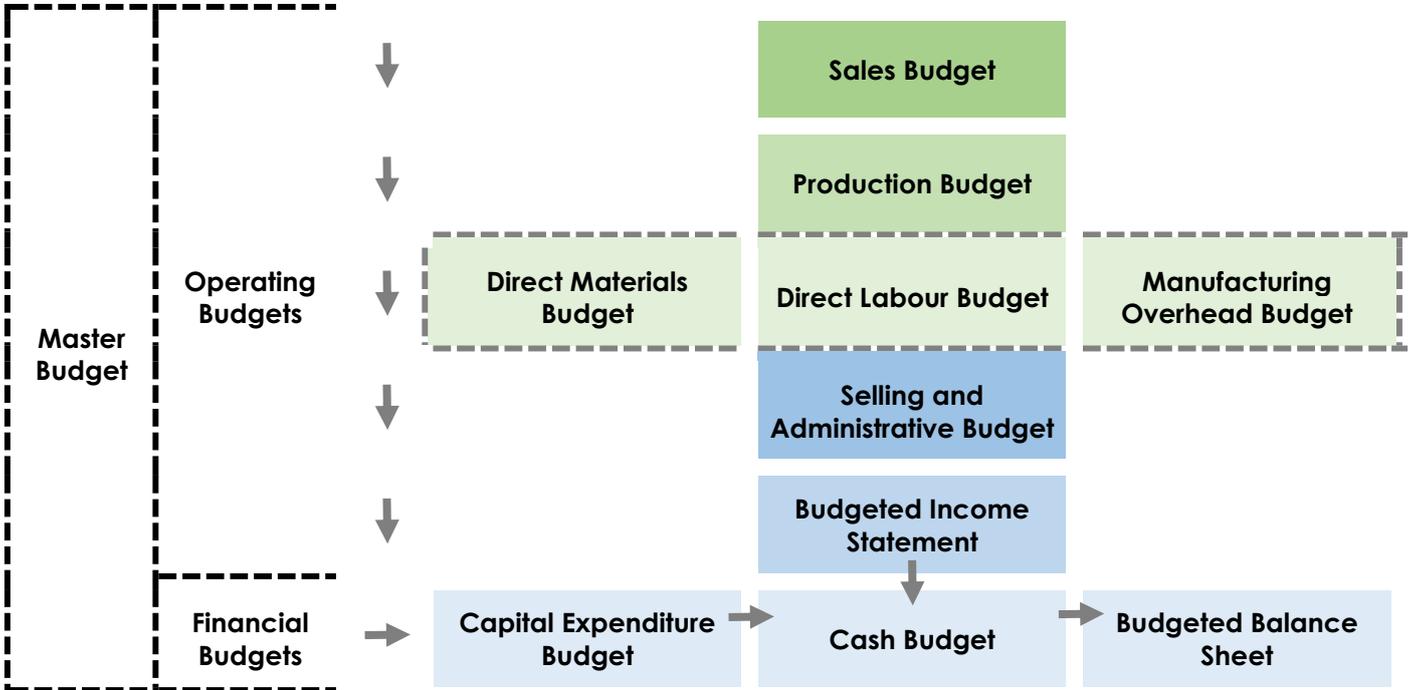
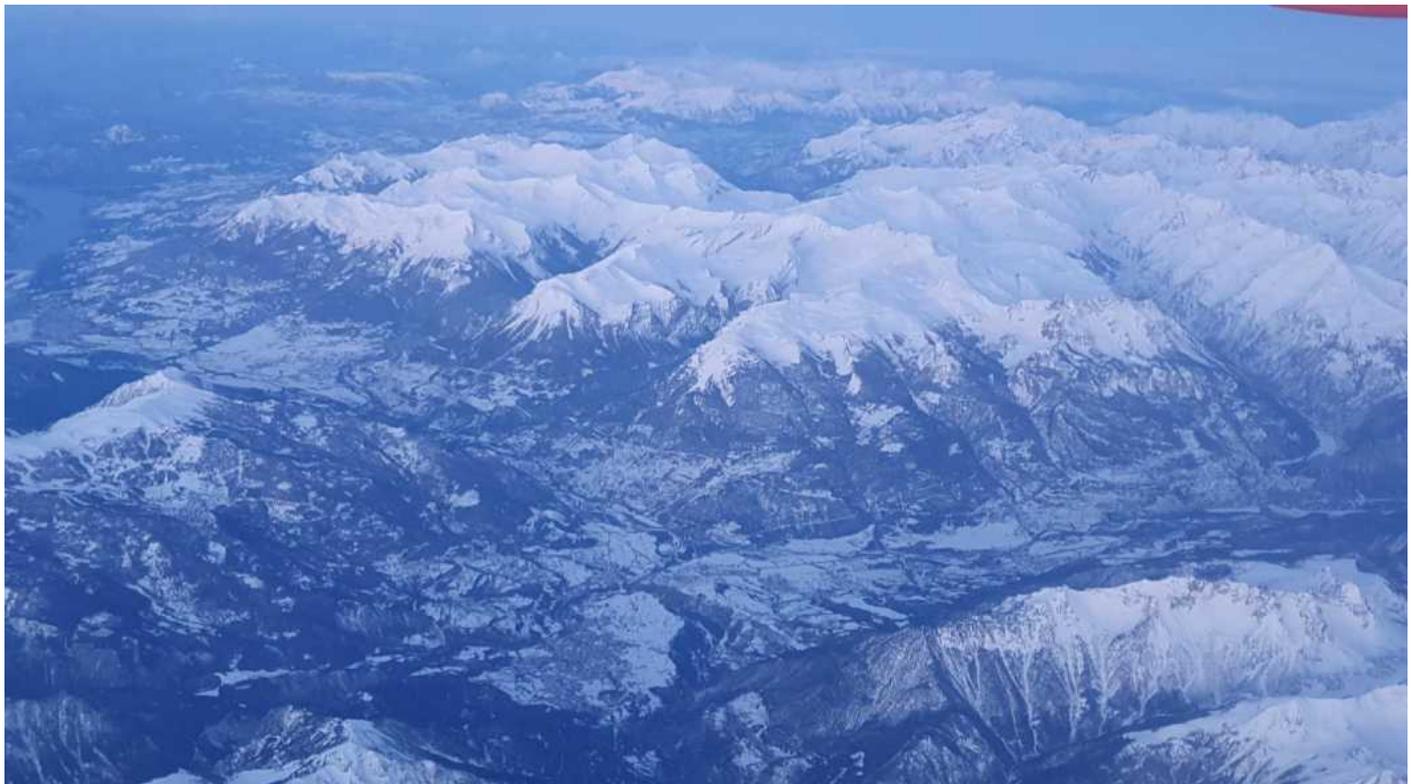


Diagram: Master budget components.



Flight from Nice to Geneva.

Budgets – Types

Identify / List	Nature / Explain	Purpose / Importance <i>Know any 2 for each</i>	Includes
Master budget	Manages future entity activities.	<ul style="list-style-type: none"> Used to set KPIs. Allows management of activities to accomplish KPIs. Employees can be motivated to achieve KPIs. Assess performance. Identify areas for improvement. 	<ul style="list-style-type: none"> Operating budget. Capital expenditure budget. Financial budget.
Operating budget	Estimates future income and expenses based on projected sales.	<ul style="list-style-type: none"> Estimate operating profit for period. Sales budget is most significant and is prepared first. 	<ul style="list-style-type: none"> Sales Budget. Production Budget. Selling and administrative budget. <p>The above contribute to Budgeted Income statement.</p>
Financial budget	Estimates future assets, liabilities and equity.	<ul style="list-style-type: none"> Highlights required funding for operations to achieve predicted financial position. Identify ability to pay debts as they fall due. 	<ul style="list-style-type: none"> Capital expenditure budget. Cash budget. Budgeted balance sheet
Capital expenditure budget	Estimates future NCA purchases and sales.	<p>Management of NCA's allows a business to:</p> <ul style="list-style-type: none"> Produce future income. Achieve business growth. 	<ul style="list-style-type: none"> Planned NCA purchases and sales.
Budgeted Income Statement	Estimates income and expenses.	<ul style="list-style-type: none"> Estimate and assess profit for the period. Assist in decision making. Develop internal control strategies regarding income and expenses. 	<ul style="list-style-type: none"> Estimated income, expenses and profit.
Cash Budget	Estimates future cash inflows and outflows for any point in future.	<ul style="list-style-type: none"> Plan and control future expenditure. Develop internal control strategies regarding cash inflows and outflows. 	<ul style="list-style-type: none"> Estimated cash inflows and cash outflows.

Cash Budgets

The theory for the table below and following subheadings is regarding Cash Budgets. This next table is a recap on Cash Budgets from the table above. Cash Budgets will be the first practical covered in the Budgets chapter after this initial theory introduction.

	Nature / Explain	Purpose / Importance <i>Know any 2 for each</i>	Includes
Cash Budget	Estimates future cash inflows and outflows for any point in future.	<ul style="list-style-type: none"> Plan and control future expenditure. Develop internal control strategies regarding cash inflows and outflows. 	Estimated cash inflows and cash outflows.

Cash Budget – Advantages

- Identify cash that could be invested.
- Anticipate liquidity issues and develop prevention strategies.
- Variance analysis can be used to improve future performance.
- Can be used as a supporting document for loan applications.

Note: This could be asked as cash budget - 'functions', 'advantages', 'how it assists in management of business cash needs.' Talk about the nature and purpose of the budget first before discussion of these advantages.

Cash – Importance to business viability

Cash reflects ability of a business to:

- Pay current liabilities.
- Pay debts earlier for discounts.
- Pass credit checks for new suppliers / creditors.
- Manage unexpected expenses.
- Prevent insolvency.
- Invest.
- Pay dividends.

Cash – Measures to ensure balance increases

- Internal control of debt collection.
- Budget management i.e., keep expenses low.
- Negotiate lower prices with suppliers.
- Acquire a loan.
- Negotiate favourable loan terms (keep interest rates low, defer payment).
- Sell unproductive assets.
- Defer unproductive purchases.

Hint: Think of cash flows/internal control and what movements are desirable.

Practice Questions

Question 1-10: Budgets Theory Introduction.

Tip	<p><u>Course Guide</u> While completing this chapter you may find it useful to refer to the relevant chapter in the Essential Insight Course Guide. The Course Guide summarizes all theory relevant for each practical guide chapter. This saves time flipping through multiple pages in the Practical Guide while revising. The Course Guide can be found by navigating to the Resource Hub link on the front page.</p>
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Question 1

Identify which of the following is not an operating budget.

- a. Production budget.
- b. Selling and Administrative budget.
- c. Cash budget.
- d. Sales budget.

Question 2

Which of the following would result in the cash balance decreasing?

- a. Purchase of unproductive assets.
- b. Acquisition of a loan.
- c. Sale of unproductive assets.
- d. Negotiation of loan terms

Question 3

The nature of the operating budget is to:

- a. Estimate future non-current asset purchases and sales.
- b. Estimate future income and expenses based on projected sales.
- c. Manage future entity activities.
- d. Estimate future assets, liabilities and equity.

Question 4

An advantage of a cash budget does not include.

- a. Can be used as a supporting document for loan applications.
- b. Identify cash that could be invested.
- c. Variance analysis can be used to improve future performance.
- d. Identify estimated profit for the period.

Question 5

A purpose of the budgeted income statement does not include:

- a. Identify the ability to pay debts as they fall due.
- b. Develop internal control strategies regarding revenue and expenses.
- c. Estimate and assess profit for the period.
- d. Assist in decision making.

Question 6

Outline advantages of a cash budget.

Question 7

Explain what a master budget is, why it is important and what is included in this budget.

Question 8

Compare the nature and importance of operating budgets and financial budgets.

Example – Cash Budget Preparation

This example will demonstrate the preparation of a cash budget.

Notes:

- The information to prepare budgets from is often found from either an income statement, balance sheet, trial balance or information in dot points. The example below features an income statement with additional information in dot points.
- Cash budgets are a management accounting report and therefore can be prepared for any given period as decided by internal management E.g., for one month, one week, three consecutive months etc.

Illuminate Lighting has provided the following financial information for the month ended 28 February 2028.

Illuminate Lighting Income statement For the month end 28 February 2028		
	\$	\$
Sales		150,200
Less Cost of Sales	60,000	
Less Discount received	3,800	63,800
Gross Profit		86,400
Add Other Income		
Interest Income		1,200
		87,600
Less expenses		
Wages	14,000	
Bad debts	1,000	
Rent	1,200	
Depreciation	3,000	
Sales commission	15,020	
Interest on loan	1,800	
Other expenses	3,000	39,020
Profit for the period		48,580

Additional information:

- Sales are estimated to be 60% cash, 40% credit. On average, 80% is received the first month after sale, 15% the second month after sale and 5% the third month after sale.
- Sales were \$150,000 in January and \$152,000 in February
- Sales are expected to be \$180,000 in March, \$170,000 in April, \$200,000 in May and \$220,000 in June.
- Inventory is purchased on credit on credit and is paid for in the month after purchase. Credit paid within two months receives a 5% discount for prompt payment.
- Purchases were expected to be \$80,000 for May, \$83,000 for April and \$84,000 for March.
- The closing bank balance as at 31 March 2028 was \$31,000
- The business expects to sell equipment in May. The carrying value of this equipment was \$12,000. The loss on sale of this equipment was \$5,500.
- A motor vehicle will be purchased with \$18,000 in cash during June.
- Staff receive a 10% commission on total sales which is paid the month the sales take place.
- Estimates for the next six months, based on September's figures are:
 - Wages, rent and interest on mortgage to remain consistent.
 - Other expenses to increase by \$500 each month.
 - Interest income from investments will be 1,200 per month.

Required task:

- Prepare a debtor's schedule outlining cash collected in the months of April, May and June 2028.
- Prepare a creditor's schedule outlining cash paid in the months of April, May and June 2028.
- Prepare a cash budget for the months of April, May and June 2028.

Solution

Step 1 – Preparation of a debtor's schedule.

Step 1.1 – Calculation of cash and credit sales for each month.

Relevant information from the question:

- Sales are estimated to be 60% cash, 40% credit.
- Sales were \$150,000 in January and \$152,000 in February
- Sales are expected to be \$180,000 in March, \$170,000 in April, \$200,000 in May and \$220,000 in June.

First, a schedule of collection from debtor's table is drawn up as demonstrated below.

- The cash sales column is equal to each month's sales multiplied by 60%.
- The credit sales column is equal to each month's sales multiplied by 40%.

Schedule of Collection from Debtors					
Month	Cash Sales	Credit Sales	April	May	June
January	$150,000 \times 0.6$ = 90,000	$150,000 \times 0.4$ = 60,000			
February	$152,000 \times 0.6$ = 91,200	$152,000 \times 0.4$ = 60,800			
March	$180,000 \times 0.6$ = 108,000	$180,000 \times 0.4$ = 72,000			
April	$170,000 \times 0.6$ = 102,000	$170,000 \times 0.4$ = 68,000			
May	$200,000 \times 0.6$ = 120,000	$200,000 \times 0.4$ = 80,000			
June	$220,000 \times 0.6$ = 132,000	$220,000 \times 0.4$ = 88,000			
Total					

Note: the cash sales figures will be relevant when preparing the cash budget in a later step.

Step 1.2 – Calculation of schedule of collection from debtors for months relevant to cash budget.

The amount paid on credit is multiplied the percentage paid in each of the following months. The result is recorded in the relevant section of the schedule of collection from debtors. The cash budget is only being prepared for April, May and June, therefore repayments not in those months are not relevant to this specific schedule of collection from debtors. Once each month is entered, each column in the table is totalled.

Relevant information from the question:

- On average, 80% is received the first month after sale, 15% the second month after sale and 5% the third month after sale.

Schedule of Collection from Debtors					
Month	Cash Sales	Credit Sales	April	May	June
January	$150,000 \times 0.6$ = 90,000	$150,000 \times 0.4$ = 60,000	$60,000 \times 0.05$ = 3,000	-	-
February	$152,000 \times 0.6$ = 91,200	$152,000 \times 0.4$ = 60,800	$60,800 \times 0.15$ = 9,120	$60,800 \times 0.05$ = 3,040	-
March	$180,000 \times 0.6$ = 108,000	$180,000 \times 0.4$ = 72,000	$72,000 \times 0.80$ = 57,600	$72,000 \times 0.15$ = 10,800	$72,000 \times 0.05$ = 3,600
April	$170,000 \times 0.6$ = 102,000	$170,000 \times 0.4$ = 68,000	-	$68,000 \times 0.80$ = 54,400	$68,000 \times 0.15$ = 10,200
May	$200,000 \times 0.6$ = 120,000	$200,000 \times 0.4$ = 80,000	-	-	$80,000 \times 0.80$ = 64,000
June	$220,000 \times 0.6$ = 132,000	$220,000 \times 0.4$ = 88,000	-	-	-
Total			\$69,720	\$68,240	\$77,800

Step 2 – Preparation of a creditor's schedule.

A creditor's schedule follows the same process as the debtor's schedule, except that it relates to accounts payable rather than accounts receivable. The creditors schedule has been shown in one step rather than two with working outs given the similar process was covered in the previous step.

Relevant information from the question:

- Inventory is purchased on credit on credit and is paid for in the month after purchase. Credit paid within two months receives a 5% discount for prompt payment.
- Purchases were expected to be \$80,000 for May, \$83,000 for April and \$84,000 for March.

Schedule of Payment to Creditors				
Credit Purchases per Month		April	May	June
March	84,000	$84,000 \times 0.95$ $= 79,800$		
April	83,000		$83,000 \times 0.95$ $= 78,850$	
May	80,000			$80,000 \times 0.95$ $= 76,000$
Total		79,800	78,850	76,000

The discount received or discount allowed does not result in any cash movement so is not included in the cash budget. Discount received or discount allowed would be included in a budgeted income statement as it uses the accrual accounting method.

This space has been left blank intentionally so that the next step can fit on one page.

Step 3 – Preparation of Cash Budget Estimated Receipts.

A reminder of cash budgets regarding the nature, purpose and what is provided below.

	Nature / Explain	Purpose / Importance <i>Know any 2 for each</i>	Includes
Cash Budget	Estimates future cash inflows and outflows for any point in future.	<ul style="list-style-type: none"> Plan and control future expenditure. Develop internal control strategies regarding cash inflows and outflows. 	Estimated cash inflows and cash outflows.

Relevant information from question:

- The closing bank balance as at 31 March 2028 was \$31,000.
 - This becomes the opening bank balance in April which is the first entry in the statement.
- The cash sales for each month were calculated during preparation of the schedule of collection from debtors.

	Cash sales
April	170,000 x 0.6 = 102,000
May	200,00 x 0.6 = 120,000
June	220,000 x 0.6 = 132,000

- The totals from the schedule of debtors collection table are entered in the collections from debtors / accounts receivable row.

April	May	June
\$69,720	\$68,240	\$77,800

- Interest income from investments will be 1,200 per month.
- The business expects to sell equipment in May. The carrying value of this equipment was \$12,000. The loss on sale of this equipment was \$5,500.

The cash budget is only concerned with the proceeds on sale of equipment as this is the cash inflow for this transaction.

Proceeds on sale of equipment = carrying value – loss on sale
 = 12,000 – 5,500
 = \$6,500

Note: If a gain on sale had taken place this would have been added to the carrying value.

The opening bank balance for May and June cannot be entered yet as these are calculated from the closing bank balance in a future step.

Total receipts = estimated receipts added together.

Illuminate Lighting Cash budget For the three months ended 31 June 2028			
Description	April	May	June
Opening bank balance	31,000		
Estimated receipts			
Cash sales	102,000	120,000	132,000
Collections from debtors / accounts receivable	69,720	68,240	77,800
Interest on investments	1,200	1,200	1,200
Proceeds from sale of equipment		6,500	
Total receipts	172,920	195,940	211,000

Note: As cash budgets are an internal report there is flexibility in how they are prepared. Rather than 'total receipts', the statement may be prepared with 'total cash available'. If using 'total cash available', this is calculated with the opening bank balance plus the estimated receipts. If using the 'total cash available' method, this row should not be calculated at this step. This is because the opening bank balance for May and June will not be able to be calculated until the estimated payments section is completed.

Step 4 – Preparation of Cash Budget Estimated Payments.

The next section of the cash budget is 'Estimated Payments' as demonstrated below.

Relevant information from question:

- The payments to creditors / accounts payable was found during step 2

April	May	June
79,800	78,850	76,000

- A motor vehicle will be purchased iswith \$18,000 in cash during June.
- Wages, rent and interest on loan to stay consistent.
 - These figures were in the income statement as wages \$14,000, rent \$1,200, Interest on loan \$1,800.
- Other expenses were \$3,000 in February and will increase by \$500 per month.
 - March = \$3,500, April = \$4,000, May = \$4,500, June = \$5,000.
- Staff receive a 10% commission on total sales which is paid the month the sales take place.
 - Commission paid = Sales from month before x 0.1
 - April = 170,000 x 0.1 = \$17,000.
 - May = 200,000 x 0.1 = \$20,000.
 - June = 220,000 x 0.1 = \$22,000.
- A motor vehicle will be purchased with \$18,000 in cash during June.

Opening bank balance = Previous months closing bank balance

Cash Surplus or Deficit = Total Receipts – Total Payments

Closing bank balance = Opening bank balance + Cash Surplus or Deficit

Illuminate Lighting Cash budget For the three months ended 31 June 2028			
Description	April	May	June
Opening bank balance	31,000	86,120	161,710
Estimated receipts			
Cash sales	102,000	120,000	132,000
Collections from debtors / accounts receivable	69,720	68,240	77,800
Interest on investments	1,200	1,200	1,200
Proceeds from sale of equipment		6,500	
Total Receipts	172,920	195,940	211,000
Estimated Payments			
Payments to creditors / accounts payable	79,800	78,850	76,000
Wages	14,000	14,000	14,000
Commission paid	17,000	20,000	22,000
Purchase of NCA: motor vehicle			18,000
Rent	1,200	1,200	1,200
Interest on loan	1,800	1,800	1,800
Other expenses	4,000	4,500	5,000
Total payments	117,800	120,350	138,000
Cash Surplus or Deficit	55,120	75,590	73,000
Closing bank balance	86,120	161,710	234,710

This cash budget can now be used by internal users within the business to make business decisions. For example, given the estimated cash surpluses, the business may start planning how to invest this money. There does not appear to be any liquidity issues. Liquidity issues would appear as a decreasing cash balance or cash deficit. This positive cash balance could be used by the business as supporting documentation for loan applications.

Once these periods have occurred, the actual performance can be compared to this estimated performance and variances analysed to improve future performance. Cash budget performance reports are completed later in this chapter.

Practice Questions

Question 11-14: Preparation of schedule of collection from debtors and schedule of payment to creditors.
Question 15-18: Preparation of cash budgets.

Prepaid expenses and accrued expenses

Prepaid expenses and accrued expenses were not included in the example but can be found using the following formula. Practice for these takes place during some of these practice questions and also during later practice question sections. You may find it useful to draw the ledger account for prepaid expenses and accrued expenses when completing questions

- Expense paid = expense + prepaid expense (prepaid expense paid for during a month)
 - If cash is used to prepay an expense during the period then a cash outflow has occurred. This is why the prepaid expense is added to the expense paid.
- Expense paid = expense – accrued expense (accrued expense remaining to be paid during a month)
 - Accrued expenses are expenses that have been used during a period, but not yet paid for with cash. The accrued expense is subtracted because the cash has not yet been paid.

Reading the question

When reading a question, label items with 'R', for 'receipts' and 'P', for 'payments'. This will act as a reminder when preparing your cash budget of what information is relevant for the receipts and payments sections. As you enter each piece of information into your cash budget you can tick or cross each of these letters to keep track of what has been done and what still needs doing.

Tips

Writing off debts and the cash budget

Some questions may refer to some debts being written off 'X' months after credit sales. If you come across this in a question this will impact the schedule of collection from debtors through a reduction in cash received. However, bad debts would not be recorded in the cash budget as there is no movement in cash.

Getting stuck

You may find specific entries difficult to process for both the cash budget and budgeted income statement e.g., accrued expenses, prepaid expenses, depreciation, discount allowed etc. If you are getting stuck during initial practice question attempts, refer to the worked example and then check the solution. Read the solution carefully step-by-step and make sure you understand the process. It may be worth going back over specific questions but focusing on certain entries only. I.e., if you are only stuck on accrued expenses and depreciation – attempt these questions later but on the repeat attempts focus only on these two entries and then check your answer, ignore the rest of the question if you are confident with the rest.

Question 11

The following financial information has been provided.

Sales for the next six months are expected to be:

- June: 50,000.
- July: 55,000.
- August: 45,000.
- September: 48,000.
- October: 52,000.
- November: 58,000.

Sales are estimated to be 30% cash, 70% credit.

Sales are estimated to be collected 50% in the first month after sale, 30% in the second month after sale, 18% in the third month after sale. 2% of credit sales are written off after three months.

Required tasks:

a. Prepare a schedule of collection from debtors for the months of September, October and November.

Schedule of Collection from Debtors					
Month	Cash Sales	Credit Sales	September	October	November
June					
July					
August					
September					
October					
November					
Total					

b. What is the estimated cash sales for September?

Workings

c. Is bad debts included in a cash budget? Why?

Question 12

The following financial information has been provided.

Credit sales for the next 6 months are estimated to be:

- February: \$30,000.
- March: \$40,000.

Credit sales are expected to be collected 80% in the first month and 20% in the following month.

Credit sales paid the month after the sale takes place receive a discount of 3%.

Required tasks:

a. Prepare a debtors collection schedule for April.

Schedule of Collection from Debtors		
Month	Credit Sales	_____

	Total	

b. What is the discount allowed for March?

Workings

c. Is discount allowed included in a cash budget? Why?

Question 14

The following financial information has been provided.

Inventory is purchased using 40% cash, 60% credit. Inventory paid for on credit is paid over two months. 80% of the credit amount is paid in the month after purchase and the remaining 20% of the credit amount is paid for in the second month after purchase. Inventory paid with cash or within one month receives a 4% discount.

Inventory purchases in 2031 were estimated for the following months:

- September \$31,000.
- October \$30,000.
- November \$34,000.

Required tasks:

a. Prepare a creditor's schedule outlining cash paid in the months of November 2031.

Schedule of Payment to Creditors			

b. Calculate the cash purchases of inventory for November 2031.

Workings

Question 15

The following financial information has been provided by Fremantle Fisheries.

- The cash at bank balance for 28 February 2023 is \$19,200
- Actual sales:
 - January \$45,000.
 - February \$48,000.
- Expected sales:
 - March \$48,000.
- All sales are usually 70% credit and 30% cash. Credit sales are usually collected in the following manner:
 - 80% the month after sale.
 - 20% in the second month after sale.
- Office furniture had a carrying value of \$1,800 that was sold with a gain on sale of \$300 during March.
- The owner plans on making drawings of \$1,000 during March.
- Actual inventory purchases:
 - January 21,000.
 - February 22,500.
- Expected inventory purchases:
 - March 22,600.
- Inventory is paid for on credit with the full amount owing paid the month after purchase to take advantage of a 4% discount.
- A motor vehicle is planned to be purchased in March for \$7,200.
- Wages expense during March should be \$7,100. Accrued wages on 31 March 2023 should be \$1,000.
- Freight inwards during March is estimated at \$700.
- Prepaid rent at 28 February 2023 was \$3,100 and at the end of the month was \$2,400.
- Advertising expense for March is due to be \$2,000. Prepaid advertising on 31 March 2023 is expected to be \$500.

Required tasks:

- a. Prepare a cash budget for the month of March 2023.

Workings

Fremantle Fisheries Cash budget For the month ended 31 March 2023	
Description	March
Opening bank balance	
Estimated receipts	
Cash sales	
Collections from debtors/ accounts receivable	
Proceeds from sale of office furniture	
Total receipts	
Estimated Payments	
Payments to creditors/ accounts payable	
Wages	
Advertising	
Purchase of motor vehicle	
Freight inwards	
Drawings	
Total payments	
Cash surplus or deficit	
Closing bank balance	

b. Is prepaid expense included as an entry in a cash budget? Why?

c. Is accrued expenses included as an entry in a cash budget? Why?

Question 17

Timboland Boots has provided the following financial information.

- The following actual and expected sales information has been provided:
 - September 1,400 boots sold for \$190 each.
 - October 1,600 boots sold for \$190 each.
 - November 1,550 boots sold for \$195 each.
- Sales are all in cash.
- Machinery was sold for a loss on sale of \$8,000 in October. The cash received for the sale of this machinery was \$4,000.
- Advertising of \$36,000 is paid for every three months. The next payment is due in November.
- Depreciation of equipment is calculated using reducing balance method of 18% per year.
- Materials used to manufacture shoes are purchased on credit.
- Accrued wages at the end of November is due to be \$8,000. Wages paid per month is \$16,700.
- A delivery van is purchased in October for \$86,000. 60% is paid for at time of purchase and the remainder is paid for on a loan in the following months at \$1,200 per month until paid off.
- The owner plans on consistently withdrawing \$25,000 from the business every month.
- Insurance premiums at the start of the year were \$12,000 per month. In July these premiums increased by 6%.
- Operating expenses were previously \$96,000 per month. A purchase of new machinery in June decreased operating expenses by 9% per month.
- The cash balance at 30 September 2023 was \$86,200.

Required tasks:

- a. Prepare a cash budget for the months of October and November 2023.

Workings

Question 18

a. Describe how a cash budget assists in management of business cash needs.

b. Describe the importance of cash to business viability.

c. List measures a business can take to ensure the cash balance increases.

Cash Budgets and Budgeted Income Statements

Identify / List	Nature / Explain	Purpose / Importance	Includes
Budgeted Income Statement	Estimates income and expenses.	<ul style="list-style-type: none"> Estimate and assess profit for the period. Assist in decision making. Develop internal control strategies regarding income and expenses. 	Estimated income, expenses and profit
Cash Budget	Estimates future cash inflows and outflows for any point in future.	<ul style="list-style-type: none"> Used to set KPIs. Allows management of activities to accomplish KPIs. Employees can be motivated to achieve KPIs. Assess performance. Identify areas for improvement. 	Estimated cash inflows and cash outflows

Note: The cash budget is prepared using cash accounting, the budgeted income statement is prepared using accrual accounting.

Examples of cash movements not recorded as income in the Budgeted Income Statement

List	Describe
Share issues	This increases the cash at bank (asset) and the equity of a business. There is no income or expense that takes place.
Loan funds	This increases cash at bank (asset) and liabilities (loan from bank) of a business. There is no income or expense that takes place.
Loan repayment	This decreases cash at bank (asset) and decreases the loan (liability) there is a movement of cash but no income or expense. The relevant expense is any interest expense paid.
Proceeds of sale of asset	This increases cash at bank (asset) and decreases the relevant non-current asset (asset) account of a business but there is no income or expense takes place. Instead, the budgeted income statement will record the gain or loss on sale of an asset which is the income or expense. The gain or loss on sale is the difference in the carrying value (historical cost subtract accumulated depreciation) and the amount received for the NCA.
Purchase of NCAs	This decreases cash (asset) or increases in accounts payable (liability) and increases the relevant NCA account (asset). There is no income or expense that takes place.
Drawings	Drawings involve equity and a decrease in cash (asset). There is no income or expense involved.



Palais Longchamp, Marseille.

Example

Okaya Furniture has provided the following budget information for the months of March and April 2039.

- Expected sales are \$59,000 in March and \$62,000 in April.
- Sales are 80% cash and 20% credit. The 20% of credit sales is expected to be paid for the month after sale.
- Discount allowed is expected to be \$400 in March and \$450 in April.
- The business has a term deposit of \$45,000 with a bank that pays interest of 4% per annum. Interest is paid twice per year in 31 March and 30 September.
- Interest expense on a loan is \$500 per month.
- Inventory account budget information:
 - 1 April – Opening balance: \$40,000.
 - 1 April to 30 April – total budgeted inventory purchases: \$13,000.
 - 30 April – Closing balance: \$27,000.
- The accrued wages balance on 30 April is \$900. Wages paid for March and April is expected to be \$6,700. The accrued wages balance at 31 March 2039 is estimated to be \$600.
- A motor vehicle with a carrying value of \$30,000 at the previous balance date is depreciated at 20% per annum using the reducing balance method.
- Insurance of \$3,600 was paid for four months on February 2039.
- Telephone expense is estimated to be \$200 per month during 2039.
- During April, equipment with a carrying value of \$7,100 is planned to be sold for a gain on sale of \$2,000.
- The company tax rate is 30%.

Required task:

Prepare a budgeted income statement for the month ended 30 April 2039.



Èze, France.

Solution

Step 1 – Calculation of entry values.

The following workings / calculations of entries are required prior to entry in the budgeted income statement.

Note: Some questions may require simpler processes for entries. This example deliberately demonstrates difficult workings to build confidence that there should not be as much of a surprise in the exams.

Interest income:

- Relevant information: The business has a term deposit of \$45,000 with a bank that pays interest of 4% per annum. Interest is paid twice per year in 31 March and 30 September.

$$45,000 \times 0.04 \times 1/12 = 150$$

Note: The income statement includes income for a period, not just when it is paid. The interest paid in March and September would be included on a cash budget.

Cost of sales:

- Relevant information: Inventory account budget information:
 - 1 April – Opening balance: \$40,000.
 - 1 April to 30 April – total budgeted inventory purchases: \$13,000.
 - 30 April – Closing balance: \$27,000.

Inventory			
Opening balance	40,000	Cost of sales	26,000
Purchases	13,000	Closing balance	27,000
	53,000		53,000

Note: As a reminder for year 11 accounting and finance, the closing balance at the end of a period becomes the opening balance for the start of the next period. I.e., in this example the closing balance of \$27,000 is how much inventory will be on hand for the start for the next period.

Alternative cost of sales calculation:

$$\text{Cost of sales} = 40,000 + 13,000 - 27,000 = 26,000$$

Therefore, cost of sales is \$26,000.

Wages expense:

- Relevant information: The accrued wages balance on 30 April is \$900. Wages paid for March and April is expected to be \$6,700. The accrued wages balance at 31 March 2039 is estimated to be \$600.

Accrued wages			
Bank	6,700	Opening balance	600
Closing balance	900	Wages expense	7,000
	7,600		7,600

Note: As a reminder for year 11 accounting and finance, the closing balance at the end of a period becomes the opening balance for the start of the next period. I.e., in this example the closing balance of \$7,000 is how much accrued wages will be owing at the start for the next period.

Alternative wages expense calculation:

$$\text{Wages expense} = 6,700 + 900 - 600 = \$7,000$$

Therefore, the wages expense is \$7,000.

Insurance expense:

- Relevant information: Insurance of \$3,600 was paid for four months on February 2039.

$$\text{Insurance expense per month} = 3,600 \times 1/4 = 900$$

Depreciation of motor vehicle:

- A motor vehicle with a carrying value of \$30,000 at the previous balance date is depreciated at 20% per annum using the reducing balance method.

Depreciation per month = carrying value x depreciation rate x 1/12
= 30,000 x 0.2 x 1/12
= 500

Step 2 – Preparation of gross profit and total income section of the budgeted income statement.

The top part of the budgeted income statement is prepared below.

Sales

- Relevant information:
 - Expected sales are \$59,000 in March and \$62,000 in April.
 - Sales are 80% cash and 20% credit. The 20% of credit sales is expected to be paid for the month after sale.

As the budgeted information statement uses the accrual method, the sales figure is simply the sales figure in April and no calculation is needed to find the cash or credit sales.

Discount allowed

- Relevant information: Discount allowed is expected to be \$400 in March and \$450 in April.

Gain on sale of equipment

- Relevant information: During April, equipment with a carrying value of \$7,100 is planned to be sold for a gain on sale of \$2,000.

The budgeted income statement uses the accrual method and therefore the income is recorded which is the gain on sale provided in the question. In some questions you may have to calculate the gain or loss on sale.

Note: the cost of sales and interest income were calculated in the previous step.

Okaya Furniture Budgeted Income Statement For the month ended 30 April 2039		
	\$	\$
Sales		62,000
Less discount allowed		450
Net sales		61,550
Less cost of sales		26,000
Gross Profit		35,550
Add other income		
Gain on sale of equipment	2,000	
Interest income	150	2,150
Total Income		37,700

This space has been left blank intentionally so that the next step can fit on one page.

Step 3 – Preparation of bottom of budgeted income statement.

All other expenses are entered under the heading of 'Less other expenses.' These are then totalled to calculate the total other expenses.

Relevant information:

- Interest expense on a loan is \$500 per month.
- Telephone expense is estimated to be \$200 per month during 2039.
- Wages expense was calculated in a previous step.
- Insurance expense was calculated in a previous step.
- Depreciation of motor vehicle was calculated in a previous step.
- The company tax rate is 30%.

Budget profit before tax = Gross profit add other income – other expenses

Income tax = profit before tax x tax rate.

Budgeted profit after tax = profit before tax – income tax

Note: some questions will not include income tax. In this instance an entry of 'Budgeted profit' or 'Estimated profit' is the final entry in the budgeted income statement.

Okaya Furniture Budgeted Income Statement For the month ended 30 April 2039		
	\$	\$
Sales		62,000
Less discount allowed		450
Net sales		61,550
Less cost of sales		26,000
Gross Profit		35,550
Add other income		
Gain on sale of equipment	2,000	
Interest income	150	2,150
Total Income		37,700
Less other expenses		
Interest expense	500	
Telephone	200	
Wages	7,000	
Insurance	900	
Depreciation of motor vehicle	500	9,100
Budgeted profit before tax		28,600
Less income tax		8,580
Budgeted profit after tax		20,020

Tips

- If there is no discount allowed, do not have an entry in the statement for less discount allowed and net sales.
- If there was a loss on sale of a non-current asset, this would appear under 'Less other expenses.'
- If income tax is not relevant, then the budgeted profit before tax, less income tax and budgeted profit after tax are replaced by just one entry of 'Budgeted Profit'.
- If the budgeted income statement is for multiple months, each month only has one column. Rather than being spread over two like in this example.

Practice Questions

Questions 19-22: Cash Budgets and Budgeted Income Statements.

Tips

Statement layout

It is helpful to revise that there is a top section to the budgeted income statement has a consistent order. Any entries not fitting into this top section will be entered under 'Less other expenses'. When reading a question, label items in the question as 'GP', for gross profit, 'TI' for total income, or 'OE', for other expenses. These notations will act as a reminder for where these entries fit in the statement.

It is recommended that students revise the layout of the cash budget and budgeted income statement to build familiarity with both the layout and the common entries that will appear across either statement. This example statement layouts in the Course Guide will help with this revision.

Getting stuck

You may find specific entries difficult to process for both the cash budget and budgeted income statement e.g., accrued expenses, prepaid expenses, depreciation, discount allowed etc. If you are getting stuck during initial practice question attempts, refer to the worked example and then check the solution. Check solutions step-by-step and make sure you understand the process. It may be worth going back over specific questions but focusing on certain entries only. I.e., if you are only stuck on accrued expenses and depreciation, attempt these questions later but focus only on these two entries and then check your answer, ignore the parts of the question you are confident with during repeat attempts.

Example statement

An example statement is below as a guide to refer to when completing practice questions.

Balance day adjustment revision activities

Balance day adjustments were covered during the year 11 course and students may need to revise this. On the sample chapters page of the resource hub linked on the front page of the book, there is a series of balance day adjustment revision activities that involve preparing BDA ledgers for calculation of figures that are needed in the cash budget or budgeted income statement. Students can view these activities digitally on their devices or teachers may want to print these for students. This is also useful for revision during the 'Companies' chapter of the Unit 4 textbook.

Balance day adjustment notes

There is a practical and theory summary of balance day adjustments in the 'Companies' chapter of the 'Course Guide' textbook and also the 'Practical Guide Unit 4' textbook. This may be useful for students to have open to refer to when completing calculation of balance day adjustments such as prepaid expense and accrued expenses.

Prepaid expenses and accrued expenses

The expense figures needed for the Budgeted Income statement that are calculated with reference to prepaid expenses or accrued expenses can be found using the following formula. You may find it useful to calculate the expense figure by drawing the ledger account for prepaid expenses or accrued expenses when completing questions.

- Expense = expense paid – prepaid expense (prepaid expense paid for during a month)
- Expense = expense paid + accrued expense (accrued expense remaining to be paid during a month)

These two equations are re-arranged versions of the equations used to find the amounts needed for the cash budget. The formulas relevant for the cash budget are as follows:

- Expense paid = expense + prepaid expense (prepaid expense paid for during a month)
- Expense paid = expense – accrued expense (accrued expense remaining to be paid during a month)

Examples of cash movements not recorded as income in the Budgeted Income Statement

See some examples listed earlier in this section before the worked example.

Budgeted Income Statement – Statement Preparation

Key:	<ul style="list-style-type: none"> • Green = positive figure. • Red = negative figure. • Blue = Total sum.
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Business Name Budgeted Income Statement For the month ended X Month 20XX		
	\$	\$
Sales		X
Less discount allowed		X
Net sales		Sales – discount allowed
Less cost of sales		X
Gross Profit		Net sales – cost of sales
Add other income		
Gain on sale of equipment	X	
Interest income	X	X
Total Income		Gross Profit + Other Income
Less other expenses		
Interest expense	X	
Telephone	X	
Wages	X	
Insurance	X	
Depreciation of motor vehicle	X	Total other expenses
Budgeted profit before tax		Total
Less income tax		X
Budgeted profit after tax		X

Tips	<ul style="list-style-type: none"> • Each time a calculation is required the values are entered in a column one to the left. • If there is only one type of 'Other Income', no calculation is required and this sole value would be entered in the far right column. • If there is no discount allowed, do not have an entry in the statement for less discount allowed and net sales. • If there was a loss on sale of a non-current asset, this would appear under 'Less other expenses.' • If income tax is not relevant, then the budgeted profit before tax, less income tax and budgeted profit after tax are replaced by just one entry of 'Budgeted Profit'. • If the budgeted income statement is for multiple months, each month only has one column. Rather than being spread over two like in this example.
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Question 19

The following financial estimated information has been provided by Humpty Dumpty Early Learning Resources for the month ended 31 March 2018.

Tip: When reading a question, label items in the question as 'GP', for gross profit, 'TI' for total income, or 'OE', for other expenses. These notations will act as a reminder for where these entries fit in the statement.

- Sales \$30,000.
- Loss on sale of equipment \$1,200.
- Interest expense \$600.
- Interest income \$400.
- Discount allowed \$650.
- Cost of sales \$4,500.
- Insurance \$6,000.
- Wages \$12,000.
- Rent \$3,100.
- Depreciation of motor vehicle \$3,500.

Required task:

a. Prepare a budgeted income statement for the month ended 31 March 2018.

Humpty Dumpty Early Learning Resources		
Budgeted Income Statement		
For the month ended 31 March 2018		
	\$	\$
Sales		
Less discount allowed		
Net sales		
Less cost of sales		
Gross Profit		
Add other income		
Interest income		
Total Income		
Less other expenses		
Interest expense		
Rent		
Wages		
Loss on sale of equipment		
Insurance		
Depreciation of motor vehicle		
Budgeted _____		

Question 20

Ace Online Tutors Ltd has provided the following budgeted and actual financial information.

- Sales are 50% cash and 50% credit. Sales in September are budgeted to be \$18,200 in September and \$18,450 in October.
- Cost of sales is estimated to be \$300 in September and \$350 in October.
- Rent paid for September and October is estimated to be \$3,100. The accrued rent balance at 31 August 2018 is \$400. The accrued rent balance at 30 September 2018 is estimated to be \$500. The accrued rent balance at 31 October 2018 is estimated to be \$300.
- The accrued wages balance on 31 August 2018 \$400. The balance of wages paid for September and October is expected to be \$6,700. The accrued wages balance on 30 September 2018 and 31 October 2018 is estimated to be \$0.
- Advertising paid per month should be \$400. Estimated prepaid advertising paid for during September 2018 is \$100 and during October 2018 is \$50.
- Equipment was purchased in January for \$4,000. The residual value will be \$500 and the useful life is 4 years. Non-current assets are depreciated using the straight line method.
- Ace Online Tutors has a \$30,000 interest only loan which it pays 3% interest per annum on.
- The tax rate is 30%.

Required tasks:

a. Prepare a budgeted income statement for Ace Online Tutors for the months of September and October in 2018.

Tips:

- Total Expense = expense paid – prepaid expense
- Total Expense = expense paid + Accrued expense
- You may find it useful to draw the ledger account for prepaid expenses and accrued expenses when completing questions.

Workings

Question 21

Big Cat Ltd. has provided the following financial information.

- Actual and expected sales:
 - January \$110,000.
 - February \$120,000.
 - March \$122,000.
- Sales are 70% cash, 30% credit. Credit sales are collected 70% in the month after sale, 25% two months after sale. Credit sales paid for the month after sale receive a 5% discount. The remaining 5% of sales not collected after two months are written off as bad debts.
- Inventory is purchased on credit from one particular supplier and paid for in the following month to receive a 3% discount.
- Actual and expected inventory purchases:
 - January: \$70,500.
 - February: \$67,000.
 - March: \$71,000.
- A motor vehicle was purchased in January for \$15,000 with a useful life of 5 years and a residual value of \$6,000. Depreciation is calculated using the straight line method.
- Another particular supplier will be paid \$30,700 during March.
- An investment of \$50,000 earns 5% interest per annum paid twice yearly during December and June.
- Equipment with a carrying value of \$6,000 is sold for a gain on sale of \$1,200.
- Rent paid during March should be \$6,200. Accrued rent at the end of March is estimated to be \$300.
- Freight inwards expense during March should be \$700.
- Wages expense is budgeted to be \$1,200 for the three months ended 31 April 2023 and is paid monthly.
- The business tax rate is 30%. Income tax is paid each year at 30 June.
- The owner contributes \$2,000 per month to the business.
- The cash balance at 28 February 2023 was \$70,400.

Required task:

a. Prepare a schedule of collections from debtors for the month ended 31 March 2023.

Schedule of Collection from Debtors			
Month	Cash Sales	Credit Sales	March
		Total	

b. Prepare a cash budget for the month ended 31 March 2023.

Workings

Question 22

Vic Park Framers has provided the following financial information.

- Machinery with a carrying value of \$9,000 at 30 June 2024 is depreciated at 12% per annum using the reducing balance method.
- The owner of the business withdraws \$17,000 from the business every year during June.
- Bad debts of \$5,000 are predicted to be written off during June.
- Discount allowed is estimated at \$350.
- Total sales in June are estimated to be \$70,000. Of these sales \$60,000 are expected to be in cash.
- Accounts receivable collected during June is estimated to be \$12,000.
- Interest expense of \$600 is paid every three months with the last payment in May.
- Rent of \$4,000 was prepaid in May. \$500 of rent was used during June.
- Inventory account budget information:
 - 1 June – Opening balance: \$50,000.
 - 1 June to 30 June – total budgeted inventory purchases: \$19,000.
 - 30 June – Closing balance: \$21,000.
- Wages expense used and paid in June is \$3,200.
- A motor vehicle with a carrying value of \$12,000 is planned to be sold for a loss of \$3,000 during June.
- \$4,900 is estimated to be paid to accounts payable during June.
- The bank balance at 31 May 2025 is \$91,200.

Required tasks:

- a. Prepare a budgeted income statement for the month ended 30 June 2025.

Workings

Performance Reports

Budgets that have been prepared by a business can be compared with actual performance once a period has taken place. This performance report then enables several functions for users outlined in the following table.

Performance Reports	
Purpose	Evaluate variances regarding budgeted and actual financial performance.
Function / Allows users to <i>Know any 3</i>	<ul style="list-style-type: none"> Analyse variances. Reflect on negative variances. Develop internal control strategies for negative variances. Reward employees responsible for positive variances. Manage the entity efficiently. <p><i>Note: If given a case study, discuss any relevant examples from exam question here.</i></p>
Example Reports <i>Know any 2</i>	<ul style="list-style-type: none"> Cash budget performance report. Budgeted income statement performance report. Sales budget performance report. Production Budget. Ratio analysis of GPFRs.

Cash and accrual – Accounting and Performance Reporting

	Cash	Accrual
Explain difference in accounting	<ul style="list-style-type: none"> Income recognised when the cash is received. Expenses recognised when the cash is paid. 	<ul style="list-style-type: none"> Income recognised when the transaction occurs (income earned). The cash may or may not have been received yet. Expenses recognised when the transaction occurs (expense incurred). The cash may or may not have been paid yet.
Explain difference in performance reporting	<ul style="list-style-type: none"> Evaluates the budgeted and actual cash inflows and outflows to identify variances. This is evaluated through comparison of budgeted cash received and cash paid with actual cash received and cash paid. 	<ul style="list-style-type: none"> Evaluates the budgeted and actual income and expense variances. This is evaluated through comparison of budgeted income earned and expenses incurred with actual income earned and expenses incurred.
Is useful to	<ul style="list-style-type: none"> Evaluate the liquidity and cash flows. 	<ul style="list-style-type: none"> Evaluate business performance and position. This is possible because accrual accounting aligns income and expenses to the year a transaction took place.
Example of difference between cash and accrual accounting – Sales	<ul style="list-style-type: none"> Cash Budget (CB) records sales when cash sales occur or when debtors pay. 	<ul style="list-style-type: none"> Budgeted Income Statement (BIS) records sales when sales made.
Example of difference between cash and accrual accounting – Prepaid advertising	<ul style="list-style-type: none"> CB records the prepaid advertising when the cash is paid 12 months in advance. 	<ul style="list-style-type: none"> BIS records prepaid advertising only when the expense used.

Note: Questions may ask for specific reference to a question with regards to how CB and BIS account for income and expenses differently. The examples in the above table are for sales and advertising expense.

Budget performance report – Reasons for variances

Variance area	Reasons for variances in budget performance report	
	Favourable	Unfavourable
Cash sales	<ul style="list-style-type: none"> Increased sales. Increased selling prices. Increased consumer demand for inventory. Decreased competition. Upswing in economic cycle. 	<ul style="list-style-type: none"> Decreased sales. Decreased selling prices. Decreased consumer demand for inventory. Increased competition. Downturn in economic cycle.
Cost of sales	<ul style="list-style-type: none"> Increased sales leading to an increased cost of sales. Decrease in cost of inventory relative to budgeted cost of inventory. 	<ul style="list-style-type: none"> Decreased sales leading to a decreased cost of sales. Increased cost of inventory relative to budgeted cost of inventory.
Inventory	<ul style="list-style-type: none"> Decreased inventory purchased due to higher supplier prices. Decreased cost of inventory relative to budgeted cost. 	<ul style="list-style-type: none"> Increased inventory purchased due to lower supplier prices. Increased cost of inventory relative to budgeted cost.
Proceeds of sale of NCA	<ul style="list-style-type: none"> Increased equipment prices relative to when equipment was purchased. Favourable exchange rate with overseas equipment sale. 	<ul style="list-style-type: none"> Decreased equipment prices relative to when equipment was purchased. Unfavourable exchange rate with overseas equipment sale.
Purchase of NCA	<ul style="list-style-type: none"> Decreased equipment prices when equipment purchased. Favourable exchange rate with overseas equipment purchase. 	<ul style="list-style-type: none"> Increased equipment prices when equipment purchased. Unfavourable exchange rate with overseas equipment purchase.
Collections from debtors	<ul style="list-style-type: none"> Increased credit sales. Increased selling prices. Improved debt management. Debtors paying earlier. 	<ul style="list-style-type: none"> Decreased credit sales. Decreased selling prices. Poor debt management. Debtors paying later.
Payments to creditors	<ul style="list-style-type: none"> Decreased supplier prices. Decreased credit purchases. Poor credit management. Payment of debts later. 	<ul style="list-style-type: none"> Increased supplier prices. Increased credit purchases. Improved credit management. Payment of debts earlier.
Wages	<ul style="list-style-type: none"> Decreased staff wages. Decreased use of overtime by slow workers. Improved staff management Firing of staff. 	<ul style="list-style-type: none"> Increased staff wages. Increased use of overtime by slow workers. Poor staff management. Hiring of staff.
Gross Profit	<ul style="list-style-type: none"> Increased sales relative to cost of sales - due to decrease in price or volume of inventory, shipping or discounts allowed. 	<ul style="list-style-type: none"> Decreased sales relative to cost of sales - due to increase in price or volume of inventory, shipping or discounts allowed.

Note: For strategies to manage these variances, refer to internal control strategies.

Performance Reports – Cash Budget Performance Report

		Cash budget performance report
Purpose	Purpose	Evaluate the actual and budgeted cash flows during a period.
	Function	<ul style="list-style-type: none"> • Detect and measure variances. • Evaluate variances as favourable or unfavourable. • Develop internal control for negative variances. • Confirm cash available for future investments and current liabilities. • Adjust future planning and budgets with insight from past performance.

Note: if a question asks for the 'purpose' but is worth more than 1 mark, talk about the function as well.

Example

Core Engineering has provided the following financial information.

Core Engineering Cash budget For the month ended 31 March 2025	
Opening bank balance	21,000
Estimated receipts	
Cash sales	26,000
Collections from accounts receivable	15,000
Proceeds from sale of equipment	6,000
Total Receipts	47,000
Estimated Payments	
Payments to accounts payable	14,000
Wages	6,000
Purchase of motor vehicle	15,000
Rent	3,800
Interest on loan	1,200
Total payments	40,000
Cash Surplus or Deficit	7,000
Closing bank balance	28,000

The following actual cash receipts and payments for 31 March 2025 have been provided:

- Cash sales: \$25,500.
- Collections from accounts receivable: \$11,000.
- Proceeds from sale of equipment: \$6,200.
- Payments to accounts payable: \$14,000.
- Wages: \$4,500.
- Purchase of motor vehicle: \$15,100.
- Rent: \$3,800.
- Interest on loan: \$1,350.

Required task:

Prepare a cash budget performance report for Core Engineering for the month ended 31 March 2025. Identify two significant variances in the performance report and outline why these variances may have occurred.

Solution

Step 1 – Preparation of cash budget performance report.

Previously when preparing the cash budget, receipts and payments were under the heading of 'estimated receipts' and 'estimated payments'. Now that a performance report is prepared, these are under the heading of 'receipts' and 'payments' (past tense) as the actual figures are known.

In the 'actual' column, the actual figures are entered. In the 'variance column', the actual figure is subtracted from the budget figure for each row.

Variance = Actual - Budget

Next to the variance figure for each row, one of the following is written:

- 'F', for favourable.
 - Receipts variance is positive (more than 0) i.e., more cash has been received than budget.
 - Payments variance is negative (less than 0) i.e., less cash has been paid than budget.
- 'U', for unfavourable.
 - Receipts variance is negative (less than 0) i.e., less cash has been received than budget.
 - Payments variance is positive (more than 0) i.e., more cash has been paid than budget.
- 'Nil', for no variance.
 - Receipts or Payments variance is 0 i.e., no difference between actual figure and budget.

Core Engineering Cash budget performance report For the month ended 31 March 2025			
	Budget \$	Actual \$	Variance \$
Opening bank balance	21,000	21,000	
Receipts			
Cash sales	26,000	25,500	500 U
Collections from accounts receivable	15,000	11,000	4,000 U
Proceeds from sale of equipment	6,000	6,200	200 F
Total Receipts	47,000	42,700	
Payments			
Payments to accounts payable	14,000	14,000	Nil
Wages	6,000	4,500	1,500 F
Purchase of motor vehicle	15,000	15,100	100 U
Rent	3,800	3,800	Nil
Interest on loan	1,200	1,350	150 U
Total payments	40,000	38,750	
Cash Surplus or Deficit	7,000	3,950	
Closing bank balance	28,000	24,950	

Step 2 – Analysis of variances.

Two significant variances chosen for analysis are collections from accounts receivable and wages.

The unfavourable variance in accounts receivable could be caused by:

- A decrease in credit sales.
- Lower selling prices.
- Poor debt management.
- Creditors paying later.

The favourable variance in wages could be caused by:

- Lower staff wages.
- Less use of overtime by workers.
- Better management of staff.
- Firing of staff.

Practice Questions

Questions 23-26: Performance Reports – Cash Budgets.

Tip	<u>Variance analysis</u>
	When completing questions, refer to the 'Budget performance report – Reasons for variances' in the course guide (or on a previous page in this book) for ideas on what can lead to variances in the budget performance report. The Course Guide can be found by navigating to the Resource Hub link on the front page.

Question 23

The following financial information has been provided by Penguin Island Tours.

Penguin Island Tours			
Cash budget performance report			
For the three months month ended 30 September 2022			
Description	Budget	Actual	Variance
Opening bank balance	81,500	81,500	
Receipts			
Cash sales	45,000	49,000	
Collections from debtors	19,000	22,000	
Total payments	64,000	71,000	
Payments			
Payments to creditors	10,300	12,000	
Staff wages	18,900	19,200	
Commission paid	1,200	1,600	
Rent	6,700	6,500	
Interest on loan	900	900	
Total payments	38,000	40,200	
Cash surplus or deficit	26,000	30,800	
Closing bank balance	107,500	112,300	

Required tasks:

a. Complete the cash budget performance report.

Note: you can calculate and write the variance in the box provided above.

b. Identify and evaluate the variance in cash sales.

c. Identify and evaluate the variance in payments to creditors.

Question 24

Lemon Wear has provided the following information.

Lemon Wear			
Cash budget performance report			
For the three months ended 30 September 2048			
Description	Budget	Actual	Variance
Opening bank balance	27,300	27,300	
Receipts			
Cash sales	19,000	18,500	
Collections from debtors	8,000	6,300	
Total payments	27,000	24,800	
Payments			
Payments to creditors	4,000	3,800	
Staff wages	6,100	6,100	
Commission paid	480	400	
Purchase of machinery	5,000	5,400	
Rent	3,100	3,100	
Interest on loan	1,200	1,300	
Total payments	19,880	20,100	
Cash surplus or deficit	7,120	4,700	
Closing bank balance	34,420	32,000	

Required tasks:

a. Complete the cash budget performance report for the three months ended 30 September 2048.

b. Identify and evaluate the variance in collections from debtors.

c. Identify and evaluate the variance in the purchase of machinery.

Question 25

Free Run Gym has provided the following cash budget.

Free Run Gum Cash budget For the month ended 31 January 2043	
Description	Budget
Opening bank balance	64,700
Receipts	
Cash sales	92,000
Collections from debtors	34,000
Total receipts	126,000
Payments	
Payments to creditors	24,000
Staff wages	4,300
Commission paid	3,400
Proceeds of sale of machinery	5,000
Insurance	2,500
Drawings	20,000
Total payments	59,200
Cash surplus or deficit	66,800
Closing bank balance	131,500

Management has provided the following actual information relating to the month ended 31 January 2043.

- The carrying value of motor vehicle at time of sale was \$9,000.
- Loss on sale of motor vehicle was \$1,900.
- Actual cash sales were 12% higher than budgeted cash sales.
- Payments to accounts payable were \$3100 higher than budgets.
- Collections from debtors were \$31,000.
- Staff wages was \$4,300.
- Commission paid to employees was 12% higher than budgeted.
- Drawings was \$5,000 higher than budgeted.
- Insurance was \$2,500.

Required tasks:

a. Prepare a cash budget performance report for the month ended 31 Jan 2043.

b. Evaluate the variance in cash sales.

c. Evaluate the variance in collections from debtors.

Question 26

Quadnet Telco has provided the following cash budget.

Quadnet Telco Cash budget For the month ended 31 July 2025	
Description	Budget
Opening bank balance	148,000
Receipts	
Cash sales	74,000
Collections from debtors	7,600
Proceeds of sale of equipment	4,400
Total receipts	86,000
Payments	
Payments to creditors	18,500
Staff wages	5,300
Telephone	1,200
Purchase of machinery	5,000
Insurance	900
Total payments	30,900
Cash surplus or deficit	55,100
Closing bank balance	203,100

Management has provided the following actual information relating to the month ended 31 January 2043.

- The gain on sale of equipment was \$500.
- The carrying value of the equipment at time of sale was \$4,200.
- Actual cash sales were 7% lower than budgeted cash sales.
- Payments to creditors were \$18,500.
- Collections from debtors were \$1,600 more than budgeted.
- Staff wages was \$5,300.
- Machinery was purchased for \$15,000. 60% was paid in cash and the remainder will be paid in 3 months' time.
- Insurance premiums increased by \$80.
- Telephone expense was \$1,200.

Required task:

a. Prepare a cash budget performance report for 31 July 2025.

Workings

Quadnet Telco Cash budget performance report For the month ended 31 July 2025			
Description	Budget	Actual	Variance
Opening bank balance			
Receipts			
Cash sales			
Collections from debtors			
Proceeds of sale of equipment			
Total payments			
Payments			
Payments to creditors			
Staff wages			
Telephone			
Purchase of machinery			
Insurance			
Total payments			
Cash surplus or deficit			
Closing bank balance			

Performance Reports – Budgeted Income Statement Performance Report

		Budgeted Income Statement Performance Report
Purpose	Purpose	Evaluate the actual and budgeted income, expenses, and profit during a period.
	Function	<ul style="list-style-type: none"> • Detect and measure variances. • Evaluate variances as favourable or unfavourable. • Develop internal control for negative variances. • Confirm profit generation ability. • Adjust future planning and budgets with insight from past performance.

Note: if a question asks for purpose but is worth more than 1 mark, talk about the function as well.

Example

A budgeted income statement is prepared and analysed in the following solution. This information can be presented in a variety of ways which you have seen in previous sections of this chapter and will also see in following practice questions.

Example Solution

A budgeted income statement performance report follows a similar process to the cash budget performance.

Variance = Actual – Budget.

Next to the variance figure for each row, one of the following is written:

- 'F', for favourable.
 - Income variance is positive (more than 0) i.e., actual income is more budgeted income.
 - Expense variance is negative (less than 0) i.e., actual expense is less than budgeted expense.
- 'U', for unfavourable.
 - Income variance is negative (less than 0) i.e., actual income is less than budgeted income.
 - Expense variance is positive (more than 0) i.e., actual expense is more than budgeted income.
- 'Nil', for no variance.
 - Income or expense variance is 0 i.e., actual figure is the same as budgeted figure.

These variances can be analysed using a similar process to cash budgets. Refer to the 'Budget performance report – Reasons for variances' in the course guide (or on a previous page in this book) for ideas on what can lead to variances in the budget performance report.

X1 Industries			
Budgeted Income Statement Performance Report			
For the month ended 31 December 2029			
	Budget	Actual	Variance
Sales	50,000	45,000	5,000 U
Less discount allowed	2,000	1,800	200 F
Net sales	48,000	43,200	4,800 U
Less cost of sales	21,000	20,500	500 F
Gross Profit	27,000	22,700	4,300 U
Add other income			
Gain on sale of motor vehicle	4,000	4,200	200 F
Interest income	500	500	Nil
Total Income	31,500	27,400	
Less other expenses			
Interest expense	560	590	30 U
Wages	7,300	7,100	200 F
Office rent	4,000	4,000	Nil
Insurance	6,000	6,000	Nil
Depreciation of motor vehicle	3,100	3,100	Nil
Total other expenses	20,960	20,790	170 F
Budgeted profit before tax	10,540	6,610	3,930 U
Less income tax	3,162	1,983	1,179 F
Budgeted profit after tax	7,378	4,627	2,751 U

Practice Questions

Questions 27-29: Performance Reports – Budgeted Income Statement Performance Reports.
Questions 30-44: Budgets theory review.

Exam Questions

See 'Budgets' chapter of the Exam Guide for practice exam questions. The Exam Guide can be found by navigating to the Resource Hub link on the front page.

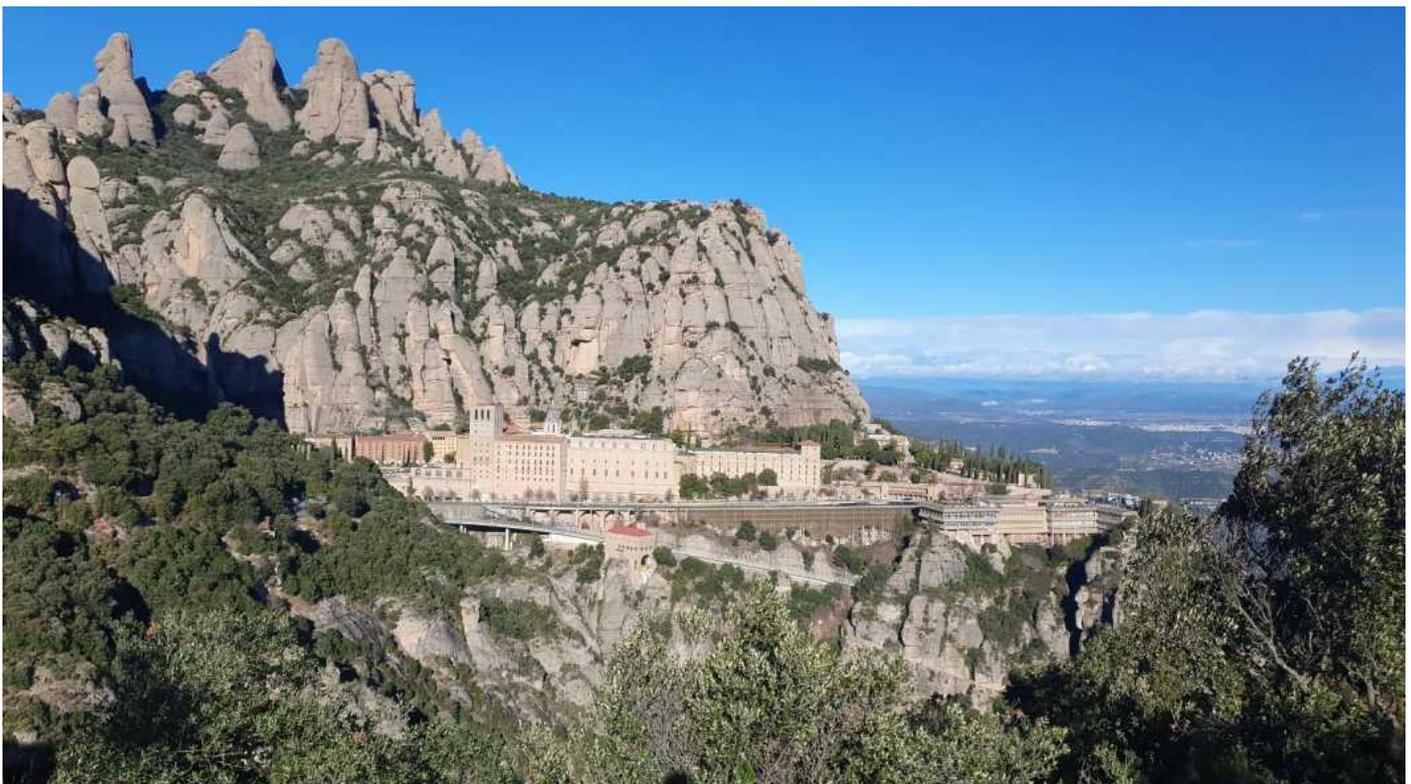
Tips

Variance analysis

When completing questions, refer to the 'Budget performance report – Reasons for variances' in the course guide (or on a previous page in this book) for ideas on what can lead to variances in the budget performance report. The Course Guide can be found by navigating to the Resource Hub link on the front page.

Format of internal reports

Budgets are internal reports. Internal reports have no strict standard for presentation format. The format of budgets in exam questions and answers may look slightly different. The format and process taught in this book should still be correct.



Santa Maria de Montserrat Abbey, Spain.

Question 27

The following financial information has been provided by C3 Builders.

C3 Builders			
Budgeted Income Statement Performance Report			
For the month ended 31 July 2046			
	Budget	Actual	Variance
Sales	100,000	114,000	
Less cost of sales	24,000	26,000	
Gross Profit	76,000	88,000	
Add other income			
Gain on sale of motor vehicle	3,000	3,500	
Interest income	400	400	
	79,400	91,900	
Less other expenses			
Interest expense	600	600	
Telephone	2,500	2,800	
Wages	32,000	31,000	
Office rent	8,500	8,900	
Office administration	4,100	4,400	
Selling expense	6,700	7,400	
Depreciation of motor vehicle	1,500	1,500	
Total other expenses	55,900	56,600	
Budgeted profit before tax	23,500	35,300	
Less income tax	7,050	10,590	
Budgeted profit after tax	16,450	24,710	

Additional information:

- The business tax rate is 30%.

Required task:

- Complete the variance column of the budgeted income statement performance report.
- Identify the variance in cost of sales and provide possible reasons for this variance.

c. Identify the variance in wages and provide possible reasons for this variance.

Question 28

The following financial information has been provided by Smelly Dog Cleaners.

Smelly Dog Cleaners			
Budgeted Income Statement Performance Report			
For the month ended 30 April 2037			
	Budget	Actual	Variance
Sales	23,000	22,000	
Less discount allowed	1,900	1,600	
Net sales	21,100	20,400	
Less cost of sales	9,200	9,100	
Gross Profit	11,900	11,300	
Add other income			
Interest income	500	600	
	12,400	11,900	
Less other expenses			
Electricity	1,200	1,150	
Loss on sale of furniture	400	200	
Wages	4,000	4,200	
Office rent	3,500	3,500	
Depreciation of furniture	300	300	
Total other expenses	9,400	9,350	
Net Profit	3,000	2,550	

Required tasks:

- a. Complete the variance column of the budgeted income statement performance report.
- b. Identify the variance in loss on sale of furniture and provide possible reasons for this variance.

- c. Identify the variance in gross profit and provide possible reasons for this variance.

Question 29

The following financial information has been provided by Indoor Plant Emporium.

- Insurance paid during the year should be \$4,500. Prepaid insurance is predicted to be \$700 on 30 June 2032.
- Wages paid during the year should be \$5,300. Accrued wages on 30 June 2032 should be \$300.
- Equipment purchased 3 years ago had an original cost of \$20,000 and residual value of \$4,000 is depreciated using the straight line method over 10 years.
- Shares are planned to be sold for a gain of \$3,000.
- Sales are estimated to be \$73,000 with a discount allowed of \$3,800.
- Cost of sales are estimated to be 30,000.
- Prepaid office rent is predicted to be \$1,100 on 30 June 2032. Office rent paid during the year should be \$6,200.

Actual figures for the income statement were as follows:

- Insurance \$3,950.
- Sales \$76,000.
- Discount allowed \$4,300.
- Wages \$5,400.
- Gain on sale of shares \$3,550.
- Cost of sales 32,500.
- Office rent \$5,300.

Required task:

a. Prepare a budgeted income statement performance report for Indoor Plant Emporium for the year ended 30 June 2032.

Workings

Practice Questions

Questions 30-44: Budgets theory review.

Tip

Course Guide

When completing the theory review you may find it useful to refer to the relevant chapter in the Essential Insight Course Guide. The Course Guide summarizes all theory relevant for each practical guide chapter. This saves time flipping through multiple pages in the Practical Guide while revising. The Course Guide can be found by navigating to the Resource Hub link on the front page.

Question 30

A cash budget performance report:

- Evaluate actual and budgeted income, expenses, and profit during a period.
- Evaluates actual and budgeted cash flows during a period.
- Evaluates actual and budgeted assets and liabilities during a period.
- Evaluates actual and budgeted revenue and expenses during a period.

Question 31

Performance reports do not allow users to:

- Pay debts earlier for discounts.
- Reflect on negative variances.
- Manage the entity efficiently.
- Analyse variances.

Question 32

An example of a cash receipt that is not recorded as income in the budgeted income statement would not include:

- Proceeds of sale of asset.
- Share issues.
- Loan funds.
- Discount received.

Question 33

The importance of the master budget includes:

- Detect and measure variances.
- Manage activities to accomplish key performance indicators.
- Evaluate variances as favourable or unfavourable.
- Evaluate budgeted and actual cash flows.

Question 34

The purpose of a cash budget does not include:

- Identify ability to pay debts as they fall due.
- Plan future expenditure.
- Develop internal control strategies regarding cash inflows and cash outflows.
- Control future expenditure.

Question 35

A financial budget would not include:

- Capital expenditure budget.
- Budgeted balance sheet.
- Sales budget.
- Cash budget.

12. Capital Investment



Activate Prior Knowledge

Respond to the following questions. Discuss your answers with a peer or the class.

<p>What kind of things could a business spend money on to expand business operations?</p>	
<p>What information would be important for a business to know when planning the purchase of new machinery?</p>	
<p>Which would be more useful for a business to know regarding a future investment:</p> <ul style="list-style-type: none">• <u>How long</u> it takes for a business to receive its money back from an investment; or• The <u>total amount</u> of money an investment will make over time.	

Capital Investment – Syllabus

Syllabus – Unit 3	
Capital Investment	Recording, using and evaluating financial information: Recording, processing and communicating financial information <ul style="list-style-type: none">capital investment/budgeting techniques for capital expenditure, limited to calculations for cash flows using straight-line depreciation method only and net of taxation<ul style="list-style-type: none">discounted cash flows [net present value (NPV) only]payback period
	Financial institutions and systems: Financial systems and fundamental principles <ul style="list-style-type: none">nature and importance of capital investment decisionsconcept of the time value of moneyfactors affecting capital investment decisions, including:<ul style="list-style-type: none">consumer preferencescompetitiongovernment regulation
	<i>Note: Some of the below syllabus sections are in both 'business planning' and 'capital investment' given the overlap in syllabus but distinctly different content/ examination questions.</i>
	Recording, using and evaluating financial information: Evaluating financial information for planning, coordinating, controlling and investing <ul style="list-style-type: none">interpretation of capital investment/budgeting techniques to evaluate capital expenditure<ul style="list-style-type: none">reducing costs and risks
	<i>Note: The below syllabus section is in both 'capital investment' and 'budgets' given the overlap in syllabus but distinctly different content/examination questions.</i>
	Evaluating financial information for planning, coordinating, controlling and investing <ul style="list-style-type: none">interpretation of capital investment/budgeting techniques to evaluate capital expenditure

Capital Investment – Introduction

Capital investment refers to the financial commitment made by a company to acquire, upgrade, or maintain physical assets or long-term investments with the expectation of generating returns over an extended period. Long-term investments have long term results and as such, careful review of capital investment decisions occurs to analyse predicted benefits and risks. Capital investment should take into account financial and non-financial (qualitative) considerations.

There are several possible methods to analyse the financial impact of capital investment decisions. The Year 12 syllabus focuses on the Payback Method and Net Present Value Method. Both of these methods have their own advantages and disadvantages which should be considered by businesses when making capital investment decisions.

Capital Investment – Introduction and Summary Table

		Capital Investment
Nature	Overview	<ul style="list-style-type: none"> The review of the viability of long term decisions with long term results. The results of this review impact future: <ul style="list-style-type: none"> Cash flow. Growth. Investor returns.
	Importance / Characteristics	<ul style="list-style-type: none"> High costs, due to NCAs often being expensive to purchase and maintain. High risk, due to uncertain future. Difficult to reverse capital investment decisions. Requirement for careful planning.
Examples		Purchase of NCAs such as: <ul style="list-style-type: none"> Motor vehicle. Machinery. Land. Shares in another entity.

There are two methods used to evaluate capital investment decisions that will be explored in this chapter:

- Payback Period Method.
- Net Present Value (NPV) Method.

Capital Investment – Important concepts

Below are important concepts to be familiar with prior evaluating capital investment decisions.

Concept	Nature
Time value of money	<ul style="list-style-type: none"> Future money is worth less than the same amount of money today. Money value changes as a result of: <ul style="list-style-type: none"> Inflation. Interest that is able to be earned on the original money value.
Present values	<ul style="list-style-type: none"> Present value of a set amount decreases over time. If interest rates increase, future money decreases in value. Similar present value calculation results are obtained with either the individual discount factor or annuity factor (see specification booklet tables). Calculation of present value is covered later in this chapter.
Opportunity cost	The loss in benefit from one option when choosing an alternate option. <ul style="list-style-type: none"> Relevant during: <ul style="list-style-type: none"> Capital investment decisions. Asset management.

Capital Investment – Non-financial (Qualitative) considerations

The payback period and NPV method calculate numerical (quantitative) results. However, it is still important to consider qualitative factors when evaluating capital investment decisions.

Identify / List	Explain / Discuss
Government regulation	<ul style="list-style-type: none"> Current and future legislation may impact entity e.g., future CSR regulation.
Consumer preferences	<ul style="list-style-type: none"> Some industries have rapidly changing trends which may decrease confidence of long term investment success.
Competition	<ul style="list-style-type: none"> Number of competitors increases difficulty to compete. An entity with competitive advantages usually outcompetes competitors.

Practice Questions

Questions 1-9: Capital Investment theory introduction.

Tip	Course Guide While completing this chapter you may find it useful to refer to the relevant chapter in the Essential Insight Course Guide. The Course Guide summarizes all theory relevant for each practical guide chapter. This saves time flipping through multiple pages in the Practical Guide while revising. The Course Guide can be found by navigating to the Resource Hub link on the front page.
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Question 1

Future money is worth less than the same amount of money today. This concept is known as:

- a. Uncertain future.
- b. Time value of money.
- c. Present values
- d. Opportunity cost

Question 2

Identify which of the following is not one of the characteristics of capital investment decisions.

- a. Difficult to reverse capital investment decisions.
- b. High risk, due to uncertain future.
- c. Requirement for careful planning.
- d. Low upfront cost due to the revenue brought in by non-current assets.

Question 3

An example of a qualitative factor when purchasing a non-current asset includes.

- a. The cost to purchase an asset.
- b. The useful life of the asset.
- c. The preferences of consumers.
- d. The amount of revenue brought in from consumers with the asset.

Question 4

Identify which of the following best describe present values.

- a. Present value of a set amount increases over time.
- b. If interest rates increase, future money increases in value.
- c. Present value of a set amount stays the same over time.
- d. If interest rates decrease, the future money increases in value.

Question 5

Identify which of the following best describes the nature of capital investment decisions.

- a. Long term decisions with short term results.
- b. Long term decisions with long term results.
- c. Short term decisions with long term results.
- d. Short term decisions with short term results.

Question 6

Explain the concept of the time value of money.

Question 7

Describe the nature of present values and opportunity cost.

Question 8

Identify three non-financial considerations for businesses when making capital investment decisions.

Payback Period Method

The payback method calculates the time required for revenue produced by an investment to reimburse the investment cost. E.g., the initial cost of the investment will be reimbursed by the net cash flows of the investment after 4 years and 7 months.

The payback method is the simpler method to calculate, however, it is less accurate than the NPV method.

Capital investment – Payback Period Method of investment evaluation

	Payback Method
Considers time value of money	No.
Nature / Explain / Calculation process	<p>Calculation of the time required for revenue produced by investment to reimburse investment cost.</p> <p>Information required for calculation:</p> <ul style="list-style-type: none"> • Original project cost. • Predicted net cash flows produced by project over first few years until investment costs covered (additional revenue less additional expenses).
Investment decision (Project) acceptable when	<p>Payback period compared to entity's benchmark payback period (e.g., investments must be repaid within 3 years or less).</p> <ul style="list-style-type: none"> • If not within benchmark, investment not accepted. • If within benchmark, investment accepted. <ul style="list-style-type: none"> ◦ As payback period decreases, risk decreases.
Comparing two investments	<ul style="list-style-type: none"> • Payback period compared between investments. • The investment paid back sooner is better.
Advantages	<ul style="list-style-type: none"> • Ease of understandability. • Simple calculation. • Provides indication of risk. • Does not require calculation of target rate of return. • Allows estimate calculation of Return on Investment.
Disadvantages	<ul style="list-style-type: none"> • Less accurate than NPV method. • Time value of money not considered. • No measurement of whether target investment return is achieved. • Cash flows not evaluated once payback achieved.

Note: Original cost of the project is usually not hard to estimate somewhat accurately.

Note: Calculations are in the Specification book.

Example 1: Payback period when annual net cash flows are constant

HSP Glory Sauce is considering building two stores in different locations.

The proposed South Perth store will cost \$120,000 and have annual net cash flows of \$43,000. The proposed Riverton store will cost \$75,000 and have net cash flows of \$16,000.

The business standard is that investments must be paid back in 5 years.

Required task:

Calculate the payback period for the proposed investments. Identify which investment should be chosen.

Solution**Step 1 – Payback Period Calculation.**

Where annual net cash flows are constant the following formula can be applied:

$$\text{Payback period} = \frac{\text{Initial cost of investment}}{\text{Annual net cash flow}}$$

South Perth store payback period
= 120,000 / 43,000
= 2.79 years.

The whole numbers in the total represent the number of whole years. The decimal total must be multiplied by 12 to find the number of months.

0.79 years x 12 months = 9.48 months. This is rounded up to 10 months.

Therefore, the payback period for the South Perth store is 2 years and 10 months.

Riverton store payback period
= 75,000 / 16,000
= 4.69 years

0.69 years x 12 months = 8.28 months. This is rounded up to 9 months.

Therefore, the payback period for the Riverton store is 4 years and 9 months.

Step 2 – Evaluation of investment options.

The payback period for the South Perth store is 2 years and 10 months. The payback period for the Riverton store is 4 years and 9 months.

Both investments are paid back within the business's acceptable payback period of 5 years. However, the South Perth store is the better investment decision as the investment is reimbursed sooner than the Riverton store.

Example 2: Payback period when annual net cash flows are not constant

Space Explorers is considering two projects, Project B16 and Project X9. Both projects have an initial cost of \$40,000. Project B16 has a useful life of 3 years, Project X9 has a useful life of 5 years. The cash inflows and cash outflows for each project are listed in the table below.

	Project B16			Project X9		
Year	Cash Inflows	Cash Outflows	Net Cash Flows	Cash Inflows	Cash Outflows	Net Cash Flows
1	23,000	5,000		21,000	6,000	
2	23,000	5,000		26,000	10,000	
3	23,000	5,000		32,000	8,000	
4	-	-	-	44,000	4,000	
5	-	-	-	42,000	2,000	

Required task:

Calculate the payback period for the proposed investments.

Solution**Step 1 – Calculate the net cash flow for each year.**

The net cash flows for a given year are found by subtracting the cash outflows from the cash inflows.

	Project B16			Project X9		
Year	Cash Inflows	Cash Outflows	Net Cash Flows	Cash Inflows	Cash Outflows	Net Cash Flows
1	23,000	5,000	18,000	21,000	6,000	15,000
2	23,000	5,000	18,000	26,000	10,000	16,000
3	23,000	5,000	18,000	32,000	8,000	24,000
4	-	-	-	44,000	4,000	40,000
5	-	-	-	42,000	2,000	40,000

Step 2 – Deciding which payback period calculation to use.

Project B16 has constant net cash flows, therefore, the payback period formula given in the specification booklet can be used.

$$\begin{aligned} \text{Payback Period:} \\ &= 40,000 / 18,000 \\ &= 2.22 \end{aligned}$$

$0.22 \times 12 \text{ months} = 2.64 \text{ months}$. This is rounded up to 3 months.

Therefore, the payback period for project B16 is 2 years and 3 months.

Step 3.1 – Calculating payback period when annual net cash flows are not constant.

Project X9 does not have constant net cash flows so the specification booklet formula cannot be used, instead the process in the below step must be used.

To calculate the payback period when net cash flows are not constant – the net cash flow for each year is subtracted from the initial investment cost one year at a time. This process is repeated until the net cash flow from a given year is less than the carrying value of the investment remaining to be paid back.

The year 1, \$15,000 net cash flow is subtracted from the \$40,000 initial investment cost.

Initial investment	40,000
Less net cash flow Year 1	(15,000)
Carrying value	25,000

Step 3.2

The year 2, \$16,000 net cash flow is subtracted from the \$35,000 carrying value.

Initial investment	40,000
Less net cash flow Year 1	(15,000)
Carrying value	25,000
Less net cash flow Year 2	(16,000)

Step 3.3

The year 3 net cash flow of \$24,000 is greater than the \$19,000 carrying value needed to reach payback. The final carrying value is divided by the last year of net cash flows to find the number of months to payback in the final year.

Initial investment	40,000
Less net cash flow Year 1	(15,000)
Carrying value	25,000
Less net cash flow Year 2	(16,000)
Carrying value	9,000
Less net cash flow Year 3	(24,000)

Payback Period for X19

= 2 full years (Year 1 and Year 2) + [(9,000 / 24,000) (Partial Year 3)]

= 2.375 years which is equal to 2 years and 5 months

The 5 months comes from $9,000 / 24,000$ which is 0.375. 0.375 is then multiplied by 12 which equals 4.5 months. 4.5 months is rounded up to 5 months.

Therefore, the payback period for Project X19 is 2 years and 5 months.

Step 4 - Evaluate investment options.

The payback period for project B16 is 2 years and 3 months. The payback period for Project X19 is 2 years and 5 months. Therefore, project B16 should be chosen as the investment is paid back sooner.



Mosque-Cathedral of Córdoba, Córdoba.

Practice Questions

Questions 10-13: Payback Method.

Payback period =	$\frac{\text{Initial cost of investment}}{\text{Annual net cash flow}}$
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Question 10

The following investments have a constant annual net cash flow. Calculate the payback period for each investment.

Question	Initial cost of investment	Annual net cash flow	Payback Period
a	10,000	3,000	$10,000 / 3,000 = 3.33$ $0.33 \times 12 \text{ months} = 3.96 \text{ months.}$ This is rounded up to 4 months. Therefore, the payback period is 3 years and 4 months.
b	15,000	2,000	
c	22,000	14,000	
d	800	1,000	

e. Which investment (a, b, c or d) from the above table should be chosen?

Question 11

The following are a series of investments options by different companies. Identify whether the investment should go ahead by writing either yes or no in the right column.

Question	Payback Period	Target investment return period	Should the investment go ahead?
a	3 years 7 months	4 years	Yes
b	2 years 4 months	2 years	
c	7 years 9 months	6 years	
d	3 years 1 month	5 years	

Question 12

Melbourne Saints are considering purchasing either of two star football players, Nat Fluff or Nick Nack. Nat Fluff will cost \$850,000 and Nick Nack will cost \$630,000. The football club aims to recover the cost of its investment in 3 years.

	Nat Fluff	Nick Nack
Initial investment	850,000	630,000
Net after tax operating cash inflows as at 30 June for the following years:		
Year 1	330,000	280,000
Year 2	330,000	280,000
Year 3	270,000	280,000
Year 4	290,000	280,000
Year 5	400,000	280,000

Required tasks:

a. Calculate the payback period for Nat Fluff.

Workings

b. Calculate the payback period for Nick Nack.

Workings

c. Evaluate which player the team should invest in.

Question 13

Red Boar Energy Drinks is considering investment in two different stunts they can use in promotional videos in Japan for the next few years. Some of the investment costs include cost of stunt people, film crew, video editing, cloud storage etc. The Olympic games is coming up in Japan and a team of specialists has predicted the net cash flows are due to increase each year. Red Boar Energy Drinks aims for stunt investments to be reimbursed within 3 years and 6 months.

	200m belly flop	Eating 300 sushi in 30 seconds
Initial investment	110,000	140,000
Net after tax operating cash inflows as at 30 June for the following years:		
Year 1	30,000	20,000
Year 2	30,000	40,000
Year 3	30,000	60,000
Year 4	30,000	60,000
Year 5	30,000	60,000

Required tasks:

a. Calculate the payback period for 200m Belly Flop.

Workings

b. Calculate the payback period for Eating 300 sushi in 30 seconds.

Workings

c. Evaluate which stunt the Red Boar Energy Drinks should invest in.

Net Present Value (NPV) Method

The NPV method calculates the net cash flows for each year of the useful life of investment with consideration of discounted cash flows. Discounted cash flows are cash flows that take into consideration the time value of money i.e., \$1,000 in the future is usually worth less (discounted) than \$1,000 today if interest rates are positive. The net discounted cash flows for each year are added together and the result is the NPV of the investment. E.g., an investment will make a profit of \$120,000 during its useful life when considering the time value of money.

The NPV method is more complicated to calculate, however, it is more accurate than the payback method.

Note: the below summary table will make more sense once completing the NPV practical guide. It is recommended to briefly cover this prior to the practical to familiarise yourself with the extent of theory to exam level. After covering some NPV practical and practice questions, review this table.

Capital investment – NPV Method of investment evaluation

	Net Present Value (NPV)
Considers time value of money	Yes
Nature / Explain / Calculation process	<p>Calculation of net cash flows for each year of the useful life of an investment with consideration of discounted cash flows (time value of money).</p> <p>Net flows are added together and result is the 'Net Present Value' of the investment.</p> <p>Information required for calculation:</p> <ul style="list-style-type: none"> • Original project cost. • Predicted net cash flows. • Revenue and expenses recorded as present day dollars using formula or discount rate table.
Investment decision (Project) acceptable when	<p>NPV compared to entity's expected investment return.</p> <ul style="list-style-type: none"> • If negative value, investment is not accepted. • If positive value, investment is accepted. <ul style="list-style-type: none"> ◦ As NPV increases, investment risk decreases.
Comparing two investments	<ul style="list-style-type: none"> • NPV of investments can be compared. • The investment with a higher NPV is the better option.
Advantages	<ul style="list-style-type: none"> • More accurate than Payback method. • Considers the time value of money. • Straight forward decision making, when NPV is zero or more, target return is achieved and vice versa. • Calculates target return/investment yield.
Disadvantages	<ul style="list-style-type: none"> • Complex calculation. • Complex to understand compared to Payback method. • Estimates later in investments useful life become increasingly approximate. • Difficult to calculate target rate of return and discount rate.

Notes:

- Original cost of the project is usually not hard to estimate quite accurately.
- The NPV method is more accurate than the payback period method due to consideration of time value of money and other advantages outlined in table.
- Calculations for each method are in the Specification book.

Net present value (NPV)		
Present value	=	$\frac{\text{Net cash flow}}{(1 + i)^n}$
Where i	=	Interest rate
n	=	Number of periods
NPV	=	Present value of future new cash flows – Present value of cost of object

NPV specification booklet introduction

The specification includes information to support calculating NPV, as well as two present value tables.

This practical guide begins by defining key terms with examples and breaking down the present value table.

Example: Present value vs. Future value vs Net Present Value																								
Future Value		Present value																						
<p><i>Note: Future value is not in the specification booklet but may help understand the perspective of present value.</i></p> <p>Future value is the value of an asset in the future based on a rate of growth.</p> <p>Future value asks the question of: How much an investment of \$100 will be worth in a year if it is expected to have a growth rate of 10%.</p>		<p>Present value is the present (current) value of an amount of money compared to the future value of this money that has grown while invested.</p> <p>Present value asks the question of: How much should be invested to achieve \$110 one year in the future with an expected growth rate of 10%.</p>																						
<table border="1"> <tr> <td>Year 0</td> <td>x 1.10</td> <td>Year 1</td> <td>x 1.10</td> <td>Year 2</td> </tr> <tr> <td>\$100</td> <td>→</td> <td>\$110</td> <td>→</td> <td>\$121</td> </tr> </table>	Year 0	x 1.10	Year 1	x 1.10	Year 2	\$100	→	\$110	→	\$121	<table border="1"> <tr> <td>Year 0</td> <td>÷ 1.10</td> <td>Year 1</td> <td>÷ 1.10</td> <td>Year 2</td> </tr> <tr> <td>\$100</td> <td>←</td> <td>\$110</td> <td>←</td> <td>\$121</td> </tr> </table>		Year 0	÷ 1.10	Year 1	÷ 1.10	Year 2	\$100	←	\$110	←	\$121		
Year 0	x 1.10	Year 1	x 1.10	Year 2																				
\$100	→	\$110	→	\$121																				
Year 0	÷ 1.10	Year 1	÷ 1.10	Year 2																				
\$100	←	\$110	←	\$121																				
<p>Solution: \$100 invested for a year with a growth rate of 10% will have a future value of \$110. In two years, this will be worth \$121.</p>		<p>Solution: To achieve a future value of \$110 one year in the future with a growth rate of 10%, a present value of \$100 should be invested. To achieve a future value of \$121 in two years, a present value of \$100 should be invested.</p>																						
Net present value																								
<p>Net present value is equal to the present value of future new cash flows subtract the initial cost of the investment (also known as the present value of the cost of object).</p> <p>Proposed investment: A business is considering investing \$100 (cost of investment) buying a factory and is aiming to achieve a return on investment of 10%. The investment receives net cash flows for two years of \$80 per year.</p> <p>Based on the above present value example above, we already know that we need to achieve a future value of \$121 with this present value to achieve a return on investment of 10%. If the present value subtract the cost of investment (NPV) is \$121 or more, the investment is viable to achieve the target rate of return. If the NPV is less than \$121, the investment is not viable to achieve the target rate of return.</p>																								
Present value	Year 0	÷ 1.10	Year 1	÷ 1.10	Year 2																			
	\$100	←	\$110	←	\$121																			
NPV	NPV = PV – Investment Cost = Less than \$0 Bad investment			NPV = PV – Investment Cost NPV = \$0 or more Good investment																				
	If the NPV is less than \$0, the investment does not achieve the target rate of return. This is a PV of less than \$121			If the NPV is \$0 or more, The investment does achieve the target rate of return This is a PV of \$121 or more.																				
<p>Proposed investment: A business is considering investing \$100 (cost of investment) buying a factory and is aiming to achieve a return on investment of 10%. The investment receives net cash flows for two years of \$80 per year.</p>																								
<p>Required task: Calculate the net present value of the investment. In other words, will the net cash flows meet the desired rate of return when adjusted for the time value of money.</p>																								

Solution:

Step 1 – Calculate the present value.

Net present value (NPV)		
Present value	=	$\frac{\text{Net cash flow}}{(1 + i)^n}$
Where i	=	Interest rate
n	=	Number of periods
NPV	=	Present value of future new cash flows – Present value of cost of object

$$\begin{aligned}
 \text{Present value} &= \text{Present value year 1} + \text{Present value year 2} \\
 &= 80 / (1 + 0.10)^1 + 80 / (1 + 0.10)^2 \\
 &= 72.73 + 66.12 \\
 &= \$138.85
 \end{aligned}$$

Step 2 – Calculate the net present value.

Net present value = the present value of future new cash flows – the initial cost of the investment
 = 138.85 – 100
 = \$38.85

Therefore, the net present value is \$38.85. In other words, the investment will make \$38.85 above the businesses desired investment growth rate of 10%. The higher the positive value, the better the investment return. If the investment result was negative (PV of less than \$121 in this example), the investment should not have been accepted because it would have been below the desired rate of return.

Present value	Year 0	÷ 1.10	Year 1	÷ 1.10	Year 2
	\$100	←	\$110	←	\$121
NPV	NPV = PV – Investment Cost = Less than \$0			NPV = PV – Investment Cost NPV = \$0 or more	
	Bad investment			Good investment	
	If the NPV is less than \$0, the investment does not achieve the target rate of return. This is a PV of less than \$121			If the NPV is \$0 or more, The investment does achieve the target rate of return. This is a PV of \$121 or more.	

Example – How the present value tables are made

The present value tables in the specification booklet are included as they allow for quicker calculation of present values. The present value table for 8% is included below.

Present value of \$1 at the end of future periods	
Periods	8%
1	0.9259
2	0.8573
3	0.7938

Present value of an ordinary annuity of \$1 at the end of future periods	
Periods	8%
1	0.9259
2	1.7833
3	2.5771

Required task:

Calculate the values in the present value tables.

Solution

Step 1 – Present value of \$1 at the end of future periods.

Net present value (NPV)	
Present value	= $\frac{\text{Net cash flow}}{(1 + i)^n}$
Where i	= Interest rate
n	= Number of periods
NPV	= Present value of future new cash flows – Present value of cost of object

$$\begin{aligned} \text{Present value} &= \text{Present value year 1} + \text{Present value year 2} + \text{Present value year 3} \\ &= 1 / (1 + 0.08)^1 + 1 / (1 + 0.08)^2 + 1 / (1 + 0.08)^3 \\ &= 0.9259 + 0.8573 + 0.7938 \end{aligned}$$

By substituting the net cash flow with 1 we have created a 'multiplier' for each year. This multiplier for each year matches the present value of \$1 table in the specification booklet. The net cash flow from a question for each individual year can be multiplied by the respective year's multiplier to give the present value of any individual year.

Step 2 – Present value of an ordinary annuity of \$1 at the end of future periods.

When more than one year has the same

$$\begin{aligned} \text{Present value} &= \text{Present value year 1} + \text{Present value year 2} + \text{Present value year 3} \\ &= 1 / (1 + 0.08)^1 + 1 / (1 + 0.08)^2 + 1 / (1 + 0.08)^3 \\ &= 0.9259 + 0.8573 + 0.7938 \\ &= 2.5771 \end{aligned}$$

Therefore, the present value of a consistent net cash flow (annuity) after 3 periods is 2.5771.

Note: Adding just the first two years would give the present annuity for 2 periods from the specification book table.

Practice Questions

Questions 14-16: NPV introduction.

$$\text{Present value} = \frac{\text{Net cash flow}}{(1 + i)^n}$$

i = interest rate

n = number of periods

Question 14

Calculate the following present values of \$1 that are found in the specification booklet. Hint: your answer will equal the relevant present value table of \$1 multiplier in the specification booklet.

Question	Net cash flow	Interest rate	Number of periods	Present value
a	1	7%	3	$1 / [(1+0.07)^3]$ = 0.8163
b	1	5%	6	
c	1	10%	5	
d	1	8%	1	
e	1	9%	8	

Question 15

Calculate the following present values of an annuity that are found in the specification booklet. Hints: the present value of an annuity is found by adding the periods together. Your answer will equal the relevant present value of an ordinary annuity table of \$1 multiplier in the specification booklet.

Question	Interest Rate	Period 1	Period 2	Period 3	Present value of annuity
a	5%	0.9524	0.9070	0.8638	$0.9524 + 0.9070 + 0.8638$ = 2.7232
b	7%	0.9346	0.8734	0.8163	
c	10%	0.9091	0.8264	-	
d	12%	0.8929	0.7972	-	
e	16%	0.8621	0.7432	0.6407	

Note: You do not need to know how to calculate the present value tables for exams which are demonstrated in question 5 and 6. These questions have been included to support understanding of how the present value tables were made.

Question 16

In the table below are a series of investment options for different companies. Each company has their own required rate of return. Use the specification booklet Present value of \$1 to calculate the Present value for each period. Once you have calculated the PV of the three periods, add these together to find the total PV. Then calculate the NPV by using the below formula. Note: The total PV can also be found by using the Present value of annuity table. The annuity table can be used because the annual net cash flow is consistent.

PV = Net cash flow x (Present value of \$ multiplier)

NPV = Present value of future new cash flows – Present value of cost of object

or NPV = PV – Initial Cost of investment

Q	Required rate of return	Annual Net Cash Flow	PV's			Total PV (P1 + P2 + P3)	Initial Cost	NPV
			Period 1	Period 2	Period 3			
a	5%	\$4,000	4,000 x 0.9524 = 3809.60	4,000 x 0.9070 = 3,628	4,000 x 0.8638 = 3,455.2	3,809.6 + 3,628 + 3,455.2 = 10,892.8 OR 4,000 x 2.7232 = 10,892.8	\$10,000	NPV = PV – IC NPV = 10892.8 - 10,000 = \$892.80
b	7%	\$3,000					\$6,000	
c	10%	\$5,000					\$22,000	
d	12%	\$700					\$3,500	
e	12%	\$13,000					\$20,000	

NPV with after tax net cash flows

Example

The initial cost and after tax net cash flows for two investment options are outlined in the table below.

	Option A	Option B
Initial cost	20,000	25,000

	Net Cash Flows	
Year	Option A	Option B
1	\$10,000	\$7,000
2	\$10,000	\$12,000
3	\$10,000	\$15,000
4	\$12,000	\$14,000

The business has a minimum return on investment target of 8%.

Required task:

Calculate the NPV of each investment. Evaluate which investment should be chosen.

Solution

Step 1: Identification of which present value table in the specification booklet to use.

If the net cash flows for multiple future periods are the same, this is referred to as an 'ordinary annuity'. The ordinary annuity table can be used as a quicker way to calculate the present value for multiple years. The Present value of \$1 table could also be used, it will just take slightly longer. Step 2A and Step 2B demonstrate both of these options for investment Option A.

Present value of \$1 at the end of future periods	
Periods	8%
1	0.9259
2	0.8573
3	0.7938
4	0.7350
5	0.6806

Present value of an ordinary annuity of \$1 at the end of future periods	
Periods	8%
1	0.9259
2	1.7833
3	2.5771
4	3.3121
5	3.9927

NPV = Present value of future new cash flows – Present value of cost of object

The present value table in the specification book simplifies PV of net cash flows calculation and the equation becomes:

Present value = Net cash flow x (Present value table multiplier)

Step 2A: Calculation PV of Option A using Present value of \$1 table.

	Net Cash Flows
Year	Option A
1	\$10,000
2	\$10,000
3	\$10,000
4	\$12,000

PV =	PV Y1	+	PV Y2	+	PV Y3	+	PV Y4
=	10,000	+	10,000	+	10,000	+	12,000
	x		x		x		x
	0.9259		0.8573		0.7938		0.7350
=	9,259	+	8,573	+	7,938	+	8,820
=	\$34,590						

Step 2A: Calculation PV of Option A using Present value of an ordinary annuity table.

Year 1-3 can use the annuity table, then year 4 is added using the value of \$1 table.

$$\begin{aligned}
 PV &= (\text{Year 1-3}) + \text{Year 4} \\
 PV &= (10,000 \times 2.5771) + (12,000 \times 0.7350) \\
 PV &= 25,771 + 8820 \\
 PV &= \$34,591
 \end{aligned}$$

Note: the difference of \$1 of the PV calculated between step 2A and 2B is due to a rounding difference between the two PV tables. This kind of rounding difference should not be penalized in assessments.

Step 3: Calculation of NPV of Option A.

$$\begin{aligned}\text{NPV} &= \text{Present value of future new cash flows} - \text{Present value of cost of object} \\ &= 34,590 - 20,000 \\ &= \$14,590\end{aligned}$$

Therefore, the NPV of Option A is \$14,590.

Step 4: Calculation PV of Option B.

Note: because the net cash flows of option B are not constant, the PV of \$1 table must be used.

PV =	PV Y1	+	PV Y2	+	PV Y3	+	PV Y4
=	7,000	+	12,000	+	15,000	+	14,000
	x		x		x		x
	0.9259		0.8573		0.7938		0.7350
=	6,481.3	+	10,287.6	+	11,907	+	10,290
=	\$38,965.90						

Step 4: Calculation of NPV of Option B.

$$\begin{aligned}\text{NPV} &= \text{Present value of future new cash flows} - \text{Present value of cost of object} \\ &= 38,965.90 - 25,000 \\ &= \$13,965.90\end{aligned}$$

Therefore, the NPV of Option B is \$13,965.90.

Step 5: Evaluation of investment options.

When evaluating NPV investment options:

1. State the NPV of all options and comment on whether they meet the target rate of return or not.

The NPV of Option A is \$14,590 and the NPV of Option B is \$13,965.90. Both investment options have a positive value and therefore, meet the target rate of return.

2. Comment on the different between the NPV of each option and state which option is the better investment option based on this.

However, Option A has NPV is \$624.10 higher than Option B (14,590 – 13,965.90), which means Option A is the better investment option to choose.



Summer Palace, Beijing.

Practice Questions

Questions 17-21: NPV with after tax net cash flows.

Tips	<u>NPV in the specification booklet</u> Present values and formulas are listed in the specification booklet. When calculating NPV have the specification booklet open.
	<u>Depreciation in the Specification booklet</u> The calculation for straight-line depreciation is listed in the specification booklet. The syllabus states you only need to be aware of the straight-line method for capital investment calculations. The year 11 practical guide chapter on depreciation is available for download on the resource hub which is linked at the front of this book. It may be useful to download and revise this chapter if necessary.

Net present value (NPV)

Present value	=	$\frac{\text{Net cash flow}}{(1 + i)^n}$
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Where i	=	Interest rate
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n	=	Number of periods
---	---	-------------------

NPV	=	Present value of future new cash flows – Present value of cost of object
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NPV	=	PV – initial cost
-----	---	-------------------

Note: This is alternate formula is not in the specification booklet

Question 17

Busselton Blockbussin is a video rental store that currently has two stores in town. An opportunity has come up to enter a six year lease of a third store in nearby Dunsborough. This lease will cost \$90,000. The business pays tax on earnings and is expecting this new store to generate net cash flows in the table below. The after tax net cash flows for year one to year five are \$20,000. In year six the after tax net cash flows will be \$15,000.

The business has a minimum rate of return on investments of 10%

Present value of \$1 at the end of future periods	
Periods	10%
1	0.9091
2	0.8264
3	0.7513
4	0.6630
5	0.6209
6	0.5645

Present value of an ordinary annuity of \$1 at the end of future periods	
Periods	10%
1	0.9091
2	1.7355
3	2.4869
4	3.1699
5	3.7908
6	4.3553

Required task:

a. Evaluate whether the business should invest in this new store.

Workings

Question 18

'Not an Evil Company Co' is considering acquiring one of two smaller companies to help its company image after a series of recent 'incidents'. 'Happy Baby Sheep Ltd' would cost \$600,000 and 'Cute Puppy Ltd' would cost \$530,000.

Not an Evil Company Co is a required rate of return of 12%.

Not An Evil Company Co's plan is to purchase either of these companies for 4 years and then sell the company at the end of the fourth year. The company pays income tax and has calculated the after tax net cash flows in the table below.

After tax net cash flows		
Periods	Happy Baby Sheep Ltd	Cute Puppy Ltd
1	\$60,000	\$50,000
2	\$60,000	\$60,000
3	\$60,000	\$65,000
4	\$700,000	\$630,000

Present value of \$1 at the end of future periods	
Periods	12%
1	0.8929
2	0.7972
3	0.7118
4	0.6335

Present value of an ordinary annuity of \$1 at the end of future periods	
Periods	12%
1	0.8929
2	1.6901
3	2.4018
4	3.0373

Required tasks:

a. Calculate the net present value of purchasing Happy Baby Sheep Ltd

Workings

b. Calculate the net present value of purchasing Cute Puppy Ltd

Workings

c. Evaluate which investment proposal should be chosen, if any.

Question 19

Next Frontier research is considering investment in two machine options. The machines are top secret and the accountant has been given codenames for each. The initial investment cost and net after tax cash flows of these two top secret machines is outlined in the table below.

The discount rate is 9%.

	Codename XA3	Codename Y2K
Initial investment	30,000	48,000
Net after tax operating cash inflows as at 30 June for the following years:		
Year 1	12,000	8,000
Year 2	12,000	23,000
Year 3	12,000	30,000

Present value of \$1 at the end of future periods	
Periods	9%
1	0.9174
2	0.8417
3	0.7722
4	0.7084
5	0.6499
6	0.5963

Present value of an ordinary annuity of \$1 at the end of future periods	
Periods	9%
1	0.9174
2	1.7591
3	2.5313
4	3.2397
5	3.8897
6	4.4859

Required tasks:

- a. Calculate the net present value of Codename XA3.

Workings

b. Calculate the net present value of Y2K.

Workings

c. A third machinery investment option is available with an NPV of \$2000. Explain, using your results part a and part b, how NPV assists management decision making.

Question 20

Outback Snap is a wildlife petting zoo in regional Tasmania specialising in crocodiles. Outback Snap is considering purchase a new koala exhibit. The details of this investment option are set out in the table below.

Details	Koala exhibit
Cost of exhibit	\$280,000
Useful life in years	4
Annual after tax net cash flows	80,000
Residual value	60,000
Discount rate	8%

Additional information:

- The koala exhibit would be paid with a payment plan. \$180,000 will be paid upfront, the remaining \$100,000 will be paid in year 1.

Present value of \$1 at the end of future periods	
Periods	8%
1	0.9259
2	0.8573
3	0.7938
4	0.7350

Present value of an ordinary annuity of \$1 at the end of future periods	
Periods	8%
1	0.9259
2	1.7833
3	2.5771
4	3.3121

Required tasks:

a. Calculate the net present value of the koala exhibit.

This question requires:

- Calculation of the initial cost is in two parts. The initial cost will be 180,000 (year 1 payment) added to 100,000 multiplied by the present value multiplier (year 2 payment).
- The residual value of the investment must be added to the final years net cash flow. Therefore, the annuity table can only be used for the first three years.

Workings

b. Tasmanian tigers have also recently been rediscovered in Tasmania and the net present value of building a Tasmania Tiger exhibit would be \$40,000. Explain, using your results part b, how NPV assists management decision making.

Question 21

Waldo Wally's Chocolate Factory has been experiencing a boom in sales following a series of TikTok challenges featuring their products. To capitalise on this popularity Waldo Wally is considering acquiring new factory machinery. The details of this investment are outlined below. The business has a minimum rate of return of 12%.

Details	Machinery
Cost of machinery	\$280,000
Setup cost	\$20,000
Useful life in years	4
Additional annual net cash flow after tax	
Year 1	\$100,000
Year 2	\$80,000
Year 3	\$80,000
Year 4	\$60,000
Discount rate	12%

Additional information:

- Depreciation has been included in the net cash flow after tax.
- The residual value of the machinery is \$90,000.
- The machinery is purchased on credit and paid for over two years. \$150,000 is paid during the first year, the remainder in the second year.

Present value of \$1 at the end of future periods	
Periods	12%
1	0.8929
2	0.7972
3	0.7118
4	0.6335

Present value of an ordinary annuity of \$1 at the end of future periods	
Periods	12%
1	0.8929
2	1.6901
3	2.4018
4	3.0373

Required task:

a. Evaluate the NPV of the investment in machinery.

This question requires:

- *The original cost of the machinery is the cost of machinery plus the setup cost.*
- *Calculation of the initial cost will occur over two years. The first and second year's payment is multiplied by the present value table multiplier.*
- *The residual value of the investment must be added to the final years net cash flow. Therefore, the annuity table can only be used for the first three years.*

Workings

Workings

NPV without tax recognition and exam insight

The syllabus only includes capital investment decisions 'net of taxation'. However, exam questions have occasionally in the past included that appear to be either 'without taxation' or 'ignore taxation'. The inclusion of these questions in previous ATAR exams appears to be a contentious issue. It is not a huge stretch to cover how to calculate this and this is covered in this section. The example and practice questions for this section also include other common exam NPV question steps such as:

- Calculation of net cash flows given cash inflows and cash outflows.
- Straight line depreciation.
- Residual value.
- Initial cost of investment when this cost is paid over multiple years.
- Exclusion of cash inflows or outflows for a given year.

Example

Pinjarra Mining is considering purchasing a new motor vehicle. Details of this purchase are outlined below.

The vehicle is to be depreciated using the straight-line method.

Details	\$
Cost of investment	200,000
Setup cost	20,000
Useful life in years	3
Additional cash inflows generated	
Year 1	140,000
Year 2	150,000
Year 3	100,000
Maintenance costs year 1 and 2	10,000
Maintenance costs year 3	70,000
Residual value	130,000
Discount rate	10%

Additional information:

- Initial cost of the investment is paid over two years. \$100,000 is paid upfront and the remainder is paid in year one.
- Ignore all tax implications.

Required task:

Evaluate this potential motor vehicle investment.

Solution

Step 1 – Calculation of treatment of depreciation expense per annum and residual value.

Depreciation: Depreciation expense is added to each year as a cash outflow.

Residual value: The residual value of an investment is a cash inflow in the final year.

Depreciation calculation: Straight-line method	
Depreciation expense per annum	= $\frac{\text{Original cost} - \text{Residual value}}{\text{Useful life}}$

Original cost = 200,000 + 20,000 = \$220,000 (Includes setup costs, it does not include maintenance costs.)

Residual value = 130,000

Useful life = 3 years

Depreciation expense per annum = $(220,000 - 130,000) / 3$ years
= \$30,000

Step 2 – Annual net cash flow calculation.

Net cash flows need to be calculated for each year. This can be done by adding each year's inflows together and subtracting the outflows. Do not forget to include depreciation as an outflow and residual value as an inflow.

	Year 1	Year 2	Year 3
Cash inflows	140,000	150,000	100,000
Residual value			130,000
Total cash inflows	140,000	150,000	230,000
Cash outflows			
Maintenance costs	10,000	10,000	70,000
Depreciation	30,000	30,000	30,000
Total cash outflows	40,000	40,000	100,000
Net cash flows	100,000	110,000	130,000

Step 3 – Present value calculation.

The present value for each year is calculated using the present values table in the specification booklet.

Present value of \$1 at the end of future periods	
Periods	10%
1	0.9091
2	0.8264
3	0.7513

PV =	PV Y1	+	PV Y2	+	PV Y3
=	100,000	+	110,000	+	130,000
	x		x		x
	0.9091		0.8264		0.7513
=	90,910	+	90,904	+	97,669
=			\$279,483		

Step 4 – Initial investment cost calculation.

The initial cost is made up of the: 'Initial cost of the investment: 200,000' and 'Setup costs: 20,000'.

Therefore, the initial cost prior to consideration of the discount rate is \$220,000. To calculate the initial investment cost with consideration of the discount rate: \$100,000 (upfront payment) is added to 120,000 multiplied by the present value multiplier (year 1 payment).

Year 0 (Upfront) cost = \$100,000.

Year 1 cost = [(220,000 – 100,000) x 0.9091]

Initial cost = 100,000 + (120,000 x 0.9091)

= 100,000 + 109,092

= 209,092

Step 5 – NPV calculation and evaluation.

NPV = PV – Initial cost

= 279,483 – 209,092

= 70,391

Therefore, the net present value of the investment is \$70,391. This is a good investment option as the NPV is positive.

Practice Questions

Questions 22-23: NPV without tax recognition and exam insight.

Note: For additional practice of this section, see 'Capital Investment' chapter of the Exam Guide. The Exam Guide can be found by navigating to the Resource Hub link on the front page.

Tip	<u>Exclusion of net cash flows for a year</u>
	Questions may ask you to calculate the NPV for a non-current asset that does not have any cash inflows or cash outflows for the first year or last year of an investment. This type of example was not included in the above example question so as not to confuse students with the simultaneous presence of depreciation but is good to be aware of. In this instance, present value calculation will ignore the first year. Proceed to calculating the present value for the second year as normal.

Question 22

Flying Kangaroo is considering purchasing a large new passenger plane to service regional communities. The following information is provided for this investment:

- The plane purchase will cost \$3,500,000.
- The estimated annual net cash inflows are \$1,200,000 after tax.
- The only non-cash expense for the plane is depreciation which is calculated at 12.5% per annum using the straight-line method.
- The plane will take one year from date of purchase to be ready for use. During the first year there are no expenses, and no depreciation takes place.
- The plane is written off at the end of 8 years.
- The target rate of return is 12%.
- The business aims for all investments to be paid back within 5 years.

Present value of \$1 at the end of future periods	
Periods	12%
1	0.8929
2	0.7972
3	0.7118
4	0.6335
5	0.5674
6	0.5066
7	0.4523
8	0.4039

Present value of an ordinary annuity of \$1 at the end of future periods	
Periods	12%
1	0.8929
2	1.6901
3	2.4018
4	3.0373
5	3.6048
6	4.1114
7	4.5638
8	4.9676

Required tasks:

- a. Calculate the annual net cash flow ignoring income tax of this investment.

Workings

b. Calculate the payback period of this investment.

Workings

c. Calculate the net present value of this investment.

Workings

d. Evaluate whether this investment should go ahead based on the payback period and the NPV method.

e. Describe any relevant qualitative factors that may influence this investment decision.

c. Calculate the net present value for each investment.

Present value of \$1 at the end of future periods	
Periods	10%
1	0.9091
2	0.8264
3	0.7513
4	0.8630

Present value of an ordinary annuity of \$1 at the end of future periods	
Periods	10%
1	0.9091
2	1.7355
3	2.4869
4	3.1699

Workings

[NPV to increase cash sales or cash savings](#)

Previous questions have analysed the net present value by calculating present values using net cash flows. This section describes how to calculate present values using net cash savings or net cash sales. In summary increases in cash savings or cash sales are treated as cash inflows and the rest of the process is very similar. This section has been included to model this subtle difference in problem wording.

Example

'Dolla Dolla Bills Yo' is an accounting firm that hires several accountants to perform accounting tasks. A technology company has approached Dolla Dolla Bills Yo with a new state of the art artificial intelligence accounting software. This software will result in savings of \$180,000 in accountants wages per year and require an increase in programmer wages of \$30,000 per year.

A three-year license for this software will cost \$350,000.

The target rate of return on investments is 9%.

Required task:

Evaluate whether investment in this software should proceed.

Solution

Step 1 – Calculate the net cash savings.

Previously net cash flows were calculated for investments. In this instance calculation of net cash savings replaces calculation of net cash flows.

	Year 1	Year 2	Year 3
Savings in accountant wages	180,000	180,000	180,000
Less increase in programmer wages	30,000	30,000	30,000
Net cash savings	150,000	150,000	150,000

Present value of \$1 at the end of future periods	
Periods	9%
1	0.9174
2	0.8417
3	0.7722

Present value of an ordinary annuity of \$1 at the end of future periods	
Periods	9%
1	0.9174
2	1.7591
3	2.5313

Step 2 – Present value calculation.

Given the net cash savings in a constant value, the present value of an annuity table can be used.

$$\begin{aligned}
 PV &= 150,000 \times 2.5313 \\
 &= 379,695
 \end{aligned}$$

Step 3 – NPV Calculation.

$$\begin{aligned}
 NPV &= PV - \text{Initial cost} \\
 &= 379,695 - 350,000 \\
 &= \$29,695
 \end{aligned}$$

Step 4 – Evaluation of investment decision.

The NPV is \$29,695 and therefore meets the required rate of return and is a good investment option.

Some NPV questions are followed up with questions asking about qualitative factors influencing investment decisions. In this instance the qualitative factor would be the that the investment involves making staff member jobs redundant. The business will need to decide whether to fire these staff or allocate them to other roles. These decisions could have flow on effects to staff morale and culture leading to impacts to staff performance, recruitment costs and the financial bottom line.

Practice Questions

Questions 24-25: NPV to increase cash sales or cash savings.

Questions 26-38: Capital Investment theory review.

Exam Questions

See 'Capital Investment' chapter of the Exam Guide for practice exam questions. The Exam Guide can be found by navigating to the Resource Hub link on the front page.

Tips

Present value table indicators

There are many different ways questions can point you towards which present value table % to use. Examples include target rate of return, discount rate, cost of capital, minimum investment performance etc. Look for any part of the question that has a % next to it and chances are this may be the clue for which present value % to use.

Label workings

Label all workings clearly to make it as clear as possible for markers to award your workings.

Read the question carefully

There are many different ways requirements of this type of question can be worded. Read the question carefully to make sure to include all steps in calculation. If you come across a wording of an exam question you are not familiar with and are really stumped, check the marking key for this question and then reattempt the question without looking at the marking key.

Question 24

Muntings Warehouse is a hardware store that is considering purchase a sausage sizzle equipment to run outside its store. The sausage sizzle cost is \$40,000. This sausage sizzle equipment will increase sales of hardware by \$30,000 per year through increased foot traffic. Community groups and charities will use the sausage sizzle to raise money for community projects and charitable work. The sausage sizzle will increase staffing costs by \$12,000 per year. The residual value of the sausage sizzle equipment is \$2,000 and the useful life is 4 years. The sausage sizzle equipment is to be depreciated using the straight line method of depreciation.

The cost of capital is 10%.

Present value of \$1 at the end of future periods	
Periods	10%
1	0.9091
2	0.8264
3	0.7513
4	0.8630

Present value of an ordinary annuity of \$1 at the end of future periods	
Periods	10%
1	0.9091
2	1.7355
3	2.4869
4	3.1699

Required tasks:

a. Evaluate whether this investment should go ahead based on the NPV method.

Workings

b. Identify qualitative decisions that may influence this capital investment decision.

Question 25

Pilbara Minerals Group is considering purchasing either a large new mining truck or a new driller. This mining truck will replace the necessity of 3 smaller trucks and associated costs. The drill rig will replace an older drill that has been losing the company large amounts of money with high costs of part replacements.

The business has a minimum rate of return of 9%.

	Truck
Initial cost	160,000
Cash savings	40,000
Maintenance costs per annum	5,000
Depreciation per annum	20,000
Residual value	40,000
Useful life	6 years

	Drill rig
Initial cost	70,000
Cashing savings	25,000
Maintenance costs per annum	3,000
Depreciation per annum	7,000
Residual value	35,000
Useful life	5 years

Present value of \$1 at the end of future periods	
Periods	9%
1	0.9174
2	0.8417
3	0.7722
4	0.7084
5	0.6499
6	0.5963

Present value of an ordinary annuity of \$1 at the end of future periods	
Periods	9%
1	0.9174
2	1.7591
3	2.5313
4	3.2397
5	3.8897
6	4.4859

Required tasks:

a. Calculate the NPV of the Truck.

Workings

b. Calculate the NPV of the Drill rig.

Workings

c. Evaluate which investment should be chosen?

Practice Questions

Questions 26-38: Capital Investment theory review.

Tip

Course Guide

When completing the theory review you may find it useful to refer to the relevant chapter in the Essential Insight Course Guide. The Course Guide summarizes all theory relevant for each practical guide chapter. This saves time flipping through multiple pages in the Practical Guide while revising. The Course Guide can be found by navigating to the Resource Hub link on the front page.

Question 26

Identify which of the following is an advantage of the payback method of evaluating capital investment decisions.

- a. Complex calculation.
- b. Provides indication of risk.
- c. No measurement of whether target investment return is achieved.
- d. Considers time value of money.

Question 27

Identify which of the following is a disadvantage of the net present value method of evaluating capital investment decisions.

- a. Time value of money not considered.
- b. Calculates target return/investment yield.
- c. Difficult to calculate target rate of return and discount rate.
- d. Cash flows not evaluated once payback achieved.

Question 28

An accountant is trying to recall what information is required for calculation of the net present value method of evaluating capital investment decisions. Which of the following is not required.

- a. Predicted net cash flows.
- b. Original project cost.
- c. Value of accounts receivable generated by the asset.
- d. Revenue and expenses recorded as present day dollars.

Question 29

Which of the following assets would not be considered capital investment decision.

- a. Shares in another entity.
- b. Motor vehicle.
- c. Land.
- d. Accounts receivable.

Question 30

Money changes in value as a result of:

- a. Taxation.
- b. Inflation.
- c. Depreciation.
- d. Doubtful debts.

Question 31

The importance of capital investment does not include:

- a. Number of competitors increases difficulty to compete.
- b. Difficult to reverse capital investment decisions.
- c. High risk, due to uncertain future.
- d. High costs, due to NCAs often expensive to purchase and maintain.



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