

 Study Package

Introduction

Reference Sheet

- We will provide a reference sheet within this study package that meets the midterm guidelines but we strongly encourage creating your own. The best way to learn is to create it yourself! ❤️ (´ω`๑)
- I strongly encourage you to put some examples of problems we do in class on your reference sheet! Knowing how to apply this content is crucial!! (´ω`´)✧
- To access the reference sheet, please see the Reference Sheet tab on the left side

About this Package:

- In this package, we cover every class prior to Activity Based Costing
- You may notice most of the practice questions sections are left blank... unfortunately we could not complete every section
 - I would strongly recommend doing the practice midterm posted on Learn, according to upper years, this is a decent reflection of the actual midterm

Chapter 1: Role of Management Accountants

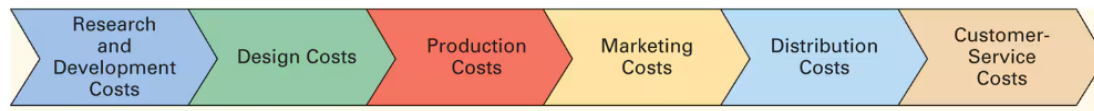
Management Accounting	Financial Accounting
Helps managers make decisions to meet organization goals, current and future	Communicates the organization's financial position and performance to external parties
Future-oriented	Past-oriented
No rules and regulations on types of reports, so up to management's discretion	Standardized reports based on GAAP and IFRS/ASPE
No rules and regulations on frequency of reports, up to management's discretion	Annual/quarterly
Can be financial or non-financial	Largely financial
Influences managers and employees because it is designed to influence decisions and actions of the organization	Influences managers and employees because performance evaluation and pay is based on reported financial results

Cost Accounting

- A major part of management accounting, cost data helps managers make decisions
- **Cost:** A sacrifice of resources
 - **Outlay Cost:** Past, present, or future cash outflow
 - **Expense:** Cost charged against revenue in an accounting period
 - **Opportunity Cost:** The benefit lost from the next best course of action

What is a Strategy?

- **Strategy:** How an organization accomplishes its objective by matching their capabilities with their opportunities
 - How an organization competes in the market and delivers value to customers
 - **Cost Leadership:** Competing through low prices with quality products/services
 - **Value Leadership:** Unique, luxury products/services at higher prices
- **Value Chain:** The sequence of business functions that add utility to products/services
 - Management accounting provides information for each function



- Think of processes such as R&D, Production, Marketing, Distribution, etc.
- **Supply Chain:** The flow of goods, services, and information from their initial sources all the way to end consumers
 - **Supply Chain Management:** Involves integrating and coordinating activities across points in the supply chain to reduce costs and increase reliability



- Management accountants track and judge an organization's value and supply chain and its key success factors relative to other organizations (benchmarking)
 - Key success factors include lower costs, greater efficiency, higher quality, timeliness, innovation

Management Accountant Guidelines

- **Cost-Benefit Approach:** Expected benefits should exceed expected costs before taking on a project or making a decision
- **Behavioural and Technical Considerations:** How can and should management motivate employees to try to achieve the goals of the organization
- **Different Costs:** One concept/cost should not be used for all purposes

Environmental, Social, and Governance (ESG)

- **Corporate Governance:** Mandatory compliance with laws, regulations, and standards to fulfill fiduciary responsibilities (the responsibility to act in good faith)
- **Ethics:** Socially agreed upon standards of honesty and fairness applying to everyone
- **Corporate Social Responsibility:** Integration of social, environmental, and financial stewardship in their conduct of business
- All of these are likely to increase costs without much obvious benefit

5-Step Decision Making Process

- **Planning:** Purposeful analysis of information to rank and select organizational goals

- 1) Identify the problem and uncertainties/risks
 - 2) Obtain information on the problem
 - 3) Forecast the future
 - 4) Make a decision
 - 5) Implement the decision, evaluate performance, and learn from it
- **Control:** Actions to measure and evaluate performance in order to make corrections

Chapter 1 Practice Questions

1. You're eating brunch with Boris and he's taking really long to look through the menu. He spends 10 minutes debating between the eggs benedict and the grilled cheese, and ends up picking the eggs benedict. The cost of him not eating the grilled cheese is called the _____ cost and the price of the eggs benedict would be the _____ cost. (Fill in the blanks.)
2. Which of the following is true about management accounting?
 - a. Focuses on decisions that are relevant and occurred in the past
 - b. Reports do *not* have to follow IFRS, but must follow GAAP principles
 - c. Focuses on decisions to meet current and future organizational goals
 - d. Reports must be issued quarterly
 - e. A and D
 - f. B and C
3. Boris is doing the financial analysis of Suguru Funeral Home (SFH) and is checking if the comparable companies he chose have the same business strategy. SFH focuses on providing a premium funeral experience, using expensive, imported mahogany wood for their coffins. Their first competitor, Toji Mortuary (TM) uses ebony for their coffins and rents out breathtaking outdoor venues for their funeral services, providing a unique and memorable funeral experience. As ebony is very pricey, TM allows customers to pay in installments. Their other competitor, Nanami Morgue (NM) uses sterling silver for their coffins and offers unique, one-of-a-kind "mass-funeral" services — this is a service where they host multiple funerals at the same time and place to allow customers to split costs.

What kind of organizational strategy does SFH use and which of its 2 competitors has a similar business strategy?

4. Which of the following business activities is NOT part of the value chain?
 - a. R&D
 - b. Marketing
 - c. Logistics
 - d. Customer service
 - e. CRM

- f. Distribution
 - g. Design
 - h. Production
 - i. D and C
 - j. D and B
 - k. C and E
 - l. C and F
 - m. None of the above
5. Inter Tech Limited (ITL) is a specialty coffin retailer that supplies their coffins to Suguru Funeral Home. Boris sees the following diagram that appears to explain the flow of ITL's costs from their supplier to their consumers.



This diagram represents ITL's...

- a. Value chain
 - b. Supply chain
- In addition, list 3 examples of key success factors that a management accountant would use to evaluate ITL's processes.
6. The managers at ITL noted in their recent email that they plan on introducing a new type of coffin to their product mix, called the "Iron Maiden Coffin", which includes a unique spike design. However, ITL is unsure of how many Iron Maiden coffins to produce, as they have not determined the demand, price, nor their supplier's production capacity. Given what you know about the 5-step decision making process, what should ITL's next step be?

Chapter 2: Cost Terms & Purposes in MGMT Accounting

Basic Cost Concepts

- **Cost Accumulation:** Collected and organized cost data using an accounting system
- **Cost Allocation:** Tracing/Allocating of accumulated costs to cost objects OR the process of assigning indirect costs to a cost object: **Define** → **Determine** → **Assign**
 - **Cost Pool:** A collection of costs that need to be assigned to cost objects
 - **Cost Allocation Rule:** The method for assigning costs to cost objects
 - **Cost Object:** Something that requires costs to exist, such as products, services, or intermediate cost objects such as marketing materials
- Costs can be classified in several ways, including:
 - **Traceability:** Considering direct or indirect costs to cost objects, where indirect costs imply the existence of an intermediate cost object
 - **Direct Cost:** Costs that are paid to attain the cost object, think the admission fee to a museum
 - **Indirect Cost:** Costs that are paid to attain a cost object that is then used to attain the end cost object, think transportation costs to get to the aforementioned museum
 - **IFRS:** Considering period and product costs
 - **Behaviour:** Considering if costs are fixed, variable, or somewhere in between
 - **Function:** Considering if the cost contributes to the administrative, manufacturing, or corporate service functions of a business
 - **Size:** Considering the total, unit, or incremental amounts
 - **Time Frame:** Considering when the costs take place, historical or budgeted
 - Only the first three are relevant to this course

Principles of Product Costing

- When it comes to manufacturing, we have **Product Costs:**
 - Direct Costs turn into:
 - **Direct Materials:** Materials directly traceable to the product
 - **Direct Labour:** Work directly traceable to transforming materials into a finished product
 - Indirect Costs turn into:
 - **Manufacturing Overhead:** All production costs other than the above
 - **Prime Costs:** The primary cost of the product, only direct materials and labour
 - **Conversion Costs:** The costs necessary to transform materials into a product, including Direct Labour and Manufacturing Overhead
 - **Total Product Costs:** The total of all costs related to production
- **Period Costs:** Non-manufacturing costs
 - Recognized as an expense when the cost is incurred
 - **Marketing:** Costs necessary to sell the product or service
 - Includes advertising, sales, and shipping costs

- **Administrative:** Costs necessary to run the underlying business
 - Includes executive salaries, data processing, and legal costs
- Some calculations:
 - $Gross\ Margin = Revenue - COS/COGS$
 - $Operating\ Profit = Gross\ Margin - Marketing\ and\ Administrative\ Costs$
 - **Operating Profit:** The excess of operating revenue over costs necessary to generate matching revenues
 - **Cost of Goods Sold Calculations:**
 - **Service:** Cost of billable hours
 - **Merchandising:** $COGS = Beg.\ Inv + Purchases\ of\ Goods - End.\ Inv$
 - This basic equation is extremely important! (≈ ㄣ)
 - **Manufacturing:**

$$Direct\ Materials\ Used = Beg.\ Mats\ Inv + Direct\ Mat\ Purchases - End.\ Mats\ Inv$$

$$Total\ Manufacturing\ Costs = Direct\ Labour + Overhead + Direct\ Materials\ Used$$

$$COG\ Manufactured = Beg.\ WIP + Total\ Manufacturing\ Costs - End.\ WIP$$

$$COGS = Beg.\ Finished\ Goods\ Inv + COG\ Manufactured - End.\ FGI$$

Cost Behaviour

- **Cost Behaviour:** How costs respond to changes in activity level within the relevant range
- **Relevant Range:** The range of activity where the total fixed costs or the unit variable costs remain unchanged
- **Fixed Costs:** Total costs do not change with volume, but per unit cost decreases as activity level increases
- **Variable Costs:** Total costs increase as activity level increases, but per unit cost remains the same
- **Semivariable/Mixed Costs:** Contains a fixed and variable cost component, thus total costs increase as activity level increases but per unit cost decreases
- **Step/Semifixed Costs:** Costs increase in total with steps in volume changes
- Product Cost Components:
 - **Full Cost:** Sum of all costs of manufacturing and selling a unit
 - **Full Absorption Cost:** Sum of all variable and fixed costs of manufacturing a unit
 - Used for external reporting (product cost or COGS)
 - **Variable Cost:** Sum of all variable costs of manufacturing and selling a unit
 - Used for internal decision making
 - $Contribution\ Margin = Revenue - Variable\ Costs$

Chapter 2 Practice Questions

1. Boris is reading examining North Shore's income statement and notes some bolded labels including gross profit and operating expenses. On the other hand, Penelope is checking over Boris Bank's financials and you notice that the labels on her report are different, including contribution margin and fixed costs. North Shore's costs are likely classified by ____ while Penelope's are likely classified by ____.
 - a. Behaviour; function
 - b. IFRS, behaviour
 - c. Size, function
 - d. IFRS, traceability
 - e. Absorption, behaviour
2. It's late in the evening and you hear a faint knock on your office door. It's Boris, the newly promoted senior manager at Boris Bank! He gingerly asks you for your help, as he struggles a lot with differentiating costs.
His client is Crossland Music Inc., a manufacturing company that specializes in producing custom electric musical instruments. Some of their key costs are summarized in the table below:

Cost Description	Amount
Factory labour wages	\$22/hour
Administrative salaries	\$25,000 per year
Raw instrument materials	\$35,790 for the whole year
Rent and utilities for the factory	\$125,400 for the whole year
Rent and utilities for the admin office	\$13,000 per month

Boris informs you that the factory workers had worked a total of 11,000 hours this year, and the admin office was used for all 12 months of the year.

Boris desperately needs your help in calculating:

- a. Prime costs
 - b. Conversion costs
 - c. Total product costs
3. After helping out Boris, you find Penelope at her desk, working away. She has a tower of files at her desk that she has to go through tonight. "Oh, you're still here! Would you mind helping me out?" She passes you a thick file titled Kaiba Corp. Internal Report. Kaiba

Corp. is a popular company that manufactures and sells trading cards! You examine it in greater detail:

Cost Description	Amount
Royalty fees for card artwork	8% of sales
Production labour wages	\$24/hour
Raw card materials	\$18,200 throughout the year
Rent for the production facility	\$140,000 per year
Rent for Kaiba Admin Headquarters	\$152,000 per year

You see some meeting notes written messily written down at the bottom of the report:

- Average selling price of 1 card pack is \$6
- 150,000 card packs were produced and sold this year
- It takes half an hour of work to produce 1 complete card pack

You also notice a list of deliverables on the back of the report:

- a. What is Kaiba Corp's full cost?
 - b. What is their full absorption cost?
 - c. What is their total variable cost?
4. Zoldyck Inc. is a manufacturing company that produces lightweight, steel weapons. They had 12 kg of steel leftover from last year and decided to purchase another 6 kg of steel this year. At the end of the year, they did an inventory count and found 13 kg of steel leftover. Each kg of steel is worth \$250 – this cost doesn't change, as Zoldyck has strong power over their suppliers. Their conversion costs totaled \$11,000 this year. At the end of last year, their report notes \$28,000 of ending WIP and \$22,000 of finished goods. This year, their accounting team has informed us that there should be \$29,500 of ending WIP and \$24,000 of finished goods. Calculate Zoldyck Inc.'s COGS for the year.
5. Yuno Gasai recently switched to a new phone plan that charges her a flat rate of \$30 per month for 20 GB of data, with a \$0.10 fee for every GB over that threshold. Yuno's new phone plan charge is an example of:
- a. Semivariable costs
 - b. Semifixed costs
 - c. Fixed costs

Chapter 10: Analysis of Cost Behaviour

Cost Estimation Techniques

- **Industrial Engineering Method:** Analyzing relationships between inputs and outputs physically, qualitative
- **Conference Method:** Gathering opinions from various departments, qualitative
- **Account Analysis:** Going account by account and classifying cost accounts as variable, fixed, or mixed, qualitative
- **High Low Method:** Choosing high and low observed values of cost driver
 - The minimum number of observations needed to estimate a line is 2
 - Extremely straightforward and easy method
 - Does not use a lot of data, so less reliable
 - The equation of a line can be used for manufacturing overhead ($y = mx + b$)
 - m is the variable cost per unit or predictor/independent variable
 - Also the slope, calculated through rise over run
 - b is the fixed cost, and is also the intercept of the line
 - When choosing high-low, we focus on the independent variable, even if the dependent variable is not the highest/lowest it can be
- **Regression Analysis:** Uses all past observations to estimate future costs
 - Considered the most robust of the cost estimation techniques
 - Simple regression uses only one independent variable
 - Multiple regression uses... multiple independent variables

Development of a Linear Regression Model

- **R²:** Measures the relationship between dependent and independent variables
 - Can range from 0 to 1.0
 - Closer to 0 indicates there's less correlation while closer to 1 indicates more correlation
 - The % of variation in the dependent variable that is explained by the movements in the Independent Variable
 - Referred to as "goodness of fit" or more formally as coefficient of determination
- It's wise to plot each independent variable with the dependent variable, just to see relationships with your plain eyes
 - Remove outliers, consider economic plausibility, find errors in data
- Afterwards, evaluating the regression through things such as using the highest R², specification analysis, and parsimony
- **t-stat:** If the absolute value of this is greater than or equal to 2, the variable is significant
 - Calculated by finding the difference between the sample mean and the hypothesized mean, then dividing by standard error of the mean
- **p-value:** If this is below 0.05, the variable is significant and you reject the null hypothesis
 - **Null Hypothesis:** a claim that there is no significant difference or relationship between two variables, and all observed effects are random chance

Specification Analysis

- **Linearity:** The possibility of a non-linear function, where linear regression would fail
- **Constant Variance of Residuals:** An assumption that the errors of your model from actual is constant
 - Also called homoscedasticity, this is good, and when plotted, should show no pattern, with a spread of residuals constant across the range of fitted values
 - The opposite is called heteroscedasticity
- **Independence of Residuals:** An assumption that the residuals in an observation don't predict or influence the residuals of another observation

Home Reading

- <https://blog.minitab.com/blog/adventures-in-statistics-2/multiple-regression-analysis-use-adjusted-r-squared-and-predicted-r-squared-to-include-the-correct-number-of-variables>
- Adding too many variables to your linear regression model often leads to overfitting
 - R-squared continuously increases, which is misleading
- Adjusted R-squared is a modified metric that accounts for sample size and number of variables, which is often lower than R-squared, and can even be negative
- Predicted R-squared indicates how well a regression model predicts responses, determining if the model is capable of providing valid predictions for new data
 - This is a key indicator for judging if a model is overfitted, as overfitted models start to model random noise from new data

Non-Linear Cost Estimation

- **Learning Curve:** The repetition of the same operation results in less time or effort expended on that operation, thus cost reduction over time
 - Introduced to the aircraft industry in 1936 by T. P. Wright published an article in the Journal of Aeronautical Science
 - Also known as progress functions
 - Usually determined by statistical analysis of actual cost data for similar products
 - Instead, we are using the Cost Estimator's Reference Manual- 2nd Ed.
 - 75% hand assembly/25% machining = 80% learning
 - $50/50 = 85$
 - $25/75 = 90$
 - Higher learning % implies less learning, as the following time/effort from doubling production quantity is reduced to that learning %
 - We experience a lot of cost reduction at the start, but this slows down
 - Industry Learning Curves:
 - Aerospace: 85%
 - Shipbuilding: 80-85%
 - Complex machine tools for new models: 75-85%
 - Repetitive electronics manufacturing: 90-95%

- Repetitive machining or punch-press operations: 90-95%
- Repetitive electrical operations: 75-85%
- Repetitive welding operations: 90%
- Raw materials: 93-96%
- Purchased parts: 85-88%
- **Learning Curve Equation:** $y = ax^b$
 - y: Input cost for the x^{th} unit
 - CAT model: Cumulative average unit cost for the x^{th} unit
 - Focus on this one for AFM 382
 - IUT model: Incremental unit cost for the x^{th} unit
 - This will be different for every volume level
 - x: Cumulative number of units produced
 - a: Input cost for the first unit
 - b: Index of learning rate
 - $b = \frac{\ln(\text{Learning Percentage})}{\ln(2)}$
 - Can also be estimated as: $\ln(y) = \ln(a) + b \times \ln(x)$
 - This looks a lot more like the linear function we are used to
 - For a, you have to reverse the natural log to get the coefficient
 - For b, it is what it is
 - Total time to produce x units if CAT model: $xy = ax^{1+b}$
 - Incremental time for x^{th} unit if CAT model: $ax^b - a(x-1)^b$
- **Polynomial Functions:** Looks like an S-curve, which also can't be modeled by a linear function, but instead requires the formula: $y = ax^3 + bx^2 + cx + d$
 - Typically seen in economies of scale

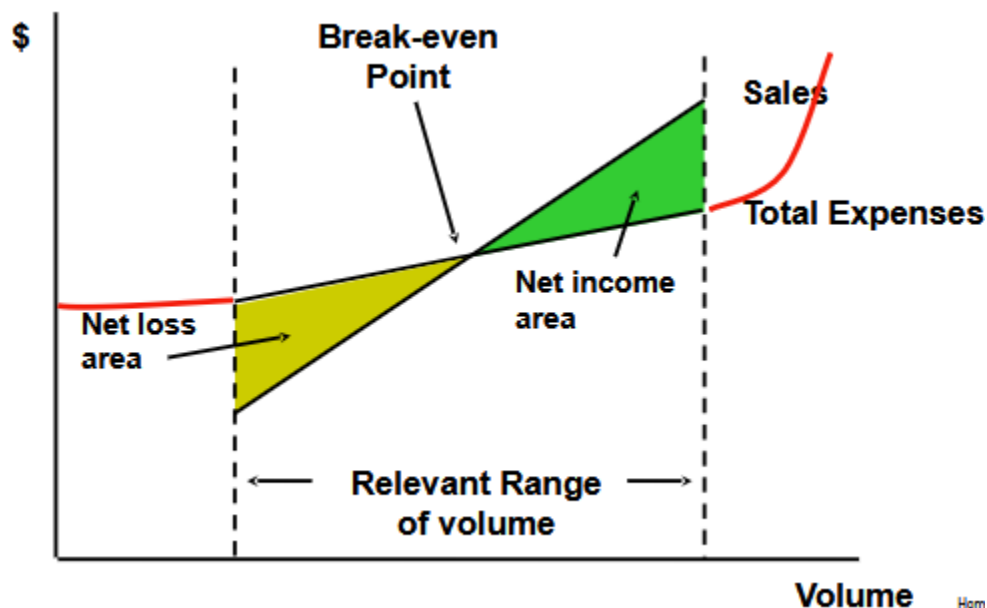
Chapter 10 Practice Questions

1.

Chapter 3: Cost Volume Profit

Cost Drivers

- **Cost Driver:** An activity that influences how a cost is incurred
- **Cost-Volume-Profit Analysis:** The study of the relationship between revenues, costs, volumes, and profits
 - This assumes that sales price and variable cost per unit are constant, at least within the relevant range of volume we are observing
 - **Contribution Margin per Unit:** Every unit contributes x to cover fixed costs and then generates profit after fixed costs are covered
 - $\text{Revenue per unit} - \text{Variable cost per unit}$
 - **Contribution Margin %:** % of sales revenues going to covering fixed costs and then generating profit after fixed costs are covered
 - $\frac{\text{CM per unit}}{\text{Revenue per unit}}$
 - **Break-Even Point:** The point in which fixed costs are covered by CM
 - **Break-Even Point in Units:** The # of units produced to meet the break-even point
 - $\frac{\text{Fixed Costs}}{\text{CM per Unit}}$
 - **Break-Even Point in Dollars:** \$ from units to meet the break-even point
 - $\frac{\text{Fixed Costs}}{\text{CM \%}}$
- **Target Income:** You can add target income to the numerator with fixed costs and do the same calculations as above to find how many units



Multiple Products

- Use the following if multiple products are sold at varying prices
 - Assume that the sales mix is constant

- **Sales Mix in Units:** Relative mix based on the number of units sold
- **Sales Mix in Dollars:** Relative mix based on the dollar amount of sales
- **Average CM per Batch of Units:** $(CM_A \times SM\ units_A) + (CM_B \times SM\ units_B)$
- **Break-even Point in Batches:** $\frac{Fixed\ Costs}{Average\ CM\ per\ Batch}$

Degrees of Operating Leverage (DOL)

- **DOL:** An effect that fixed costs have on changes in operating income as units are sold
 - $\frac{CM}{Operating\ Income}$
 - A % change in sales that predicts the % change in operating income
 - This is different at every volume/operating income
- **High Operating Leverage:**
 - Implies high fixed / low variable costs
 - Higher break-even point
 - Greater risk, but greater potential return
- **Low Operating Leverage:**
 - Implies low fixed / high variable costs
 - Lower break-even point
 - Reduced risk, but lower potential returns

Uncertainty in Planning

- Income taxes in problems should only apply on operating income
- **Problems with CVP Analysis:**
 - Relies on only one cost driver, either units sold or produced
 - Probability of error of input parameter
 - A sensitivity analysis should be done
 - The concept of model elasticity:
 - $\frac{\% \text{ Change in Profit}}{\% \text{ Change in Input Parameter}}$
 - Use of high / low / average concept of estimates
 - Possible casual relationships between input parameters
- **Margin of Safety:** A buffer that can absorb unexpected costs or changes in assumptions
 - **In dollars:** $Budgeted/Actual\ Sales - Breakeven\ Sales$
 - **In units:** $Budgeted/Actual\ Units - Breakeven\ Units$
 - **In percentage:** $\frac{Margin\ of\ Safety\ in\ dollars}{Budgeted/Actual\ revenue}$
- The following two are not explicitly mentioned in the lectures but may be useful to keep in mind, as the Question on Uncertainty slides encroach on this subject matter
- **Value at Risk (VaR):** used to estimate potential loss over a specific time period with a given level of confidence, used to assess risk exposure
- **Expected Shortfall:** the average loss in the worst-case scenarios, ignoring a given confidence level and assuming the worst has occurred, how bad is the loss?

Chapter 3 Practice Questions

1.

Chapter 11: Relevant Costing

The Decision Process

1. Identify the problem and uncertainties/risks
2. Collect relevant information
3. Use information as a basis for predicting the future
4. Make a decision based on quantitative and qualitative analysis
5. Implement chosen action and evaluate performance for feedback

Relevant Costing

- **Differential/Relevant Costs/Revenues:** Forecasted future costs/revenues or information that differs among the alternatives being considered
 - **Historical Costs/Revenues:** By themselves, they are not relevant, but they may be useful for predicting future events/costs/revenues
- Decision makers must weigh the extra cost of obtaining more accurate information against the benefit of which the increased accuracy offers
- **Differential Analysis:** The process of estimating differential costs/revenues of alternatives and comparing these estimates to the status quo
 - We also need to consider how much capacity we have
- **Short Run:** The period of time over which capacity/activity will be constant, often less than one year, where anything longer is considered long-run
 - **Short Run Analysis:** How to use assets in the short run to the greatest advantage
 - Decisions must be mindful of long term commitments
 - Production that is required by contractual commitments or production for strategic purposes, must be scheduled first
 - There is no uncertainty
- Under the concept that the full cost of manufacturing must be covered:
 - Variable costs must always be covered and are a short-run pricing decision
 - Fixed costs are covered in the long run
- **Product Life-Cycle:** The time from initial R&D to when customer support ends
 - **Cradle:** Beginning of the life-cycle
 - **Grave:** Endpoint of the life-cycle
- **Life-Cycle Costing:** Covering all the costs incurred within the product life-cycle
- **Death Spiral:** Focusing on irrelevant information such as common fixed overhead, can make the company make continuously bad decisions, leading them to death
- **Bottleneck:** A constraining resource/operation where the work required limits production
 - For example, we could consider units of production per hour a bottleneck
- **Theory of Constraints:** When making a decision with bottlenecks, sell with the highest contribution margin per the limiting factor (up to demand, then switch products)

Linear Programming:

- **Linear Programming:** A deterministic mathematical technique allocating scarce resources optimally based on a given criterion of optimality
 1. Specify an objective function
 2. Specify the constraining factors
 3. Specify the technical relationships
 4. Solve the problem
 - **Parameter Uncertainty:**
 - The slope of the objective function line changes as the estimated product CM changes (A/B)
 - The slope and/or location of the constraint lines will change as the estimates of the product requirements for each resource and resource availability changes (right-hand side of the constraints)
- **Indifference Point:** The point at which 2 possible options are equal
 - Create the equations to get the operating profits for both options and set them equal to each other
 - This would be the point at which the two options produce equal profits (e.g. at 100 units, you might be indifferent between 2 costing models)
 - Generally practice questions in the class and quizzes related to this also ask which option you produce less than or more than the indifference point
 - This is algebra → just plug in the new units to the equation you set up earlier! Easy as pie! ☆*: .o.(≥ ∇ ≤)o .o.:*☆

Chapter 11 Practice Questions

1.

Chapter 4: Job Order Costing

Cost Flows

- **Job Order Costing:** Emphasizes production in the value chain, although other components are also important contributors to profitability
 - Allocates costs to products that are readily identifiable
 - Common in construction, print shops, and unique goods
 - Accumulates costs for specific jobs
 - Produce for sale
- **Improper Job Costing:**
 - Misstating the stage of completion
 - Charging costs to the wrong job
 - Misrepresenting the cost of jobs
 - Cost misrepresentation in “cost-plus” contracts
- **Cost Flows:**
 - **Material Purchases:** Raw material purchases are recorded as inventory
 - Debit: Raw Materials
 - Credit: Accounts Payable
 - **Material Usage:** Direct materials used increases WIP and decreases raw materials, indirect materials are charged to manufacturing overhead as well
 - Debit: Work in Process
 - Debit: Manufacturing Overhead
 - Credit: Raw Materials
 - **Labour:** The cost of direct labour increases WIP and indirect labour increases manufacturing overhead
 - Debit: Work in Process
 - Debit: Manufacturing Overhead
 - Credit: Wages Payable
 - **Actual Overhead:** Other manufacturing overhead costs are incurred other than indirect materials and indirect labour
 - Debit: Manufacturing Overhead
 - Credit: Accounts Payable, Property Taxes Payable, Prepaid Insurance, Accumulated Depreciation
 - **Overhead Applied:** WIP is increased when manufacturing overhead is used
 - Debit: Work in Process
 - Credit: Manufacturing Overhead
 - **COGManufactured:** When jobs are finished, COG manufactured is transferred to finished goods from WIP
 - Debit: Finished Goods
 - Credit: Work in Process
 - **Sales:** Two entries are required, the sale, and the COGS

- Debit: Accounts Receivable
Credit: Sales
- Debit: Cost of Goods Sold
Credit: Finished Goods
- **Period Expenses:** Nonmanufacturing costs are charged as expenses
 - Debit: Salaries Expense
Credit: Salaries and Wages Payable

Job Cards

- **Job Order Cost Cards:** Estimates the costs of a job, drawing information from:
 - Direct Material Requisition Sheet
 - Labour Time Ticket
 - Overhead Application Rate
- Useful for estimating costs, to then properly price the job to the client
- Below is an example:

Job Cost Sheet	
Job #963	12 units
Direct materials	\$460.00
Direct labour	267.50
Applied factory overhead	<u>180.00</u>
Total cost	\$907.50
Unit cost (\$907.50 / 12)	\$75.625

Overhead Allocation

- **Overhead Application (Overhead Absorption):** Allocation of overhead costs to products
- **Budgeted Factory Overhead Rate:** Calculated at the beginning of the year and used to apply overhead to products throughout the year
- **Eight Steps of Cost Assignment to Cost Object:**
 1. Identify the chosen cost object
 2. Identify the direct costs allocated to that cost object
 3. Select the cost-allocation base to use in allocating indirect costs
 - **Cost-allocation Base:** A specific amount, such as Direct Labour Hours
 4. Identify the indirect costs associated with the cost-allocation base
 5. Compute the rate per unit of each cost-allocation base
 - Divide overhead by the cost-allocation base
 6. Compute the indirect costs allocated to the cost object using this rate
 7. Determine the cost of the cost object by summing the direct and indirect costs
 8. At year-end, reconcile the costs assigned with actual costs
- **Challenges with Assigning Overhead:**

- Manufacturing Overhead is indirect:
 - By definition, Manufacturing Overhead are product costs that are difficult to trace directly to a certain product or job
 - Costs are allocated rather than traced
- Nature of Manufacturing Overhead that needs to be allocated varies:
 - Could be by type or timing
- Manufacturing Overhead does not vary perfectly with output because of the presence of fixed costs:
 - If production varies due to seasonality or other factors, using the actual overhead can cause varying unit cost
- Using applied Manufacturing Overhead is useful for a stable trend of costs
- **Assigning Overhead to Jobs:**
 - When overhead costs are actually incurred, debit Manufacturing Overhead and credit the appropriate account
 - Each time we apply overhead, we debit the WIP account for the job and credit Manufacturing Overhead
 - **Overhead Variance:** The difference between actual and applied overhead
 - **Underapplied:** Actual is greater than Applied
 - Debit: Applied Manufacturing Overhead
 - Debit: WIP, FGI, COGS
 - Credit: Actual Manufacturing Overhead
 - **Overapplied:** Actual is less than Applied
 - Debit: Applied Manufacturing Overhead
 - Credit: WIP, FGI, COGS
 - Credit: Actual Manufacturing Overhead
 - **End of Period Adjustments:**
 - Sources:
 - Difference in cost estimated and incurred
 - Difference in estimated activity and volume of activity
 - Reconciliations:
 - Adjusted allocation rate to correct all Manufacturing Overhead entries to the correct entries
 - **Proration Approach:**
 - Allocate application to WIP, Finished Goods Inventory, and COGS based upon percentage of overhead in each
 - Allocated application to WIP, Finished Goods Inventory, and COGS based upon total costs in each
 - Manufacturing Overhead is first incurred in WIP, but that's it, don't touch Direct Materials
 - Can be based on Ending Balance
 - Write off all application to COGS
 - If the adjustment is immaterial relative to COGS

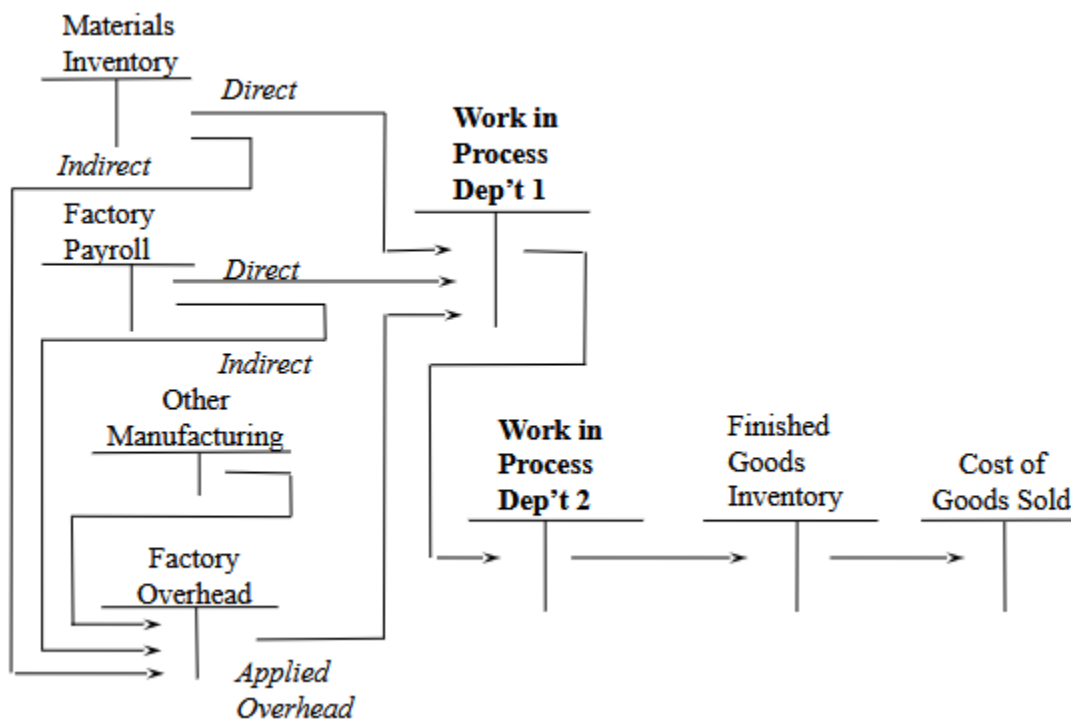
Chapter 4 Practice Questions

1.

Chapter 18/19: Process Costing

Process Costing

- **Process Costing:** Average costs over large numbers of nearly identical units
 - Common in chemical, textiles, lumber, glass, and food processing
 - Accumulates costs by departments
 - Produce for inventory
- **Process Costing Factors:**
 - **Timing of Costs into Process:**
 - When are Direct Materials added to the process
 - Are conversion costs applied evenly throughout the production process or is it applied at the start
 - **Two Buckets:** Costs of direct materials and conversion costs
 - No cost allocation of joint cost is necessary
 - **Presence of Beginning/Ending Inventories:**
 - Accuracy of completion percentages depends upon quality of estimate
 - Completed products are not the same as incomplete products
- **Process Accounting System Flowchart:**



- What amount should be in Ending WIP for each department, and what should go to Cost of Goods Sold/Manufactured?
- **Five Steps of Process Costing (SECRA):**
 1. **S**ummarize the flow of physical units
 - Where from? Where to?

- Inflows should match the outflows
- 2. **E**quivalent unit output
 - We will have some units that are finished and some units that are partial
 - We see how many finished units the partial units can make up
- 3. **C**alculate total costs to account for
- 4. **R**ecord costs per equivalent units
- 5. **A**ssign total costs to units completed and ending WIP
 - Make sure the total costs in step 3 and 5 are the same
- **Equivalent Units (EU):** *# of partially completed units × % of completion*
 - Calculated separately for each input
- When accounting for beginning balance and current period activities and costs, we can make unit costs a weighted average or we use FIFO, which traces costs to their units
 - *Beginning WIP + Manufacturing cost added = COGM + Ending WIP*
 - Determine the split between Cost of Goods Manufacturing and Ending WIP
 - We will focus on the Weighted Average method

Step	Weighted Average	FIFO
Summarize the flow of physical units	Use the basic cost flow model: Beginning Inventory + Transferred In = Ending Inventory + Transferred Out	Same, but separate units from beginning WIP and those started within the period
Compute EUs for each cost category	Multiply physical units by degree of completion	Same, but subtract EUs in beginning WIP to obtain current EUs
Summarize total costs to account for	Add costs in beginning WIP to costs of the current period	Same
Compute costs per EU	Divide total costs in process by total EUs in each cost category to get average cost/EU, being careful of how direct material costs are assigned throughout the conversion process	Divide current costs in process by current EUs in each cost category to get a current cost/EU
Assign costs to products and spoilage	Multiply EUs by cost category for units completed, units spoiled, units in ending WIP by cost/EU in each cost category	Beginning WIP units started in the period are always transferred out or assigned to spoiled units. Costs of

- **Transferred in Goods:**
 - When dealing with multiple production processes, the finished goods of one process needs to be transferred into another process
 - Any unit transferred in are considered to be 100% complete in terms of prior department's process costs
 - Transferred in costs can only be 0% completed or 100% completed
- **Hybrid Costing:** Not really covered but a mix between job and process costing
 - Used in Automobiles, Computers, Clothing, etc.
 - Cars with different seats but the same process for building cars
 - Clothes have similar cutting and stitching operations, but the materials differ

Spoilage

- **Spoilage:** Unacceptable units of production that cannot be sold or fixed and are disposed
 - **Normal:** Occurs by design of the production process
 - **Abnormal:** Occurs due to inefficient or exceptional operations
- **Rework:** Unacceptable units that can be re-processed to become acceptable
- **Seconds:** Unacceptable units of production that are sold for a discounted price
- **Scrap** refers to any extra unusable pieces that are produced by the production process (ex. The excess leftover fabric after cutting a pattern for clothes), can be sold (to a different market at a different price, not to typical customers)
- Spoilage Calculation Steps for process costing:
 1. Summarize the physical flow including normal and abnormal spoilage
 2. Compute output in terms of equivalent units including spoilage
 3. Summarize total costs to account for
 4. Compute equivalent unit costs
 5. Assign these costs to unit completed, spoiled units, and ending WIP

FYI these are the same steps as SECRA, just modified to include separating out normal and abnormal spoilage!! (˘ ω ˘) ✧
- Job Costing and Spoilage:
 - Costs of normal spoilage may be charged to MOH or specific jobs
 - **Common Normal Spoilage:** spoilage that could have gone to anybody or any job → this is allocated to MOH-control
 - **Specific Spoilage:** spoilage that is related to a specific job and goes directly to that job's WIP
 - Costs of abnormal spoilage should be charged to an abnormal spoilage expense account to attract management's attention
 - Managers need to identify whether spoilage exists, if it can be eliminated, if it is worthwhile to eliminate, and the cost of the spoilage
- Journal Entries:
 - Normal Spoilage:

- Intuition is to remove costs from the spoiled units from WIP and allocate directly to the finished goods it relates to based on equivalent units if it's process costing, or to the specific MOH-control or job expense for job order costing
 - Debit: Finished Goods Inventory (or MOH - control if it's common)
Credit: WIP Inventory
 - Abnormal Spoilage:
 - Debit: Abnormal Spoilage Expense
Credit: WIP Inventory
- What if there's rework?
 - Common Normal Rework:
 - Debit: MOH - control
Credit: Materials, wages payable, MOH - applied (where all the costs going into the rework might have previously been stored)
 - Common Specific Rework:
 - Debit: WIP Control
Credit: Materials, wages payable, MOH - applied (where all the costs going into the rework might have previously been stored)
 - Abnormal Rework:
 - Debit: Loss from abnormal rework (period cost)
Credit: Materials, wages payable, MOH - applied (where all the costs going into the rework might have previously been stored)
- What if scrap is sold?
 - Extra unusable pieces from the production process → not separated out between normal and abnormal
 - If it was an immaterial amount that was originally going to be expensed:
 - Debit: Cash
Credit: Scrap sales/revenue
 - If it was part of WIP previously:
 - Debit: Cash
Credit: WIP

Chapter 18/19 Practice Questions

1.

Chapter 3b: Risk and Uncertainty

Risk and Uncertainty

- **Control:** Actions to measure and evaluate performance and take corrective action
- **Uncertainty:** The inability to predict the future with certainty, described by probabilities
 - Inability to measure the outcomes of various options
 - Inability to identify all the possible options
 - Inability to describe the problem accurately
 - Inability to anticipate all future environments
- **Risk:** Depends on how the person feels about risk
 - Typically, higher risk means higher return and loss
- Risk Analysis Questions:
 - Where is the risk situated?
 - How significant is the risk?
 - What is the amount and type of risk?
 - Is the risk worth taking?
- Risk Analysis Financial Modeling:
 - **Point Estimates:** Most likely amount that would be returned
 - **Range Estimates:** Most likely range that would be returned
 - **What If Analysis:** Self-explanatory
 - **Scenario Planning:** Useful when problem is difficult to quantify
 - **Monte Carlo Simulation:** Simulations based on past data to determine the future
- We want to select the best action today by performing this analysis

Decision Analysis and Expected Value

- **Expected Value:** The weighted average outcome of a decision
- **Expected Value Decision Making:**
 - Estimate the outcome(s) of each decision
 - Estimate the probability of each outcome occurring
 - Weight each outcome by its probability
 - Sum the weighted products to get the expected value of the decision
 - Choose the option that maximizes expected value
- **Payoff Tables:** Shows expected value from each action/decision

State Action	Probability			Expected Value
	Slump	No Change	Growth	
Regular Production				
Expanded Production				

- **Decision Analysis:** Logical and quantitative analysis incorporating all factors that influence a decision, to come to the best decision
 - **States of Nature:** Different events that may occur that cannot be controlled
 - Each event should have its own probability, adding up to 100%
 - **Actions:** Choices that the decision-maker can control
 - Good decision-making processes don't always lead to good outcomes
 - Managers should be rewarded for good decision-making, not good outcomes
 - But this is a lot harder to determine
- **Perfect Information:** A decision-maker that is risk-neutral should be willing to pay the difference between the expected value of having perfect information with the higher expected value decision
 - Your reaction to risk might increase or decrease how much you are willing to pay

Statistics and Probability Distributions Review Materials:

- **Statistics:** Ways of using a sample of data to infer the characteristics of a population
 - **Descriptive Statistics:** Describing a sample
 - **Mean:** Sum of all observations divided by the number of observations
 - **Median:** The middle observation in the population
 - **Mode:** The most frequently occurring value
 - **Standard Deviation:** How spread out values are from the mean on average
 - In a sample, $n-1$ is the degrees of freedom
 - **Variance:** Square of the standard deviation
 - **Payoff Tables:** Shows results expected from each action/decision
 - **Skewness:** The asymmetry of the data, where positive indicates a skewness to the right and negative is a skewness to the left
 - **Kurtosis:** Flatness of peakedness of the distribution
 - **Inductive Statistics:** Inferring the characteristics about the whole population based on a sample, and providing measures of uncertainty for the inference
- **Probabilities:** A number between 0 and 1, where all possible events sum up to 1
 - **Probability Density Function:** Assigns probabilities to events
 - **Discrete:** Each outcome has a specific probability
 - **Continuous:** Each outcome has no associated probability, since the random variable is assumed to vary continuously along a line
 - **Random Variable:** Any variable with a probability associated with it
- **Normal Distribution:**
 - A family of distributions where the mean and the variance specify the distribution
 - Symmetrical and bell-shaped
 - Mean, median, and mode are identical
 - Not skewed left or right, so 0
 - Smooth curve

Good luck on studying the massive amount of content!

Chapter 3b Practice Questions

1.

Answer Key

Any short answers provided should not be considered perfect or the only answer.

Chapter 1

1. You're eating brunch with Boris and he's taking really long to look through the menu. He spends 10 minutes debating between the eggs benedict and the grilled cheese, and ends up picking the eggs benedict. The cost of him not eating the grilled cheese is called the **Opportunity** cost and the price of the eggs benedict would be the **Outlay** cost.
2. Which of the following is true about management accounting?
 - a. Focuses on decisions that are relevant and occurred in the past
 - b. Reports do *not* have to follow IFRS, but must follow GAAP principles
 - c. **Focuses on decisions to meet current and future organizational goals**
 - d. Reports must be issued quarterly
 - e. A and D
 - f. B and C
3. Value leadership (luxury, premium); Toji Mortuary is also uses a value leadership strategy with its expensive materials and services, compared to Nanami Morgue who uses a cost leadership model
4. Which of the following business activities is NOT part of the value chain?
 - a. R&D
 - b. Marketing
 - c. Logistics
 - d. Customer service
 - e. CRM
 - f. Distribution
 - g. Design
 - h. Production
 - i. D and C
 - j. D and B
 - k. **C and E**
 - l. C and F
 - m. None of the above
5. Value chain: it touches upon the 6 activities and goes beyond the scope of a supply chain, as the diagram looks at the costs of activities irrelevant to the flow of information, goods, or services through the supply chain (e.g. It includes repair customer service)
Examples of key success factors include:

- Increasing efficiency of the coffin production process
 - Improving quality of wood selected
 - Introducing more innovation in the coffin blueprint design
6. Currently, ITL has identified a problem and some uncertainties, but is missing the necessary information to make any projections or decisions. So, the next step should be to obtain information, specifically information about the cost and selling price of the new coffin, its demand, and the supplier's production capacity for it.

Chapter 2

1. Boris is reading examining North Shore's income statement and notes some bolded labels including gross profit and operating expenses. On the other hand, Penelope is checking over Boris Bank's financials and you notice that the labels on her report are different, including contribution margin and fixed costs. North Shore's costs are likely classified by ____ while Penelope's are likely classified by _____.
 - a. Behaviour; function
 - b. IFRS, behaviour
 - c. Size, function
 - d. IFRS, traceability
 - e. Absorption, behaviour
2.
 - a. Prime costs = $DL + DM = 22 \times 11,000 + 35,790 = 277,790$
 - b. Conversion costs = $DL + MOH = 22 \times 11,000 + 125,400 = 367,400$
 - c. Total product costs = $DL + DM + MOH = 22 \times 1000 + 35,790 + 125,400 = 403,190$
3.
 - a. Sales = $150,000 \times \$6 = \$900,000$
 Total hours of production labour = $150,000 \times 0.5 = 75,000$
 Full cost = $8\% \times 900,000 + \$24 \times 75,000 + 18,200 + 140,000 + 152,000$
 Full cost = 2,182,200
 - b. Full absorption cost = full cost - period costs = $2,182,200 - 152,000 = 2,030,200$
 - c. Total variable cost = full cost - fixed costs = $2,182,200 - 140,000 - 152,000 = 1,890,200$
 FYI: the direct materials are generally variable, as the amounts of direct materials used varies based on the volume produced/sold
4. First, we calculate Direct Materials Used:

$$Direct\ Materials\ Used = Beg.\ Mats\ Inv + Direct\ Mat\ Purchases - End.\ Mats\ Inv$$

$$DMU = 12 + 6 - 13 = 5\ kg\ of\ steel = \$1,250$$
 Second, we calculate Total Manufacturing Costs:

Total Manufacturing Costs = Direct Labour + Overhead + Direct Materials Used

Conversion Costs = Direct Labour + Overhead

$TMC = \$11,000 + \$1,250 = \$12,250$

Third, we calculate COG Manufactured

COG Manufactured = Beg. WIP + Total Manufacturing Costs – End. WIP

$COG\ Manufactured = \$28,000 + \$12,250 - \$29,500 = \$10,750$

Finally, we can calculate COGS

COGS = Beg. Finished Goods Inv + COG Manufactured – End. FGI

$COGS = \$22,000 + \$10,750 - \$24,000 = \$8,750$

5. Yuno Gasai recently switched to a new phone plan that charges her a flat rate of \$30 per month for 20 GB of data, with a \$0.10 fee for every GB over that threshold. Yuno's new phone plan charge is an example of:
- a. Semivariable costs
 - b. Semifixed costs
 - c. Fixed costs



Reference Sheet

Class 1 Management accounting: Helps managers make decisions to meet organization goals, current and future, Future-oriented, No rules/regulations, Can be financial/non-financial | **Financial accounting:** Snapshot of firm's financial position, Past-oriented, Standardize reports based on GAAP and IFRS/ASPE, Annual/quarterly, Financial, Influences managers and employees based on performance evaluation as pay is based on reported financial results | **Outlay Cost:** Past, present, or future cash outflow | **Expense:** Cost charged against revenue in an accounting period | **Opportunity Cost:** The benefit lost from the next best course of action | **Strategies:** **Cost Leadership:** Competing through low prices with quality products/services | **Value Leadership:** Unique, luxury products/services at higher prices || **Cost-Benefit Approach:** Expected benefits > expected costs || **Planning:** 1) Identify the problem and uncertainties/risks 2) Obtain information on the problem 3) Forecast the future 4) Make a decision 5) Implement the decision, evaluate performance, and learn from it | **Control:** Actions to measure and evaluate performance and make corrections | **Value Chain:** The sequence of business functions that add utility to products/services (includes R&D > design cost > production costs > marketing costs > distribution costs > customer service costs) | **Supply Chain:** Flow of goods, services, and information from their initial sources to end consumers | **Supply Chain Management:** Integrating and coordinating activities across points in the supply chain to reduce costs and increase reliability | Key success factors include lower costs, greater efficiency, higher quality, timeliness, innovation | **Class 2 Cost Accumulation:** Collected and organized cost data using an accounting system | **Cost Allocation:** Tracing/Allocating of accumulated costs to cost objects OR the process of assigning indirect costs to a cost object: **Define, Determine, Assign** | **Cost Pool:** A collection of costs that need to be assigned to cost objects | **Cost Allocation Rule:** The method for assigning costs to cost objects | **Cost Object:** Something that requires costs to exist, such as products, services, or intermediate cost objects such as marketing materials | (1) **Traceability:** Considering direct or indirect costs to cost objects, where indirect costs imply the existence of an intermediate cost object | **Direct Cost:** Costs that are paid to attain the cost object | **Indirect Cost:** Costs paid to attain a cost object, then used to attain the end cost object (2) **IFRS:** Considering period and product costs (3) **Behaviour:** Fixed vs. variable, or in between | **Product Costs:** **Direct Materials:** Materials directly traceable to the product | **Direct Labour:** Work directly traceable to transforming materials into a finished product | **Manufacturing Overhead:** All production costs other than the above (indirect) | **Prime Costs** = DM+DL | **Conversion Costs:** DL+MOH (convert raw materials → product) | **Total Product Costs:** DM+MOH+DL | **Period Costs:** Non-manufacturing costs (i.e. marketing → cost to sell product/service (ex. Shipping, sales, advertising), admin → costs to run underlying business (ex. Exec salaries, legal, etc.)) | **Gross Margin**=Rev-COS/COGS | **Operating Profit**=Gross Margin-SG&A; excess of operating revenue over costs necessary to generate matching revenues || **COGS Calculations:** **Service:** Cost of billable hours | **Merchandising:** COGS=Beg. Inv+Purchases of Goods-End. Inv | **Manufacturing:** DM Used=Beg. Mats Inv+DM Purchases-End. Mats Inv, Total Manufacturing Costs=DL+Overhead+DM Used, COGM =Beg. WIP + Total Manufacturing Costs-End. WIP, COGS=Beg. Finished Goods Inv+COGM-End. FGI | **Cost Behaviour:** How costs respond to changes in activity level within the relevant range | **Relevant Range:** The range of activity where the total fixed costs or the unit variable costs remain unchanged | **Fixed Costs:** Total costs do not change with volume, but per unit cost decreases as activity level increases | **Variable Costs:** Total costs increase as activity level increases, but per unit cost remains the same | **Semivariable/Mixed Costs:** Contains a fixed and variable cost component, thus total costs increase as activity level increases but per unit cost decreases | **Step/Semifixed Costs:** Costs increase in total with steps in volume changes | **Full Cost:** Sum of all costs, product + period | **Full Absorption Cost:** All product costs (for manufacturing, external decision-making) | **Variable Cost:** Sum of all variable costs of manufacturing and selling a unit (internal decision-making) | **Contribution Margin** =Revenue-Variable Costs | **Class 3 Industrial Engineering Method:** Analyzing relationships between inputs and outputs physically, qualitative | **Conference Method:** Gathering opinions from various departments, qualitative | **Account Analysis:** Manually classifying cost accounts as variable, fixed, or mixed, qualitative | **High Low Method:** Cost is $y = mx + b$, m is the variable cost (rise/run), b is fixed cost (intercept), choose highest and lowest (based on independent variable or 'x') and find change in rise/change in run | **Regression Analysis:** Uses all past observations to estimate future costs, most robust cost estimation | **R²:** Measures the relationship between dependent and independent variables, can range from 0 (less correlation) to 1 (more correlation) → % of variation in the dependent variable that is explained by the movements in the independent variable | referred to as "goodness of fit" or more formally as "coefficient of determination", ensure predictor has economic plausibility | **t-stat:** If the absolute value of this >= 2, variable is significant, = coefficient estimate / standard error (if not significant → 0) | **p-value:** Significant if < 0.05, also can reject the null hypothesis; **Null Hypothesis:** a claim that there is no significant difference or relationship between two variables, and all observed effects are random chance | **Linearity:** The possibility of a non-linear function, where linear regression would fail | **Constant Variance of Residuals:** An assumption that the errors of your model from actual is constant, AKA **homoscedasticity**, this is good, and when plotted, should show no pattern, with a spread of residuals constant across the range of fitted values, the opposite is called **heteroscedasticity** | **Independence of Residuals:** An assumption that the residuals in an observation don't predict or influence the residuals of another observation || Adding too many variables to your linear regression model often leads to overfitting → **Adjusted R-squared** is a modified to account for sample size and number of variables, often lower than R-squared, can be negative | want **parsimony of model** → best fit with least predictors || **Multiple R:** correlation between x and y, sqrt of R² | **Predicted R-squared:** determines if the model is capable of providing valid predictions for new data (check if overfit)|| **Class 4 Learning curve:** repetition of the same operation results in less time or effort expended on that operation, thus cost reduction over time AKA progress functions → 80% learning rate means it takes 80% of time | **CAT model:** y is avg unit cost to make each unit when you make X units, use this one!!!! **IUT model:** y is the unit cost for the Xth unit, This will be different for every volume level, x: Cumulative number of units produced, a: Input cost for the first unit, b: Index of learning rate, $b = \ln(L)/\ln(2)$, (L = learning curve %) → $\ln(y) = \ln(a) + b \cdot \ln(x)$ to make it linear || to get the coefficients → reverse the natural log with e to get the coefficient (don't need to do this for b) Total time to produce x units if CAT model: **xy or ax^{1/b}**, Incremental time for xth unit if CAT model: $ax^{1/b} - a(x-1)^{1/b}$ | **Polynomial function:** Looks like an S-curve, seen in economies of scales, uses $y = ax^3 + bx^2 + cx + d$ || **Class 5 Cost Driver:** Activities that influence costs | CM/Unit: Rev/Unit - Var. Cost/Unit | CM%: CM/Unit / Rev/Unit | Break-Even: Fixed Costs / CM/Unit or Fixed Costs / CM% | **Target Operating Income:** Add to fixed costs in prev equation → **Target net income:** divide by (1-tax rate) first | Sales Mix: Relative mix/batch based on units sold or dollar amount of sales | Average CM/Batch: $(CM_A \times SM_A \text{ units}) + (CM_B \times SM_B \text{ units})$ | BP in Batches: Fixed Costs / ACM/Batch | **Degrees of Operating Leverage:** CM/Operating Income: % change in sales that predicts % change in operating income, differs at every operating income | **High DOL:** High fixed, low variable, higher break-even, > risk > return | **Low DOL:** and vice versa | **Limitation of CVP** → only uses 1 cost driver, need sensitivity test → **Model Elasticity:** % Change in Profit / % Change in Input Parameter | **Margin of Safety:** Budgeted/Actual - Breakeven | MS%: MS / (Budgeted/Actual) | **Class 6 Relevant costs** have to be in the future and differ between alternatives | Theory of Constraints: Sell units with the highest CM per limiting factor up to demand | Indifference Point: When 2 possible options are equal, set their equations equal to each other and solve | **Class 7 Linear programming** - if there's > 1 constraint: (1) Specify an objective function (objective → maximize CM → $CM_A \cdot A + CM_B \cdot B$), (2) Specify the constraining factors (ex. $_A + _B \leq _$), (3) Specify the technical constraints (i.e. any min/max to make for A and B) (4) Solve the problem (either click solver or GRAPH → if asked to graph: find points where A and B are maximized and connect it, then draw a vertical line for the constraint) | Parameter Uncertainty: Slope of objective function line changes as estimated product CM changes (A/B) | **Class 8 Job Order Costing** accumulates costs for specific jobs | **JE's: Material Purchases:** DR Raw Materials CR AP | **Material Usage:** DR WIP, MOH CR Raw Materials | Labour: DR WIP, MOH CR Wages Payable | **Actual OH:** DR MOH CR AP, Property Tax Payable, Prepaid Insurance, Acc Deprec | **OH Applied:** DR WIP CR MOH | **COGManufactured:** DR Finished Goods CR WIP | **Sales:** DR AR CR Sakes, DR COGS CR Finished Goods | Period Expenses: DR Salaries Exp CR Wages Payable | Job Cards: Estimates the costs of a job | Cost Allocation Base: Similar to a cost driver, we find the rate of this to get Applied OH which is an estimate we reconcile at year-end | **Underapplied:** DR Applied MOH, WIP, FGI, COGS CR Actual MOH | **Overapplied:** DR Applied MOH CR WIP, FGI, COGS, Actual MOH | When OH is applied, we debit WIP and credit MOH so the prior JE's adjust for any difference between applied and actual | Allocate application to WIP, FGI, and COGS based upon % of OH in each OR Write off all application to COGS if the adjustment is immaterial relative to COGS | **Class 9 separate buckets** → i.e. conversion cost, DM, TI costs, **process costing** → **SECRA:** (1) Summarize flow of physical units (2) Equivalent units output (based on % of completion → transferred-in costs are always either 0% or 100% completed, if given beginning and ending WIP %, only look at ending WIP % of completion) (3) Calculate total costs to account for (4) Record costs per EU (total costs/total EUs) (5) Assign total costs to COGM and ending WIP (multiply cost/EU by EUs) | **Class 10 Spoilage:** Unacceptable units of production | Normal: Occurs by design of production process| Abnormal: Occurs due to inefficiency or exceptions | Rework: Spoilage that can be re-processed | Seconds: Spoilage that can be sold at a discounted price | Scrap: Extra unusable pieces that can be sold to a different market at a different price | Follow SECRA for spoilage, just separating out normal and abnormal spoilage in EUs | For Job Costing, normal can be charged to MOH or specific jobs | **Common Normal:** spoilage that could have been charged to any job allocated to MOH-control | **Specific:** related to specific jobs and goes directly to its WIP, should be noted for managers to notice | **Normal:** DR FGI or MOH, CR WIP Inv | **Abnormal:** DR Abnormal Exp CR WIP Inv | **Common Normal Rework:** DR MOH Control CR WIP Inv | **Common Specific rework:** DR WIP Control CR Materials, Wages Payable, MOH applied | **Abnormal Rework:** DR Loss CR Materials, Wages Payable, MOH applied | **Sold**

Scrap: If immaterial DR Cash CR Scrap Sales, if part of WIP DR Cash CR WIP | **Class 11** **Uncertainty:** inability to predict the future, described by probabilities | **Risk:** Depends on how the person feels about risk, but we usually assume risk-neutral | **Expected Value:** Weighted average outcome | **States of Nature:** Different events that may occur that cannot be controlled, with separate probabilities that add up to 100% | **Perfect Info:** Risk-neutral should be willing to pay the difference between EV of having perfect info and highest EV decision, but reaction to risk changes this.