Math in Business

Guided Notes

This resource is designed to help you actively engage with key mathematical concepts. By completing these notes, you'll establish connections between concepts, identify patterns, and develop a deeper understanding of the material.

Fill in the blanks, solve examples, and note questions as you go. Writing in your own words strengthens your memory and helps identify areas needing more attention. Bring your questions to class discussions where your instructor can address specific concerns. Don't focus on perfection—you'll learn math best through active engagement!

Why Business Math Matters

The Decision-Making Tool

Business math serves as a tool for making informed decisions by helping to:

- Quantify variables and risks: ______________________________
- Make decisions based on: ________________________________

Connect It: How might understanding ROI help an entrepreneur evaluate business opportunities?

Operational Efficiency

Math contributes to streamlining operations by:

- ______________________________
- ______________________________

Market Understanding

Math helps businesses understand their market through:

- Analysis of: ______________________________
- Forecasting: ______________________________

Real-World Example: Café Business Math

If you run a small café, math would help you:

1. Calculate profit margins:
    - If coffee costs $1 to make and sells for $3, the profit margin is: _________%

Think About It

How might you use math to make better decisions in your personal life or future career?

____

____

The Scope of Business Math

The Decision-Making Tool

Business math applies across various areas:

Finance

Types of financial calculations:

- Simple interest: ______________________________
- Compound interest: ______________________________

Marketing

Math in marketing includes:

- Pricing strategies: ______________________________
- A/B testing: ______________________________

Operations

Mathematical applications in operations:

- Inventory management: ___________________________________
- Production planning: _____________________________________

Data Analysis

Math provides the foundation for:

- Statistical methods: ______________________________________
- Risk assessment: ____

Think About It

For a business you're interested in, what specific ways would you use math?

____

____

The Importance of Quantitative Literacy

The Decision-Making Tool

Quantitative literacy means: ____

Beyond Basic Calculations

Quantitative literacy includes skills like:

- Reading and interpreting: __________________________________
- Understanding financial statements to: ________________________

Data Interpretation

Data interpretation skills allow business professionals to:

- Identify patterns: ____
- Extract meaningful insights: _______________________________

Decision-Making and Problem-Solving

Quantitative literacy enables:

- Analysis based on: ________________________________
- Decision-making using: ______________________________

Think About It

How might quantitative literacy help you evaluate statistical claims in media?

Why Do We Need Financial Information?

The Decision-Making Tool

Financial information enables businesses to answer critical questions such as:

- How much cash is needed to ____________________________
- Is the business profitable or ____________________________
- What is the cost of ________________________________
- What expenses occur ______________________________
- Are customers paying ______________________________
- How much money does the business _________________________

Think About It

What similarities do you see between how you might track your personal finances and how a business tracks its finances? What are the key differences?

What Is Accounting?

The Decision-Making Tool

Accounting is defined as: ____

Bookkeeping is defined as: ____

The Accounting System

The accounting system converts:

- Financial transaction details into ________________________
- Data into _____________________________________
- Information into __________________________________

Who Uses Financial Reports?

The accounting system generates two types of financial reports:

Managerial Accounting:

- Used by: ______________________________________
- Provides information for: ____________________________
- Examples of reports: _______________________________

Financial Accounting:

- Used by: ______________________________________
- Primarily used for: ________________________________
- Key difference from managerial accounting: _________________

Think About It

Why might a business need both managerial and financial accounting? In what situations would each type be most valuable?

The Accounting Equation

The Accounting Equation: ______________________________

Key components:

- **Assets**: ______________________________
- **Liabilities**: ______________________________
- **Owner's Equity**: ______________________________

Double-Entry Bookkeeping

Double-entry bookkeeping keeps the accounting equation in balance by:

____

Example: If you start a coffee shop with $10,000 cash:

- Assets = $__________
- Liabilities = $__________
- Owner's Equity = $__________

If you then borrow $10,000 from the bank:

- Assets = $__________
- Liabilities = $__________
- Owner's Equity = $__________

Financial Statements

The Decision-Making Tool

Financial statements are prepared in the following order:

1. ______________________________
2. ______________________________
3. ______________________________

4. ______________________________

Income Statement

The **income statement** reports the ______________________ for a stated period of time.

Components:

- **Revenues**: ______________________________
- **Expenses**: ______________________________
- **Net Income**: ______________________________

Formula: Net Income = ______________________________

Example calculation: If a business has $60,000 in revenues and $2,100 in expenses, the net income is $____________

Statement of Retained Earnings

The **statement of retained earnings** explains: ____________________________

Components:

- Beginning retained earnings
- __________ (added from the income statement)
- __________ (subtracted)
- Ending retained earnings

Example calculation: Beginning Retained Earnings: $0 Net Income: $57,900 Dividends: $0 Ending Retained Earnings: $____________

Balance Sheet

The **balance sheet** lists: ____________________________

Key features:

- Shows financial position at a _________________________

- Is organized into ______________, ______________, and ______________
- Must satisfy the accounting equation: ________________________

Statement of Cash Flows

The **statement of cash flows** summarizes: ___________________________

Cash flows are classified into three categories:

1. **Operating Activities**: _______________________________________
2. **Investing Activities**: _______________________________________
3. **Financing Activities**: _______________________________________

Pricing Strategies

Pricing is a strategic decision that involves:

- Production costs: _______________________________________
- Competitor pricing: _____________________________________
- Consumer demand: ______________________________________

Cost-Based Pricing

Cost-based pricing involves:

- Calculating total cost of production: _________________________
- Adding a markup percentage: ______________________________

Competitor-Based Pricing

Competitor-based pricing involves:

- Using competitor prices as a: ______________________________
- Understanding your product's: _____________________________
- Conducting market research to: ____________________________

Benefits:

- Useful in saturated markets with: ______________________________
- Allows you to position your product: ____________________________

Value-Based Pricing

Value-based pricing sets price based on:

- ____

Factors that can add value:

- ____
- ____
- ____

Challenges of value-based pricing:

- ____

Market Analysis

Market analysis involves using statistical methods to understand:

- ____
- ____
- ____

Understanding Consumer Behavior

Understanding consumer behavior includes analyzing:

- Cultural influences: ____
- Psychological triggers: _____________________________________
- Economic conditions: ____

Statistical tools used:

- Correlation analysis can: ____________________________________

- Regression analysis can: ________________________________

Identifying Market Trends

Market trends analysis involves examining:

1. **Historical Sales Data**:
    - Purpose: ________________________________
2. **Market Growth Rates**:
    - Definition: ________________________________
    - Example from electric vehicle market: ____________________
3. **Key Performance Indicators (KPIs)**:
    - Examples: ________________________________
4. **Time-Series Analysis**:
    - Purpose: ________________________________

Understanding the Competitive Landscape

This involves analyzing:

- Competitors' strategies: ________________________________
- Market positioning: ________________________________
- Strengths and weaknesses: ________________________________

Tools used:

- Comparative analysis: ________________________________
- SWOT analysis: ________________________________

Sales Forecasting

Sales forecasting involves:

- ____

Importance of Accurate Sales Forecasts

Consequences of inaccurate forecasts:

- Overestimating sales can lead to: ______________________________
- Underestimating demand can result in: __________________________

Methods of Sales Forecasting

Time-series analysis:

- Based on: ____
- Most useful for: ____
- Limitations: ____

Causal models:

Consider external factors such as:

1. ____
2. ____
3. ____
4. ____

Inventory Management

Inventory management involves: ____

Types of Inventory Management Techniques

Economic Order Quantity (EOQ)

EOQ is a mathematical model that determines: _____________________________

The EOQ formula is: $EOQ = \sqrt{\dfrac{2DS}{H}}$

Where:

- D = ____
- S = ____
- H = ____

Just-In-Time (JIT) Inventory

JIT is an inventory system that: ______________________________

JIT operates on key principles:

- Pull Method: ______________________________
- Quality Over Quantity: ______________________________

Advantages of JIT:

- ______________________________
- ______________________________
- ______________________________

Disadvantages of JIT:

- ______________________________
- ______________________________
- ______________________________

Optimization Techniques in Operations

Optimization is: ______________________________

Linear Programming

Linear programming is a mathematical technique used to: _______________

Applications include:

- ______________________________
- ______________________________
- ______________________________

Advantages of linear programming:

- Versatility: ______________________________

- Efficiency: ____________________

Disadvantages:

- ____________________
- ____________________

Integer Programming

Integer programming is used when: ____________________

In manufacturing, integer programming helps with: ____________________

Network Optimization

Network optimization is used for problems that can be represented as:

____

Example application:

- ____________________

Sensitivity Analysis

Sensitivity analysis determines: ____________________

It helps businesses:

- ____________________
- ____________________

Scheduling

Scheduling involves: ____________________

Key scheduling concepts:

- **Processors**: ______________________________
- **Finishing time**: ______________________________
- **Optimal schedule**: ______________________________
- **Idle time**: ______________________________
- **Critical time**: ______________________________
- **Critical path**: ______________________________

List Processing Algorithm

1. ______________________________
2. ______________________________
3. ______________________________
4. ______________________________

The List Processing Algorithm uses a **priority list**, which is: ______________________________

Pricing Strategies

Freelancers typically use three main pricing strategies:

1. **Hourly Rate**: ______________________________
   When is this most appropriate? ______________________________
2. **Fixed Rate**: ______________________________
   When is this most appropriate? ______________________________
3. **Value-Based Pricing**: ______________________________
   When is this most appropriate? ______________________________

Comparing Payment Methods

Payment Method	Pros	Cons
Hourly Rate		

Fixed Rate		
Value-Based		

Rate Calculation

Rate refers to: ____

Hourly rate calculation involves three key components:

1. ____
2. ____
3. ____

Hourly Rate Formula

$$\text{Hourly Rate} = \frac{\text{Desired Annual Income} + \text{Overhead Costs}}{\text{Number of Billable Hours per Year}}$$

Tax Estimation

As a freelancer, you are responsible for: ___________________________

Quarterly Tax Payment Formula

$$\text{Quarterly Tax} = \frac{\text{Annual Income} \times \text{Tax Rate}}{4}$$

Budgeting for Expenses

Budgeting is critical for freelancers because: ________________________

To determine required work hours:

$$\text{Required Work Hours} = \frac{\text{Total Monthly Expenses}}{\text{Hourly Rate}}$$

Sample Budget Categories

- Fixed Expenses: ______________________________
- Variable Expenses: ______________________________
- Business Expenses: ______________________________

Profit and Loss Analysis

Profit and loss analysis is: ______________________________

Basic formula:

$$\text{Profit or Loss} = \text{Total Income} - \text{Total Expenses}$$

Time Management

Time is a freelancer's most valuable asset because: ______________________________

Mathematical Approach to Time Allocation

Total project time formula:

$$\text{Total Project Time} = \sum_{i=1}^{n} \text{Time for Task}_i$$

Creating a Project Timeline

Benefits of creating a timeline:

1. ______________________________
2. ______________________________
3. ______________________________
4. ______________________________

Steps to create a timeline:

1. ______
2. ______
3. ______
4. ______
5. ______

Key Takeaways

Summarize the most important concepts from each section:

Introduction to Business Math:

- ______
- ______
- ______

Finance and Accounting:

- ______
- ______
- ______

Marketing and Sales:

- ______
- ______

-

Operations and Supply Chain:

-
-
-

Freelancing:

-
-
-

Questions to Ask in Class:

1.
2.
3.