EDU SERUMX COLLEGE OF COMMERCE and MANAGMENT

SYLLABUS

Class – B.B.A. I Year

Subject: Business Mathematics

Unit	Topics
I	**Basic Arithmetic**: Average, Ratio and Proportion, Percentage
II	**Simultaneous Equations**: Meaning, Characteristics, Types, Calculations, Preparation of Invoice
III	**Determinants and Matrices**: Definition, Types, Basic Operations, Cofactor, Minor, Adjoint, Inverse
IV	**Advanced Math Concepts**: Vedic Math, Logarithms and Antilogarithms, Simple Interest, Compound Interest
V	**Profit Calculations**: Profit and Loss, Commission, Discount, Brokerage

EDU SERUMX COLLEGE OF COMMERCE and MANAGMENT

UNIT-1

AVERAGE

The average of the number of quantities of observations of the same kind is their sum divided by their number. The average is also called average value or mean value or arithmetic mean.

Average	=	Sum of all Elements
		Total No. of Elements

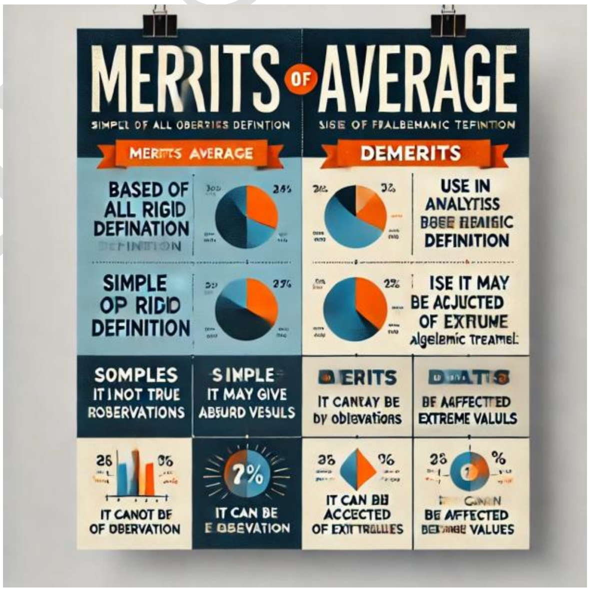
Average =	X1+X2+X3+……………………..+XN	for observations x1 ,x2, x3, ……………xn

Functions of Average

a) To present the salient features of data in simple and summarized form

b) To compare and draw conclusion

c) To get a simple value that describes the characteristics of the entire group d) To help in statistical analysis



Ratio

A **ratio** is a way to compare two or more quantities. It shows how many times one quantity is in relation to another.

For example, if you have **2 apples and 3 oranges**, the ratio of apples to oranges is **2:3**. This means for every 2 apples, there are 3 oranges.

Ratios can be used in many everyday situations, like comparing scores, recipes, or distances. Here are some key points:

- **Written as:** "a to b" or "a

  " (e.g., 2:3).

- **Order matters:** 2:3 is different from 3:2.
- **Can be scaled up or down:** Ratios like 2:3 are the same as 4:6 or 6:9.

There are several types of ratios that help us understand different kinds of comparisons:

1. **Part-to-Part Ratio**: This compares one part of a group to another part of the same group.
   - **Example**: In a class with 10 boys and 15 girls, the ratio of boys to girls is **10:15** or simplified to **2:3**.
2. **Part-to-Whole Ratio**: This compares one part of a group to the total group.
   - **Example**: In the same class, the ratio of boys to the total number of students (25) is **10:25**, simplified to **2:5**.
3. **Whole-to-Part Ratio**: This compares the total amount to a single part of the group.
   - **Example**: Using the same class, the ratio of total students to boys is **25:10**, simplified to **5:2**.
4. **Equivalent Ratios**: These are ratios that represent the same relationship, even if the numbers look different.
   - **Example**: A 2:3 ratio is the same as 4:6 or 6:9. We multiply or divide both parts of the ratio by the same number to find equivalent ratios.
5. **Compound Ratio**: This combines two or more ratios to compare more than two quantities.
   - **Example**: If a recipe calls for 2 parts sugar, 3 parts flour, and 1 part butter, the compound ratio is **2:3:1**.
6. **Unit Ratio**: This is a ratio where one of the quantities is set to 1, often used in pricing or rates.
   - **Example**: If 5 apples cost $10, the unit ratio (price per apple) is **$2:1 apple**.
7. **Proportion**: Though not a type of ratio, it's worth noting that a **proportion** shows that two ratios are equal.
   - **Example**: If 2:3 = 4:6, then these two ratios are in proportion.

Proportion

Proportion is a relationship between two ratios that are equal. It shows that two sets of quantities have the same relative size or ratio.

For example: 2:5::6:152:5::6:152:5::6:15 This means the ratio of 2 to 5 is the same as the ratio of 6 to 15. We write this using four colons (::).

Key Points About Proportion:

1. **Four Parts**: A proportion involves four numbers:
    - The first number is called the **first term**.
    - The second number is called the **second term**.
    - The third number is called the **third term**.
    - The fourth number is called the **fourth term**.
2. **Extremes and Means**:
    - The first and fourth terms are called the **extremes**.
    - The second and third terms are called the **means**.
3. **Not Homogeneous**: The four items in a proportion do not need to be of the same type. However, the relationship between the first two items must be the same as the relationship between the last two items.

Example: 2:5::6:152:5::6:152:5::6:15 Here, 5 is 2.5 times 2 (because 5÷2=2.55 \div 2 = 2.55÷2=2.5). Similarly, 15 is 2.5 times 6 (because 15÷6=2.515 \div 6 = 2.515÷6=2.5).

Types of Proportion

1. **Continued Proportion**:
    - This occurs when the ratio between consecutive items continues.
    - **Example**: AB=BC=CD=DE=…\frac{A}{B} = \frac{B}{C} = \frac{C}{D} = \frac{D}{E} = \ldotsBA=CB=DC=ED=…
    - If A=2A = 2A=2, B=4B = 4B=4, C=8C = 8C=8, then 24=48=816\frac{2}{4} = \frac{4}{8} = \frac{8}{16}42=84=168.
2. **Direct Proportion**:
    - Two items are in direct proportion if an increase or decrease in one item causes a corresponding increase or decrease in the other.
    - **Example**: If you buy more apples, the cost will increase proportionally. If apples cost $2 each, 5 apples will cost $10 (since 5×2=105 \times 2 = 105×2=10).
3. **Inverse Proportion**:
    - Two items are in inverse proportion if an increase in one item causes a decrease in the other, and vice versa.
    - **Example**: If you travel a fixed distance, the speed and time are inversely proportional. If you drive faster, the time taken decreases.

Difference between Ratio and Proportion

S.No.	Ratio	Proportion
1	A ratio compares two quantities.	A proportion compares two ratios.
2	Involves only two terms.	Involves four terms.
3	Quantities must be of the same type.	Quantities can be of different types but maintain the same relationship.
4	No product rule.	The product of the extremes equals the product of the means.

Example of the product rule: 2:5::6:152:5::6:152:5::6:15 Here, the product of the extremes (2 and 15) is equal to the product of the means (5 and 6): 2×15=302 \times 15 = 302×15=30 5×6=305 \times 6 = 305×6=30

Percentage

Percentage means "for every one hundred" or "out of 100." It is a way to compare parts of a whole by breaking the whole into 100 parts.

For example:

- **10%** means **10 out of 100**.
- If you get 10% of something, you are getting 10 parts out of 100 parts of that thing.

The **%** symbol means "percent." So, **10 percent** is the same as **10%** or the fraction 10100\frac{10}{100}10010. This fraction can be simplified further:

10100=110\frac{10}{100} = \frac{1}{10}10010=101

So, 10% is the same as 110\frac{1}{10}101 in fraction form.

Converting Between Fractions and Percentages

1. **To Convert a Fraction to a Percentage**:
   - Multiply the fraction by 100 and add the **%** sign.
   - **Example**: Convert 110\frac{1}{10}101 to a percentage. 110×100=10%\frac{1}{10} \times 100 = 10\%101×100=10%
2. **To Convert a Percentage to a Fraction**:
   - Write the percentage over 100, then simplify if possible.
   - **Example**: Convert 10% to a fraction. 10100=110\frac{10}{100} = \frac{1}{10}10010=101

How to Find the Percentage of One Quantity Compared to Another

If you want to find what percent one quantity is of another, use this formula:

Percentage=PartWhole×100\text{Percentage} = \frac{\text{Part}}{\text{Whole}} \times 100Percentage=WholePart×100

- **Example**: What percent is Rs. 20 out of Rs. 350?
  Percentage=20350×100=2000350≈5.71%\text{Percentage} = \frac{20}{350} \times 100 = \frac{2000}{350} \approx 5.71\%Percentage=35020×100=3502000≈5.71%

So, Rs. 20 is about **5.71%** of Rs. 350.

Finding the Quantity When the Percentage and Rate Are Known

If you know the percentage value and the rate, you can find the quantity with this formula:

Quantity=Percentage Value×100Rate Percent\text{Quantity} = \frac{\text{Percentage Value} \times 100}{\text{Rate Percent}}Quantity=Rate PercentPercentage Value×100

For example:

- If you know 10% of a number is 50, to find the full quantity:
  Quantity=50×10010=500\text{Quantity} = \frac{50 \times 100}{10} = 500Quantity=1050×100=500

So, 10% of **500** is **50**.

EDU SERUMX COLLEGE OF COMMERCE and MANAGEMENT

Simultaneous Equations: Simple Explanation

Equations show that two algebraic expressions are equal. They have an **equals sign (=)** between two sides that balance each other.

Key Terms:

1. **Equation**: A statement showing two expressions are equal.
   - Example: 4x+y=24x + y = 24x+y=2
2. **Identity**: An equation that's true for all values of its variables.
   - Example: x+x=2xx + x = 2xx+x=2x (This is always true for any value of xxx).
3. **Root of an Equation**: The value(s) of the unknown(s) that make the equation true. Solving the equation means finding these values.
4. **Degree of an Equation**: The highest power of the variable in an equation.
   - A **linear equation** has a degree of 1 (e.g., 4x+y=24x + y = 24x+y=2).

Types of Linear Equations:

1. **One-Variable Equation**: An equation with just one unknown, like ax=cax = cax=c (e.g., 4x=84x = 84x=8).
2. **Two-Variable Equation**: An equation with two unknowns (e.g., 4x+y=24x + y = 24x+y=2).
3. **Three-Variable Equation**: An equation with three unknowns (e.g., 3x+5y−7z=133x + 5y - 7z = 133x+5y−7z=13).

Types of Simultaneous Equations:

1. **Two-Variable Linear Simultaneous Equations**: Two equations with two variables that are solved together.
   - Example: 4x+y=24x + y = 24x+y=2 3x−5y=183x - 5y = 183x−5y=18
2. **Three-Variable Linear Simultaneous Equations**: Three equations with three variables that are solved together.
   - Example: 3x+5y−7z=133x + 5y - 7z = 133x+5y−7z=13 4x+y−12z=64x + y - 12z = 64x+y−12z=6 2x+9y−3z=202x + 9y - 3z = 202x+9y−3z=20
3. **Specific Types of Equations**: Other forms, such as quadratic equations or reciprocal equations.
   - Quadratic Equation: ax2+bx+c=0ax^2 + bx + c = 0ax2+bx+c=0
   - Reciprocal Equation: ax+by=c\frac{a}{x} + \frac{b}{y} = cxa+yb=c

Solutions to Simultaneous Equations:

1. **Infinite Solutions**: When both equations represent the same line. The system has many solutions, as every point on the line is a solution.
2. **Unique Solution**: When the equations cross at one point. The system has exactly one solution.
3. **No Solution**: When the lines are parallel and never meet.

Methods to Solve Simultaneous Equations:

1. Elimination Method:

- Align the equations so the xxx’s and yyy’s line up.
- Make the coefficients of one variable (either xxx or yyy) the same.
- If the signs are the same, subtract one equation from the other; if different, add them.
- Solve for the remaining variable, then substitute back to find the other variable.

Example of Elimination:

- Equations: 4x+y=24x + y = 24x+y=2 3x−y=53x - y = 53x−y=5
- Adding these equations will cancel out yyy and help solve for xxx.

2. Substitution Method:

- Rearrange one equation to isolate xxx or yyy.
- Substitute this expression into the other equation.
- Solve for one variable, then substitute back to find the other variable.

Example of Substitution:

- Equations: x+y=6x + y = 6x+y=6 2x−y=32x - y = 32x−y=3
- Solve the first equation for xxx: x=6−yx = 6 - yx=6−y.
- Substitute into the second equation to find yyy.

Cross Multiplication Method:

The **cross multiplication method** is a quick way to solve two simultaneous linear equations with two variables. This method can help you find the values of xxx and yyy without much rearranging.

Let’s say we have two linear equations:

1. a1x+b1y=c1a_1x + b_1y = c_1a1x+b1y=c1
2. a2x+b2y=c2a_2x + b_2y = c_2a2x+b2y=c2

The steps to solve these using cross multiplication are:

Step 1: Write the Equations in Standard Form

Make sure both equations are in this format:

a1x+b1y=c1a_1x + b_1y = c_1a1x+b1y=c1 a2x+b2y=c2a_2x + b_2y = c_2a2x+b2y=c2

Step 2: Set Up the Cross Multiplication Framework

To solve for xxx and yyy, use this arrangement for cross-multiplication:

x(b1c2−b2c1)=y(c1a2−c2a1)=1(a1b2−a2b1)\frac{x}{(b_1c_2 - b_2c_1)} = \frac{y}{(c_1a_2 - c_2a_1)} = \frac{1}{(a_1b_2 - a_2b_1)}(b1c2−b2c1)x=(c1a2−c2a1)y=(a1b2−a2b1)1

Step 3: Solve for xxx and yyy

1. **Solve for xxx**: Multiply both sides by (b1c2−b2c1)(b_1c_2 - b_2c_1)(b1c2−b2c1).

   x=(b1c2−b2c1)(a1b2−a2b1)x = \frac{(b_1c_2 - b_2c_1)}{(a_1b_2 - a_2b_1)}x=(a1b2−a2b1)(b1c2−b2c1)

2. **Solve for yyy**: Multiply both sides by (c1a2−c2a1)(c_1a_2 - c_2a_1)(c1a2−c2a1).

   y=(c1a2−c2a1)(a1b2−a2b1)y = \frac{(c_1a_2 - c_2a_1)}{(a_1b_2 - a_2b_1)}y=(a1b2−a2b1)(c1a2−c2a1)

Example Problem

Let’s solve the equations using cross multiplication:

1. 3x+2y=83x + 2y = 83x+2y=8
2. 4x−y=−24x - y = -24x−y=−2
3. Arrange in standard form:
   - First equation: a1=3 a_1 = 3a1=3, b1=2 b_1 = 2b1=2, c1=8c_1 = 8c1=8
   - Second equation: a2=4 a_2 = 4a2=4, b2=−1 b_2 = -1b2=−1, c2=−2c_2 = -2c2=−2
4. Set up cross multiplication:

   x=(2×−2)−(−1×8)(3×−1)−(4×2)x = \frac{(2 \times -2) - (-1 \times 8)}{(3 \times -1) - (4 \times 2)}x=(3×−1)−(4×2)(2×−2)−(−1×8)

   Simplify:

   x=(−4)+8−3−8=4−11=−411x = \frac{(-4) + 8}{-3 - 8} = \frac{4}{-11} = -\frac{4}{11}x=−3−8(−4)+8=−114=−114

5. Solve for yyy:

   y=(8×4)−(−2×3)(3×−1)−(4×2)y = \frac{(8 \times 4) - (-2 \times 3)}{(3 \times -1) - (4 \times 2)}y=(3×−1)−(4×2)(8×4)−(−2×3)

   Simplify:

   y=32+6−3−8=38−11=−3811y = \frac{32 + 6}{-3 - 8} = \frac{38}{-11} = -\frac{38}{11}y=−3−832+6=−1138=−1138

Final Answer:

x=−411,y=−3811x = -\frac{4}{11}, \quad y = -\frac{38}{11}x=−114,y=−1138

Preparation of Invoice: Explained Simply

An **invoice** is a document created by the seller after goods are shipped to the buyer. It shows details of what was sold, like the quantity, quality, and price. If there's any discount, it's subtracted from the total, and extra expenses are added (such as transportation costs). If goods are sent by train, the invoice will include the railway receipt number.

Types of Invoices

1. **Local Invoice**:
   - Only the cost of goods is included, with any discount taken off.
   - Extra costs (like packing, loading, or delivery) are added and paid by the buyer.
2. **At Station Invoice**:
   - The seller covers all expenses up to the railway station.
   - After that, costs (like shipping, insurance) are the buyer's responsibility.
3. **Free on Rails (FOR) Invoice**:
   - The seller pays for everything up to loading the goods onto the train.
   - The buyer handles any costs beyond that, like insurance.
4. **Cost and Freight (C&F) Invoice**:
   - The seller's price includes the cost of goods, packing, and transportation to the buyer.
   - Insurance is extra and paid by the buyer.
5. **Cost, Insurance, and Freight (CI&F) Invoice**:
   - The seller's price includes goods, packing, transportation, and insurance.
   - The buyer covers any additional costs.
6. **Franco Invoice**:
   - The seller's price includes everything needed to deliver the goods to the buyer's door.

How to Prepare an Invoice

An invoice has two copies: the **original** for the buyer and a **duplicate** for the seller's records. Here's what's typically included:

1. Seller's name and address
2. Invoice number and date
3. Purchase order number
4. Buyer's name and address
5. Place of issue
6. Trade terms
7. Quantity and details of goods
8. Date of sale
9. Price per item and total price
10. Any trade discounts
11. Extra expenses (like delivery costs)
12. Any advance payment made by the buyer
13. Total amount due
14. Delivery details
15. Special notes, if any
16. Seller's signature

Why Invoices are Useful

1. **For the Buyer**: It tells them the cost and any extra charges.
2. **Planning**: If the invoice arrives before the goods, the buyer can prepare to resell them.
3. **Checking**: The buyer can verify if the invoice matches their original order.
4. **Comparing**: After getting the goods, the buyer can compare the items with the invoice to see if anything is missing or incorrect.
5. **For Tax Purposes**: The invoice helps calculate any taxes like octroi.
6. **Accounting**: Both parties use the invoice to update their financial records.

UNIT-3

Definition of a Matrix

A **matrix** is a way of organizing numbers or other values in a rectangular shape with rows (left to right) and columns (top to bottom).

For example:

[123456]\begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \end{bmatrix}[142536]

This matrix has **2 rows** and **3 columns**.

Types of Matrices

1. **Row Matrix (or Row Vector)**: A matrix with just **one row**. Example:

   [1 2 3][1 \ 2 \ 3][1 2 3]

2. **Column Matrix (or Column Vector)**: A matrix with just **one column**. Example:

   [123]\begin{bmatrix} 1 \\ 2 \\ 3 \end{bmatrix}123

3. **Zero Matrix (or Null Matrix)**: A matrix in which **all elements are zero**. Example:

   [0000]\begin{bmatrix} 0 & 0 \\ 0 & 0 \end{bmatrix}[0000]

4. **Diagonal Matrix**: A square matrix where **only the diagonal elements are non-zero**, and all other elements are zero. Example:

   [1003]\begin{bmatrix} 1 & 0 \\ 0 & 3 \end{bmatrix}[1003]

5. **Square Matrix**: A matrix with an **equal number of rows and columns**. Example:

   [3514]\begin{bmatrix} 3 & 5 \\ 1 & 4 \end{bmatrix}[3154]

6. **Identity Matrix (or Unit Matrix)**: A square matrix where **diagonal elements are 1** and all other elements are zero. Example:

   [100010001]\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}100 010001

7. **Scalar Matrix**: A **diagonal matrix** where all the diagonal elements are **the same**. Example:

   [2002]\begin{bmatrix} 2 & 0 \\ 0 & 2 \end{bmatrix}[2002]

8. **Upper Triangular Matrix**: A square matrix where **all elements below the diagonal are zero**. Example:

   [1032]\begin{bmatrix} 1 & 0 \\ 3 & 2 \end{bmatrix}[1302]

9. **Lower Triangular Matrix**: A square matrix where **all elements above the diagonal are zero**. Example:

   [2013]\begin{bmatrix} 2 & 0 \\ 1 & 3 \end{bmatrix}[2103]

10. **Transpose Matrix**: A matrix made by **swapping the rows and columns** of a given matrix. Example:

- If we start with matrix AAA: A=[2345]A = \begin{bmatrix} 2 & 3 \\ 4 & 5 \end{bmatrix}A=[2435]
- The **transpose of A** (written as ATA^TAT) would be: AT=[2435]A^T = \begin{bmatrix} 2 & 4 \\ 3 & 5 \end{bmatrix}AT=[2345]

EDU SERUMX COLLEGE OF COMMERCE and MANAGEMENT

UNIT – 4

Multiplication Rules in Vedic Mathematics

1. **Criss-Cross Method for Multiplication**
    - The Criss-Cross method is a technique in Vedic Mathematics used to multiply numbers. This method is especially useful for multiplying two-digit or three-digit numbers quickly without relying on the standard multiplication algorithm.
    - Let's look at examples by the number of digits in each number (2x2, 3x3, etc.):
        - **2x2 Example**:

          ```
          markdown
          Copy code
          34
          × 37
          ----
          ```

          Using the criss-cross method, multiply the numbers across and diagonally, then sum them up.

        - **3x3 Example**:

          ```
          markdown
          Copy code
          123
          × 457
          ------
          ```

          Again, apply the criss-cross method in steps for each pair of numbers and sum up the partial results.

        - **4x4 Example**:

          ```
          markdown
          Copy code
          4527
          × 3215
          -------
          ```

          Apply the same steps, increasing in complexity for each digit pair.

2. **Ekadhikam Purvam (One More than the Previous) – Squaring Technique**
    - This rule is applied when squaring numbers ending in 5.
    - For example:
        - 55×5555 × 5555×55:
            - Separate the last digit (5) from the first digit (5).
            - Multiply the first digit by one more than itself: 5×6=305 × 6 = 305×6=30.
            - The square of the number becomes 302530253025.

- Another example with 35×3535 × 3535×35:
  - Separate the last digit (5), and take the first digit (3).
  - Multiply 3×(3+1)=123 × (3+1) = 123×(3+1)=12, so the answer is 122512251225.

3. **Duplex Method**
   - This method involves creating "D's" (double products) for pairs of numbers:
   - Example:
     - **16 (4-D's):** The square of 4 is 161616.
     - **23 (D's - 2(2×3) = 12):** Multiply 2 and 3 to get 121212.
4. **Nikhilam Sutra – Base Multiplication**
   - This sutra is effective for numbers near a common base, like 10, 100, or 1000.
   - Examples:
     - **102 × 104**:
       - Take each number and find how much it deviates from the base.
       - Add these deviations, multiply them for one part of the answer, and adjust for the base.
5. **Squaring by Duplex (D's) Method**
   - Squaring numbers with D's involves multiplying each part of the number by itself or by another part, following specific steps.
   - For example, with **232**:
     - **3-D's (9)**, followed by **23-D's**, and so on.

Simple Interest (SI)

- **Interest**: When you borrow money, you pay back the original amount plus some extra money called interest. This interest is the cost of borrowing money.
- **Simple Interest**: It's a way of calculating the interest only on the original amount (called the Principal) for a set time period.

Key Terms:

- **Principal (P)**: The original amount of money you borrow or invest.
- **Interest (I)**: The extra amount of money you pay or earn on the borrowed or invested money.
- **Time (T)**: The length of time for which the money is borrowed or invested (usually in years).
- **Rate of Interest (R)**: The percentage of the principal that you pay as interest.

Formula for Simple Interest:

I=P×R×T100I = \frac{P \times R \times T}{100}I=100P×R×T

Where:

- **P** = Principal
- **R** = Rate of Interest (percentage)
- **T** = Time (in years)

Total Amount (A) = Principal (P) + Simple Interest (I)

Compound Interest (CI)

- **Compound Interest**: Unlike Simple Interest, compound interest is calculated on the original principal **and** on the interest added each year. This means the interest keeps growing because it's calculated on both the principal and the accumulated interest from previous years.

How Compound Interest Works:

1. Interest is calculated on the principal for the first year.
2. At the end of the year, the interest is added to the principal, and for the next year, the interest is calculated on the new total (principal + interest).
3. This process continues for each year, making the amount grow faster compared to simple interest.

Formula for Compound Interest:

A=P(1+R100)nA = P \left(1 + \frac{R}{100}\right)^nA=P(1+100R)n

Where:

- **A** = Total Amount (Principal + Interest) after n years
- **P** = Principal (original amount)
- **R** = Rate of Interest (percentage)
- **n** = Number of years

Compound Interest (CI) = Total Amount (A) - Principal (P)

Difference Between Simple Interest and Compound Interest:

- **Simple Interest**: Interest is calculated only on the original amount (principal) and remains the same throughout the period.
- **Compound Interest**: Interest is calculated on the growing total (principal + interest), so it increases faster.

Example of Simple Interest:

- If you borrow $1000 at a rate of 5% for 2 years: I=1000×5×2100=100I = \frac{1000 \times 5 \times 2}{100} = 100I=1001000×5×2=100 So, you will pay $100 as interest in total.

Example of Compound Interest:

- If you borrow $1000 at 5% interest for 2 years, and interest is compounded yearly: A=1000(1+5100)2=1000×1.052=1102.50A = 1000 \left(1 + \frac{5}{100}\right)^2 = 1000 \times 1.05^2 = 1102.50A=1000(1+1005)2=1000×1.052=1102.50 Compound Interest = $1102.50 - $1000 = $102.50.

UNIT-5

PROFIT AND LOSS SOME IMPORTANT DEFINITIONSRELATED WITH PROFIT AND LOSS

Important Definitions:

1. **Cost Price (CP)**:
    - This is the price you pay to buy a product, including all additional expenses like transportation, taxes, etc.
2. **Selling Price (SP)**:
    - The price at which you sell the product. This is the amount of money you receive when you sell it.
3. **Marked Price (MP)**:
    - The price that is displayed on the product, such as the listed or catalog price.
4. **Profit**:
    - When the **Selling Price (SP)** is higher than the **Cost Price (CP)**, the difference is called **Profit** or **Gain**.
    - **Profit Formula**: Profit=Selling Price (SP)−Cost Price (CP)\text{Profit} = \text{Selling Price (SP)} - \text{Cost Price (CP)}Profit=Selling Price (SP)−Cost Price (CP)
5. **Loss**:
    - When the **Selling Price (SP)** is lower than the **Cost Price (CP)**, the difference is called **Loss**.
    - **Loss Formula**: Loss=Cost Price (CP)−Selling Price (SP)\text{Loss} = \text{Cost Price (CP)} - \text{Selling Price (SP)}Loss=Cost Price (CP)−Selling Price (SP)
6. **Profit Percentage**:
    - To find out how much profit you make in percentage:
    - **Profit Percentage Formula**: Profit Percentage=100×ProfitCost Price (CP)\text{Profit Percentage} = \frac{100 \times \text{Profit}}{\text{Cost Price (CP)}}Profit Percentage=Cost Price (CP)100×Profit
7. **Loss Percentage**:
    - To calculate the percentage of loss:
    - **Loss Percentage Formula**: Loss Percentage=100×LossCost Price (CP)\text{Loss Percentage} = \frac{100 \times \text{Loss}}{\text{Cost Price (CP)}}Loss Percentage=Cost Price (CP)100×Loss

Agents, Brokers, and Commissions:

1. **Commission**:
   - Agents or salespeople often earn a commission, which is a payment for helping make a sale. This is usually a percentage of the total sales amount.
   - **Commission Formula**:
     Amount of Commission=Rate of Commission×Amount of Sales100\text{Amount of Commission} = \frac{\text{Rate of Commission} \times \text{Amount of Sales}}{100}Amount of Commission=100Rate of Commission×Amount of Sales
2. **Broker**:
   - A **Broker** is a middleman who helps buyers and sellers make transactions. They earn a **Brokerage** for their work, which is also a percentage of the total business they help complete.
3. **Brokerage**:
   - The money a broker earns for facilitating a deal. It is usually a percentage of the total transaction value.
   - **Brokerage Formula**:
     Brokerage=Rate of Brokerage×Total Transaction Value100\text{Brokerage} = \frac{\text{Rate of Brokerage} \times \text{Total Transaction Value}}{100}Brokerage=100Rate of Brokerage×Total Transaction Value
4. **Del Credere Agent**:
   - This type of agent guarantees that payments from customers will be collected. They earn a special **Del Credere Commission**, which is a percentage of the credit sales they help to collect.
   - **Del Credere Commission Formula**:
     Amount of Del Credere Commission=Credit Sales×Rate of Del Credere Commission100\text{Amount of Del Credere Commission} = \frac{\text{Credit Sales} \times \text{Rate of Del Credere Commission}}{100}Amount of Del Credere Commission=100Credit Sales×Rate of Del Credere Commission
5. **Travelling Agent**:
   - A **Travelling Agent** is an agent who travels around to sell products or services on behalf of a business.

Other Important Commission Formulas:

1. **Rate of Commission**:
   If you know the commission and sales amount, you can find the rate of commission:

   Rate of Commission=Amount of Commission×100Amount of Sales\text{Rate of Commission} = \frac{\text{Amount of Commission} \times 100}{\text{Amount of Sales}}Rate of Commission=Amount of SalesAmount of Commission×100

2. **Amount of Sales**:
   If you know the commission and the rate of commission, you can calculate the total sales:

   Amount of Sales=Amount of Commission×100Rate of Commission\text{Amount of Sales} = \frac{\text{Amount of Commission} \times 100}{\text{Rate of Commission}}Amount of Sales=Rate of CommissionAmount of Commission×100