CLASS-7

LESSON-7 COMPARING QUANTITIES

(This PDF Based on NCERT Book)

COMPARING QUANTITIES(मात्राओ का तुलना)-Comparing quantities means determining which of two or more things has a greater, smaller, or equal value. This is a fundamental concept used in daily life to make decisions, such as figuring out who has more cookies or which item is the better deal at a store.

SOME METHODS OF COMPARING QUANTITIES(मात्राओ की तुलना करने वाली कुछ विधि)-

1. **Percentage- Another Way Of Comparing Quantities(प्रतिशत मात्राओ की तुलना करने का तरीका):**

For example, imagine two students take tests with different total scores:

- Student A scores **8 out of 10**.
- Student B scores **18 out of 20**.

Simply looking at the scores, it's not immediately obvious who did better. However, by converting both scores to percentages, you get a clear comparison:

- Student A: (8 ÷ 10) x 100 = **80%**
- Student B: (18 ÷ 20) x 100 = **90%**

Comparing **90%** to **80%** makes it obvious that Student B performed better. Percentages work as a universal language for comparison, making them useful in many situations, from shopping discounts to financial reports.

- **Converting Fraction Numbers to Percentage(भिन्न संख्या को प्रतिशत मे परिवर्तित करना):**

To convert a fraction to a percentage, you can follow these simple steps:

1. **Divide the numerator by the denominator.** The **numerator** is the top number of the fraction, and the **denominator** is the bottom number.
2. **Multiply the result by 100.** This will give you the percentage.

Here's an example:

Let's convert the fraction $\frac{3}{4}$ to a percentage.

1. Divide the numerator (3) by the denominator (4): 3÷4=0.75
2. Multiply the result (0.75) by 100: 0.75×100=75

So, the fraction $\frac{3}{4}$ is equal to **75%**.

- **Converting Decimals to percentage(दशमलव को प्रतिशत मे परिवर्तित करना):**

To convert a **decimal** to a **percentage**, you can simply multiply the decimal by 100. This is the same as moving the decimal point two places to the right.

Method

1. Take your decimal number.
2. Multiply it by 100.
3. Add the percent sign (%) to the result.

Examples

- To convert 0.5 to a percentage: 0.5×100=50. So, 0.5=50%.
- To convert 0.75 to a percentage: 0.75×100=75. So, 0.75=75%.
- To convert 0.025 to a percentage: 0.025×100=2.5. So, 0.025=2.5%.

This conversion works because the word "percent" means "per hundred" or "out of 100." When you multiply a decimal by 100, you are finding out what that number would be if it were part of a whole of 100 instead of part of a whole of 1.

2. **USE OF PERCENTAGE(प्रतिशत का उपयोग):**

Percentages are widely used in everyday life to represent and compare quantities, often in a more understandable way than fractions or decimals.

- **Converting percentage to "How many"(प्रतिशत को संख्या मे परिवर्तित करना):**

To convert a **percentage** to a specific number or quantity, you need to know the total amount or "whole" that the percentage is being taken from.

The basic process is to:

1. Convert the percentage to a decimal.
2. Multiply that decimal by the total amount.

How to Convert a Percentage to a Number

Let's use an example to illustrate this.

Problem: What is **25%** of a total of **200**?

Step 1: Convert the percentage to a decimal.

The term "percent" means "per hundred." So, to convert a percentage to a decimal, you divide the percentage number by 100. 25%÷100=0.25

Step 2: Multiply the decimal by the total number.

Now, multiply the decimal you just calculated by the total amount. 0.25×200=50

So, **25% of 200 is 50**.

This simple method can be applied to any scenario where you need to find a portion of a whole amount, whether it's calculating a discount, a tip, or a specific value from a dataset.

- **Ratio to percents(प्रतिशत से अनुपात):**

To convert a **ratio** to a **percentage**, you first need to understand that a ratio can represent a **part-to-part** or **part-to-whole** relationship. The method you use depends on which relationship the ratio represents.

Part-to-Whole Ratios

If your ratio is already a part-to-whole comparison, the conversion is straightforward.

Method:

1. Write the ratio as a **fraction**, with the part as the numerator and the whole as the denominator.
2. Multiply the fraction by 100.
3. Add the percent sign (%).

Example:

- A basketball player made 4 shots out of 5 attempts. This is a ratio of 4:5.
- To convert this to a percentage, treat it as the fraction 54.
- 54×100=80
- So, the player's shooting percentage is **80%**.

Part-to-Part Ratios

If the ratio compares one part to another part, you must first find the **total number of parts** to create a part-to-whole relationship.

Method:

1. **Add all the parts** of the ratio to find the total.
2. Create a **new fraction** for each part, with that part as the numerator and the total as the denominator.
3. Multiply each fraction by 100 to get its percentage.

Example:

- In a class, the ratio of boys to girls is **3:2**.
- First, find the total number of parts: 3+2=5. This means there are 5 total "parts" or students in the ratio.
- Now, convert each part to a percentage of the total:
  - For the boys: 53×100=60%
  - For the girls: 52×100=40%
- So, boys make up **60%** of the class, and girls make up **40%**.

3. PRICES RELATED TO AN ITEM OR BUYING AND SELLING(किसी वस्तु या खरीद-बिक्री से संबंधित कीमतें):

When we talk about prices, we're dealing with the financial aspects of buying and selling. This involves several key concepts, many of which use percentages to make calculations easier.

1. The Basics: Cost, Price, Profit, and Loss

- **Cost Price (CP):** The amount of money it takes to acquire or produce an item.
- **Selling Price (SP):** The price at which the item is sold to a customer.
- **Profit:** When the selling price is greater than the cost price (SP > CP). It's the money a seller makes from a transaction.
- **Loss:** When the selling price is less than the cost price (SP < CP). It's the money a seller loses.

You can calculate profit or loss using this simple formula: **Profit/Loss = Selling Price - Cost Price**

- **Profit or Loss as a Percentage(प्रतिशत के रूप मे लाभ या हानि):**

To calculate profit or loss as a percentage, you need to know the **cost price** (CP), which is what an item costs the seller, and the **selling price** (SP), which is what the item is sold for.

Profit Percentage

A **profit** occurs when the selling price is higher than the cost price. The profit percentage tells you the profit made for every $100 spent.

Formula:

Profit Percentage=(Profit/Cost Price)×100%

First, calculate the profit:

Profit=Selling Price−Cost Price

Example:

- A shop owner buys a hat for **$20** (CP).
- The owner sells the hat for **$25** (SP).

1. **Calculate the profit:** 25−20=5 The profit is $5.

2. **Calculate the profit percentage:** (5/20)×100%=25% The shop owner made a **25% profit** on the hat.

Loss Percentage

A **loss** occurs when the selling price is lower than the cost price. The loss percentage tells you the loss incurred for every $100 spent.

Formula:

Loss Percentage=(Loss/Cost Price)×100%

First, calculate the loss:

Loss=Cost Price−Selling Price

Example:

- A shop owner buys a shirt for **$30** (CP).
- The owner sells the shirt for **$24** (SP).

1. **Calculate the loss:** 30−24=6 The loss is $6.
2. **Calculate the loss percentage:** (6/30)×100%=20% The shop owner had a **20% loss** on the shirt.

4. CHARGE GIVEN ON BORROWED MONEY OR SIMPLE INTEREST(उधार ली गई धनराशि या साधारण ब्याज पर दिया गया शुल्क):

Simple interest is the charge given on borrowed money. It's the most basic type of interest, calculated only on the original amount of money borrowed or lent, called the **principal**.

Simple Interest Formula

You can calculate simple interest using this formula:

$$SI=\frac{P\times R\times T}{100}$$

Where:

- I = Simple **Interest**
- P = The **Principal** amount (the initial amount of money borrowed or lent).
- R = The **Interest Rate** (the percentage charged, expressed as a decimal).
- T = The **Time** period of the loan (usually in years).

To use the formula, you need to convert the interest rate percentage to a decimal by dividing it by 100.

Example

Let's say you borrow **$1,000** at an annual simple interest rate of **5%** for **3 years**.

1. **Identify the variables:**
   - Principal (P) = $1,000
   - Rate (R) = 5% = 5÷100=0.05
   - Time (T) = 3 years
2. **Calculate the interest:** I=1,000×0.05×3=150 The total interest you will pay is **$150**.
3. **Calculate the total amount to repay:** Total Amount = Principal + Interest 1,000+150=1,150 You will repay a total of **$1,150**.

- **Interest for Multiple years(कई वर्षों के लिए ब्याज):**

The **Simple Interest (SI)** formula for multiple years is:

$$SI=\frac{P\times R\times T}{100}$$

Where:

- **P** = Principal (the original money you kept)
- **R** = Rate of interest (per year, in %)
- **T** = Time (number of years)

Total Amount (A) after T years:

$$A=P+SI$$

Example with ₹1,000, 10% rate, 3 years:

$$SI=\frac{1000\times 10\times 3}{100}=300$$