

Simple Interest and compound Interest

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Aug-Dec 2025

The concepts of Simple Interest and Compound Interest are fundamental in finance and everyday life, especially for students learning about money, loans, and investments. Understanding these concepts helps students make better decisions about borrowing, saving, and investing money.

Simple Interest

Simple Interest is the interest calculated only on the original principal amount, or the initial sum of money invested or borrowed. The interest remains constant over time because it does not include interest on interest. This makes it straight forward and easy to understand.

Simple Interest Formula:

$$\text{Simple Interest (SI)} = P \times R \times T / 100$$

Where:

- P = Principal amount (initial money)
- R = Rate of interest per year (in %)
- T = Time period (years)

Example of Simple Interest:

Suppose a student borrows ₹50,000 from a bank at an interest rate of 5% per annum for 3 years. The simple interest will be:

$$SI = 50,000 \times 5 \times 3 / 100 = ₹7,500$$

So, the total amount to be repaid after 3 years is ₹50,000 (principal) + ₹7,500 (interest) = ₹57,500.

Compound Interest

Compound Interest is the interest calculated on both the principal amount and the interest that accumulates on the principal over previous periods. This means the interest grows faster because you earn "interest on interest." It is widely used for investments and long-term savings.

Compound Interest Formula:

$$A=P(1+R/100)^T$$

$$\text{Compound Interest (CI)}=A-P$$

Where:

- A = Amount after time T
- P = Principal amount
- R = Rate of interest per year (in %)
- T = Time period (years)

Example of Compound Interest:

If the same student invests ₹50,000 in a savings account with an annual compound interest rate of 5% for 3 years, the amount after 3 years will be:

$$\begin{aligned}A &= 50,000 \times (1+5/100) \\ &= 50,000 \times (1.157625) \\ &= ₹57,881.\end{aligned}$$

The compound interest earned is:

$$CI = ₹57,881.25 - ₹50,000 = ₹7,881.25$$

This is slightly higher than the simple interest earned because interest accumulates on interest.

Key Differences Between Simple and Compound Interest

Aspect	Simple Interest	Compound Interest
Calculation Base	Only on the principal amount	On principal + accumulated interest
Interest Growth	Linear, remains the same each period	Exponential, grows because of interest on interest

Aspect	Simple Interest	Compound Interest
Total Amount after Time	Principal + fixed interest	Principal + interest that grows each period
Use Case	Short-term loans, simple investments	Long-term investments, savings accounts
Example	₹7,500 interest on ₹50,000 at 5% for 3 years	₹7,881.25 interest on ₹50,000 at 5% compounded for 3 years

Simple interest is easy to calculate and best for short-term borrowing or fixed investments. Compound interest, however, provides greater returns over time and is ideal for long-term savings or investments. For students, understanding these differences can help in managing loans wisely and making informed investment plans.