

## Chapter 9

SIMPLE AND  
COMPOUND INTEREST

In the previous classes, you have already learnt about simple interest and other related terms. You have also solved many problems on simple interest. In this chapter, we shall refresh those concepts and solve slightly tougher problems and shall also learn about compound interest.

## SIMPLE INTEREST

**Principal.** The money borrowed (lent or invested) is called **principal**.

**Interest.** The additional money paid by the borrower to the moneylender in lieu of the money used is called **interest**.

**Amount.** The total money paid by the borrower to the moneylender is called **amount**. Thus, **amount = principal + interest**.

**Rate.** It is the interest paid on ₹100 for specified period.

**For example :**

(i) Rate of  $6\frac{1}{4}\%$  per annum means that the interest paid on ₹100 for one year is ₹ $6\frac{1}{4}$ .

(ii) Rate of 1.25% per month means that the interest paid on ₹100 for one month is ₹1.25.

(iii) Rate of 2.5% per quarterly means that the interest paid on ₹100 for 3 months is ₹2.5.

However, if the time period for the interest rate is not given, then we shall take the time period as one year.

**Time.** It is the time for which the money is borrowed (or invested).

**Simple interest.** It is the interest calculated on the original money (principal) at given rate of interest for any given time.

Simple interest is given by the formula :

$$\text{Simple interest} = \frac{\text{Principal} \times \text{Rate} \times \text{Time}}{100}$$

**In solving problems on simple interest, remember the following :**

If P denotes the principal, R the rate of interest, T the time for which the money is borrowed (or invested), I (or S.I.) the simple interest and A the amount, then

$$* I = \frac{P \times R \times T}{100}$$

$$* P = \frac{I \times 100}{R \times T}, R = \frac{I \times 100}{P \times T}, T = \frac{I \times 100}{P \times R}$$

$$* A = P + I = P + \frac{P \times R \times T}{100} = \left(1 + \frac{R \times T}{100}\right)P$$

## SIMPLE COMPOUND INTEREST

For counting the time between two given dates, only one of the two dates is counted (either first or last). Usually, we exclude the date of start and include the date of return.

For converting the time in days into years, always divide by 365, whether it is a leap year or not.

The time must be taken in accordance with the interest rate percent. Thus, if the interest rate is per month then time must be taken in months.

**Example 1.**

Find the simple interest on ₹ 7850 at 7.5% per annum for 3 years 4 months. Also find the amount.

**Solution.**

Here, P (principal) = ₹ 7850, R (rate of interest) = 7.5% p.a.,

T (time) = 3 years 4 months =  $3\frac{4}{12}$  years =  $3\frac{1}{3}$  years =  $\frac{10}{3}$  years.

$$\begin{aligned}\therefore I (\text{simple interest}) &= \frac{P \times R \times T}{100} = ₹ \frac{7850 \times 7.5 \times \frac{10}{3}}{100} \\ &= ₹ (785 \times 2.5) = ₹ 1962.50\end{aligned}$$

$$\text{Amount} = P + I = ₹ 7850 + ₹ 1962.50 = ₹ 9812.50.$$

**Example 2.**

Find the simple interest on ₹ 15840 at  $6\frac{2}{3}\%$  per annum from 18th October 2011 to 12th March 2012. Also find the amount.

**Solution.**

Here, P = ₹ 15840, R =  $6\frac{2}{3}\%$  p.a. =  $\frac{20}{3}\%$  p.a.,

October	November	December	January	February	March
T = 13	+ 30	+ 31	+ 31	+ 29	+ 12
(31 - 18)				(leap year)	

$$= 146 \text{ days} = \frac{146}{365} \text{ years} = \frac{2}{5} \text{ years}$$

$$\begin{aligned}\therefore I (\text{simple interest}) &= \frac{P \times R \times T}{100} = ₹ \frac{15840 \times \frac{20}{3} \times \frac{2}{5}}{100} \\ &= ₹ \frac{1584 \times 4}{15} = ₹ 422.40\end{aligned}$$

$$\text{Amount} = P + I = ₹ 15840 + ₹ 422.40 = ₹ 16262.40.$$

**Example 3.**

What sum of money will fetch ₹ 661.50 as simple interest in one year 9 months at  $6\frac{2}{3}\%$  per annum?

**Solution.**

Let the sum of money (principal) be ₹ P.

Interest = ₹ 661.50 = ₹  $\frac{1323}{2}$ , rate =  $6\frac{2}{3}\%$  p.a. =  $\frac{20}{3}\%$  p.a.,

time = 1 year 9 months =  $1\frac{9}{12}$  years =  $1\frac{3}{4}$  years =  $\frac{7}{4}$  years.

Using  $P = \frac{I \times 100}{R \times T}$ , we get

$$P = \frac{\frac{1323}{2} \times 100}{\frac{20}{3} \times \frac{7}{4}} = \frac{1323}{2} \times 100 \times \frac{3}{20} \times \frac{4}{7} = \frac{1323 \times 5 \times 6}{7} = 5670$$

Hence, the required sum of money = ₹ 5670.

**Example 4.** How long will it take for ₹ 5660 invested at 10% per annum simple interest to amount to ₹ 7641?

**Solution.**

Here,  $P = ₹ 5660$ ,  $A = ₹ 7641$ ,  $R = 10\%$  p.a.

$$I = A - P = ₹ 7641 - ₹ 5660 = ₹ 1981$$

Let  $T$  years be the required time.

$$\text{Using } T = \frac{I \times 100}{P \times R}, \text{ we get } T = \frac{1981 \times 100}{5660 \times 10} = \frac{1981}{566} = \frac{7}{2} = 3\frac{1}{2}.$$

Hence, the required time =  $3\frac{1}{2}$  years = 3 years 6 months.

**Example 5.** In what time will the simple interest on a certain sum of money at  $6\frac{1}{4}\%$  per annum be  $\frac{3}{8}$  of itself?

**Solution.**

Let the sum of money (principal) be ₹  $P$ , then

$$\text{Interest} = \frac{3}{8} \text{ of } ₹ P = ₹ \frac{3}{8} P$$

$$\text{Rate of simple interest} = 6\frac{1}{4}\% \text{ p.a.} = \frac{25}{4}\% \text{ p.a.}$$

Let  $T$  years be the required time

$$\text{Using, } T = \frac{I \times 100}{P \times R}, \text{ we get } T = \frac{\frac{3}{8} P \times 100}{P \times \frac{25}{4}} = \frac{3}{8} \times 100 \times \frac{4}{25} = 6.$$

Hence, the required time = 6 years.

**Example 6.** If the interest charged for 9 months be 0.09 times the money borrowed, find the rate of simple interest per annum.

**Solution.**

Let the money borrowed (principal) be ₹  $P$ , then

$$I \text{ (simple interest)} = 0.09 \text{ of } ₹ P = ₹ \frac{9}{100} P$$

$$\text{Time} = 9 \text{ months} = \frac{9}{12} \text{ years} = \frac{3}{4} \text{ years.}$$

Let  $R$  be the rate percent of simple interest per annum.

$$\text{Using } R = \frac{I \times 100}{P \times T}, \text{ we get } R = \frac{\frac{9}{100} P \times 100}{P \times \frac{3}{4}} = 9 \times \frac{4}{3} = 12.$$

Hence, the rate of simple interest per annum = 12%.

**Example 7.** At what rate percent simple interest will a sum of money will amount to  $\frac{5}{3}$  of itself in 6 years 8 months?

**Solution.**

Let the principal be ₹  $P$ , then

$$\text{amount} = \frac{5}{3} \text{ of } ₹ P = ₹ \frac{5}{3} P$$

$$I \text{ (Interest)} = \text{amount} - \text{principal} = ₹ \frac{5}{3} P - ₹ P$$

$$= ₹ \left( \frac{5}{3} P - P \right) = ₹ \left( \frac{5}{3} - 1 \right) P = ₹ \frac{2}{3} P$$

$$\text{Time} = 6 \text{ years } 8 \text{ months} = 6\frac{8}{12} \text{ years} = 6\frac{2}{3} \text{ years} = \frac{20}{3} \text{ years}$$

Let  $R$  be the rate percent per annum of simple interest.

$$\text{Using } R = \frac{I \times 100}{P \times T}, \text{ we get } R = \frac{\frac{2}{3}P \times 100}{P \times \frac{20}{3}} = \frac{200}{3} \times \frac{3}{20} = 10.$$

Hence, the required rate of interest = 10% per annum.

**Example 8.**

What sum of money will amount to ₹ 4230 in  $2\frac{1}{2}$  years at 7% per annum simple interest?

**Solution.**

Let the sum of money (principal) be ₹  $P$ .

$$A \text{ (amount)} = ₹ 4230, T \text{ (time)} = 2\frac{1}{2} \text{ years} = \frac{5}{2} \text{ years,}$$

$$R \text{ (rate)} = 7\% \text{ per annum}$$

Using the formula  $A = \left(1 + \frac{R \times T}{100}\right)P$ , we get

$$4230 = \left(1 + \frac{7 \times \frac{5}{2}}{100}\right)P = \left(1 + \frac{7}{40}\right)P = \frac{47}{40}P \Rightarrow P = \frac{4230 \times 40}{47} = 3600.$$

Hence, the required sum of money = ₹ 3600.

**Example 9.**

At a certain rate of simple interest, ₹ 3200 becomes ₹ 4000 in 2 years. What sum of money will become ₹ 7755 in 3 years at the same rate of interest?

**Solution.**

$$\text{Here, } P = ₹ 3200, A = ₹ 4000, T = 2 \text{ years}$$

$$I = A - P = ₹ 4000 - ₹ 3200 = ₹ 800$$

Let the rate of simple interest be  $R\%$  per annum, then

$$R = \frac{I \times 100}{P \times T} = \frac{800 \times 100}{3200 \times 2} = \frac{25}{2}.$$

Hence, the rate of simple interest is  $\frac{25}{2}\%$  p.a.

$$\text{Now, } A = ₹ 7755, R = \frac{25}{2}\% \text{ p.a., } T = 3 \text{ years}$$

Let the required sum of money (principal) be ₹  $P$

Using the formula  $A = \left(1 + \frac{R \times T}{100}\right)P$ , we get

$$7755 = \left(1 + \frac{\frac{25}{2} \times 3}{100}\right)P = \left(1 + \frac{3}{8}\right)P = \frac{11}{8}P \Rightarrow P = \frac{7755 \times 8}{11} = 5640$$

Hence, the required sum of money = ₹ 5640.

**Example 10.**

The amounts of a certain sum of money with simple interest at a certain rate of interest are ₹ 5440 in 3 years and ₹ 6400 in 5 years. Find the sum and the rate of interest.

**Solution.**

$$\text{Amount in 3 years} = ₹ 5440 \text{ and amount in 5 years} = ₹ 6400$$

$$\therefore \text{Principal} + \text{Interest of 3 years} = ₹ 5440 \quad \dots(i)$$

$$\text{and Principal} + \text{Interest of 5 years} = ₹ 6400 \quad \dots(ii)$$

Subtracting (i) from (ii), we get

Interest of 2 years = ₹ 960

$$\therefore \text{Interest of 1 year} = ₹ \frac{960}{2} = ₹ 480$$

$$\therefore \text{Interest of 3 years} = ₹ (480 \times 3) = ₹ 1440$$

$$\therefore \text{From (i), Principal} + ₹ 1440 = ₹ 5440$$

$$\Rightarrow \text{Principal} = ₹ 5440 - ₹ 1440 = ₹ 4000$$

Let the rate of simple interest be  $R\%$  p.a., then

$$R = \frac{I \times 100}{P \times T} = \frac{480 \times 100}{4000 \times 1} = 12$$

Hence, the required sum is ₹ 4000 and rate of interest is 12%.

### Example 11.

A sum of money lent at 12% per annum simple interest for 3 years yields a certain amount of interest. If lent for 5 years, it would have yielded ₹ 2040 more. Find the sum.

### Solution.

Let the sum of money (principal) lent be ₹  $P$ , Rate = 12% p.a.

$$\text{Interest for 3 years} = ₹ \frac{P \times 12 \times 3}{100} = ₹ \frac{9}{25} P$$

$$\text{Interest for 5 years} = ₹ \frac{P \times 12 \times 5}{100} = ₹ \frac{3}{5} P$$

$$\text{According to given information, } \frac{3}{5} P - \frac{9}{25} P = 2040 \quad (\text{Multiply by 25})$$

$$\Rightarrow 15P - 9P = 2040 \times 25 \Rightarrow 6P = 2040 \times 25$$

$$\Rightarrow P = \frac{2040 \times 25}{6} = 340 \times 25 = 8500$$

Hence, the required sum of money = ₹ 8500.

### Example 12.

Divide ₹ 6600 into two parts so that S.I. on the first part for 3 years at 10% p.a. is equal to S.I. on the second part for 4 years at 9% p.a.

### Solution.

Let the first part be ₹  $x$ , then the second part = ₹  $(6600 - x)$

According to given information,

$$\text{S.I. on ₹ } x \text{ for 3 years at 10\% p.a.} = \text{S.I. on ₹ } (6600 - x) \text{ for 4 years at 9\%}$$

$$\Rightarrow ₹ \frac{x \times 10 \times 3}{100} = ₹ \frac{(6600 - x) \times 9 \times 4}{100} \quad \left| \text{S.I.} = \frac{P \times R \times T}{100} \right.$$

$$\Rightarrow \frac{30x}{100} = \frac{36(6600 - x)}{100} \Rightarrow 30x = 36(6600 - x)$$

$$\Rightarrow 5x = 6(6600 - x) \Rightarrow 5x = 6 \times 6600 - 6x$$

$$\Rightarrow 5x + 6x = 6 \times 6600 \Rightarrow 11x = 6 \times 6600$$

$$\Rightarrow x = 6 \times 600 \Rightarrow x = 3600$$

$$\therefore \text{First part} = ₹ 3600, \text{ second part} = ₹ (6600 - 3600) = ₹ 3000.$$

## Exercise 9.1

1. Find the simple interest on :

(i) ₹ 4000 at  $7\frac{1}{2}\%$  p.a. for 3 years 3 months

(ii) ₹ 1200 at 6% p.a. for  $6\frac{2}{3}$  months

Where is S.I used?  
e.c.I used?

- (iii) ₹ 2688 at 7.5% p.a. for 3 years 5 months  
 (iv) ₹ 5000 for 1 year 3 months at 7 paise per rupee per annum  
 (v) ₹ 1360 for 1 year 4 months at 1.25% per month.

Also find the amount in each case.

- Find the simple interest and the amount of ₹ 3675 at  $8\frac{1}{3}\%$  from 10th December 2011 to 4th May 2012.
- What sum of money will yield ₹ 170.10 as simple interest in 2 years 3 months at 6% per annum?
- Find the rate of interest when ₹ 800 fetches ₹ 130 as simple interest in 2 years 6 months.
- Find the time when simple interest on ₹ 3.3 lakhs at 6.5% per annum is ₹ 75075.
- Find the sum of money when
  - simple interest at  $7\frac{1}{4}\%$  p.a. for  $2\frac{1}{2}$  years is ₹ 2356.25
  - final amount is ₹ 11300 at 4% p.a. for 3 years 3 months.
- A man borrowed ₹ 1500 on 1st April and returned ₹ 1572 on 13th June same year. Find the rate of interest charged.
- The interest on a sum of money at the end of 5 years is  $\frac{3}{5}$ th of the sum. Find the rate of interest.
- How long will it take a certain sum of money to triple itself at  $13\frac{1}{3}\%$  per annum simple interest?
- At a certain rate of simple interest ₹ 4050 amounts to ₹ 4576.50 in 2 years. At the same rate of simple interest, how much would ₹ 1 lakh amount to in 3 years?
- What sum of money invested at 7.5% p.a. simple interest for 2 years produces twice as much interest as ₹ 9600 in 3 years 6 months at 10% p.a. simple interest?

[Hint. Let the money invested be ₹ P. According to given information,

$$\text{₹ } \frac{P \times 7.5 \times 2}{100} = \text{twice of ₹ } \frac{9600 \times 10 \times \frac{7}{2}}{100} .]$$

- What sum of money invested at 7.5% per annum will yield the same simple interest in 4 years as ₹ 5000 yields in 5 years at 9% per annum?
- A certain sum of money amounts to ₹ 7650 in 4 years and to ₹ 8100 in 6 years. Find the sum and the rate of simple interest.
- If the simple interest on ₹ 3600 is more than the interest on ₹ 3200 by ₹ 108 in 3 years, find the rate of interest.

## COMPOUND INTEREST

→ Practically

Till now, you have learnt about simple interest. In simple interest, the principal remains constant for the whole loan period. However, in practice, the method according to which banks, post offices, insurance companies and other financial institutions calculate interest is different from the one given above.

These institutions calculate the interest for one year. Then the yearly interest is added to the principal and the amount so obtained is treated as the principal for calculating

the interest for the second year and so on. This process is repeated until the amount for the whole loan period is found.

The difference between the final amount and the original principal (money borrowed) is called the **compound interest**.

Compound interest in short is written as C.I.



### Remark

In case of simple interest, the principal remains constant for the whole loan period but in case of compound interest, the principal goes on changing every year.

### Example 1.

Calculate the compound interest on ₹ 12500 for 2 years at 6% per annum.

#### Solution.

Rate of interest = 6% per annum, Principal for the first year = ₹ 12500.

$$\text{Interest for the first year} = ₹ \frac{12500 \times 6 \times 1}{100} = ₹ 750$$

$$\text{Amount at the end of first year} = ₹ 12500 + ₹ 750 = ₹ 13250$$

$$\text{Principal for the second year} = ₹ 13250$$

$$\text{Interest for the second year} = ₹ \frac{13250 \times 6 \times 1}{100} = ₹ 795$$

$$\text{Amount at the end of second year} = ₹ 13250 + ₹ 795 = ₹ 14045$$

$$\begin{aligned} \therefore \text{Compound interest for 2 years} &= \text{final amount} - (\text{original}) \text{ principal} \\ &= ₹ 14045 - ₹ 12500 = ₹ 1545. \end{aligned}$$

**Note.** The compound interest may also be obtained by adding together the interest of consecutive years.

Thus, in the above example,

$$\begin{aligned} \text{compound interest for 2 years} &= \text{interest of 1st year} + \text{interest of 2nd year} \\ &= ₹ 750 + ₹ 795 = ₹ 1545. \end{aligned}$$

### Example 2.

Kapil invests ₹ 12000 for 3 years at 10% per annum compound interest in Bank of Baroda. Calculate :

(i) the compound interest for the second year.

(ii) the compound interest for the third year.

#### Solution.

Rate of interest = 10% per annum

(i) Principal for the first year = ₹ 12000

$$\text{Interest for the first year} = ₹ \frac{12000 \times 10 \times 1}{100} = ₹ 1200$$

$$\text{Amount at the end of first year} = ₹ 12000 + ₹ 1200 = ₹ 13200$$

$$\text{Principal for the second year} = ₹ 13200$$

$$\text{Interest for the second year} = ₹ \frac{13200 \times 10 \times 1}{100} = ₹ 1320$$

$$\therefore \text{Compound interest for the second year} = ₹ 1320.$$

(ii) Amount at the end of second year = ₹ 13200 + ₹ 1320 = ₹ 14520

$$\text{Principal for the third year} = ₹ 14520$$

$$\text{Interest for the third year} = ₹ \frac{14520 \times 10 \times 1}{100} = ₹ 1452$$

$$\therefore \text{Compound interest for the third year} = ₹ 1452.$$

**Example 3.**

Calculate the amount and the compound interest on ₹ 20000 for three years at 8% per annum.

**Solution.**

Rate of interest = 8% per annum,

Principal for the first year = ₹ 20000

$$\text{Interest for the first year} = ₹ \frac{20000 \times 8 \times 1}{100} = ₹ 1600$$

$$\text{Amount at the end of first year} = ₹ 20000 + ₹ 1600 = ₹ 21600$$

Principal for the second year = ₹ 21600

$$\text{Interest for the second year} = ₹ \frac{21600 \times 8 \times 1}{100} = ₹ 1728$$

$$\text{Amount at the end of second year} = ₹ 21600 + ₹ 1728 = ₹ 23328$$

Principal for the third year = ₹ 23328

$$\text{Interest for the third year} = ₹ \frac{23328 \times 8 \times 1}{100} = ₹ 1866.24$$

$$\text{Amount at the end of third year} = ₹ 23328 + ₹ 1866.24 = ₹ 25194.24$$

$$\begin{aligned} \therefore \text{Compound interest for 3 years} &= \text{final amount} - (\text{original}) \text{ principal} \\ &= ₹ 25194.24 - ₹ 20000 = ₹ 5194.24 \end{aligned}$$

$$\begin{aligned} \text{or compound interest for 3 years} &= \text{interest of 1st year} + \text{interest of 2nd} \\ &\quad \text{year} + \text{interest of 3rd year} \\ &= ₹ 1600 + ₹ 1728 + ₹ 1866.24 \\ &= ₹ 5194.24 \end{aligned}$$

$$\text{Hence, amount} = ₹ 25194.24 \text{ and compound interest} = ₹ 5194.24$$

**Example 4.**

Swati took a loan of ₹ 8000 from State Bank of India for 3 years at the rate of 12.5% p.a., compounded annually. Find the amount and the compound interest she has to pay at the end of 3 years to clear her debt, to the nearest rupee.

**Solution.**

$$\text{Rate of interest} = 12.5\% = \frac{25}{2}\% \text{ p.a.}$$

Principal for the first year = ₹ 8000

$$\text{Interest for the first year} = ₹ \frac{8000 \times \frac{25}{2} \times 1}{100} = ₹ 1000$$

$$\text{Amount at the end of first year} = ₹ 8000 + ₹ 1000 = ₹ 9000$$

Principal for the second year = ₹ 9000

$$\text{Interest for the second year} = ₹ \frac{9000 \times \frac{25}{2} \times 1}{100} = ₹ 1125$$

$$\text{Amount at the end of second year} = ₹ 9000 + ₹ 1125 = ₹ 10125$$

Principal for the third year = ₹ 10125

$$\text{Interest for the third year} = ₹ \frac{10125 \times \frac{25}{2}}{100} = ₹ 1265.625$$

$$\text{Amount at the end of 3 years} = ₹ 10125 + ₹ 1265.625 = ₹ 11390.625$$

$\therefore$  Swati has to pay ₹ 11390.625 i.e. ₹ 11391

(to the nearest rupee) to clear her debt.

$$\begin{aligned} \text{Compound interest paid by Swati} &= \text{final amount} - (\text{original}) \text{ principal} \\ &= ₹ 11391 - ₹ 8000 \\ &= ₹ 3391 \text{ (to the nearest rupee).} \end{aligned}$$

**Example 5.**

Calculate the amount due and the compound interest on ₹ 10000 in 2 years when the rate of interest on successive years is 8% and 9% respectively.

**Solution.**

Principal for the first year = ₹ 10000, rate = 8% p.a.

$$\text{Interest for the first year} = ₹ \frac{10000 \times 8 \times 1}{100} = ₹ 800$$

Amount at the end of first year = ₹ 10000 + ₹ 800 = ₹ 10800

Principal for the second year = ₹ 10800, rate = 9% p.a.

$$\text{Interest for the second year} = ₹ \frac{10800 \times 9 \times 1}{100} = ₹ 972$$

Amount at the end of second year = ₹ 10800 + ₹ 972 = ₹ 11772

$\therefore$  Amount due after 2 years = ₹ 11772

$$\begin{aligned} \text{Compound interest for 2 years} &= \text{final amount} - (\text{original}) \text{ principal} \\ &= ₹ 11772 - ₹ 10000 = ₹ 1772. \end{aligned}$$

**Exercise 9.2**

- Calculate the compound interest on ₹ 6000 at 10% per annum for two years.
- Salma borrowed from Mahila Samiti a sum of ₹ 1875 to purchase a sewing machine. If the rate of interest is 4% per annum, what is the compound interest that she has to pay after 2 years?
- Find the amount and the compound interest on ₹ 8000 at 7% per annum for 2 years.
- Jacob invests ₹ 12000 for 3 years at 10% per annum. Calculate the amount and the compound interest that Jacob will get after 3 years.
- To renovate his shop, Gautam borrowed ₹ 16000 from Vijaya Bank for 3 years at the rate of 15% per annum. What amount will he pay to the bank to clear his debt after 3 years?
- A man invests ₹ 46875 at 4% per annum compound interest for 3 years. Calculate :
  - the interest for the first year.
  - the amount standing to his credit at the end of second year.
  - the interest for the third year.
- Calculate the compound interest for the second year on ₹ 6000 invested for 3 years at 10% p.a. Also find the sum due at the end of third year.
- Calculate the amount and the compound interest on ₹ 5000 in 2 years when the rate of interest for successive years is 6% and 8% respectively.
- Calculate the difference between the compound interest and the simple interest on ₹ 20000 in 2 years at 8% per annum.

## Summary

- ➔ The money borrowed (lent or invested) is called principal (P).
- ➔ The additional money paid by the borrower to the moneylender in lieu of the money used is called interest (I).
- ➔ The total money paid by the borrower to the moneylender is called amount (A). Thus, amount = principal + interest *i.e.*  $A = P + I$ .
- ➔ The interest paid on ₹ 100 for a specified period is called rate of interest (R).
- ➔ The time for which the money is borrowed (lent or invested) is called time (T).
- ➔ The simple interest is given by the formula :  $I = \frac{P \times R \times T}{100}$

This formula can also be written as :

$$P = \frac{I \times 100}{R \times T}, R = \frac{I \times 100}{P \times T}, T = \frac{I \times 100}{P \times R}$$

- ➔ In simple interest, the principal remains constant for the whole loan period whereas in compound interest, the principal goes on changing every year.
- ➔ In compound interest, the interest accrued at the end of first year is added to the (original) principal and the amount so obtained is treated as the principal for calculating the interest for the second year and so on. This process is repeated until the whole loan period.
- ➔ The difference between the final amount and the original principal is called the compound interest.
- ➔ Compound interest may also be obtained by adding together the interest of consecutive years.

## Check Your Progress

1. A man invested ₹ 2000 at a rate of interest of 1 paisa per rupee per month. What amount will he get after 4 months?
2. A sum of money doubles in 4 years. Calculate the rate of simple interest. At the same rate, how much time will it take to amount to four times of itself?
3. A sum of money lent at 8% per annum simple interest for 5 years yields a certain amount of interest. If lent for 7 years, it would have yielded ₹ 1200 more interest. Find the sum of money.
4. ₹ 4000 amounts to ₹ 5000 in 6 years. At the same rate of simple interest, how much would ₹ 2500 amount in 3 years?
5. What sum of money will amount to ₹ 5890 in 3 years 6 months at  $8\frac{1}{3}\%$  per annum simple interest?
6. How long will it take for a certain sum of money to amount to  $\frac{7}{5}$  of itself at the rate of 7.5% per annum simple interest?
7. A certain sum amounts to ₹ 7535 in 3 years and to ₹ 8905 in 5 years. Find the rate of simple interest and the sum.
8. Calculate the compound interest on ₹ 1850 at 10% per annum for two years.
9. Rajesh borrowed ₹ 50000 from Vijay at simple interest of 12% per annum for 2 years, but lent it to Sunder on the same day at 12% per annum compound interest for 2 years. Find his gain after 2 years.