Simple Interest

1. **Principal:**

   The money borrowed or lent out for a certain period is called the **principal** or the **sum.**

2. **Interest:**

   Extra money paid for using other's money is called **interest.**

3. Simple Interest (S.I.):

   If the interest on a sum borrowed for certain period is reckoned uniformly, then it is called **simple interest.**

   Let Principal = P, Rate = R% per annum (p.a.) and Time = T years. Then

   (i). Simple Intereest = $\left(\frac{P \times R \times T}{100}\right)$

   (ii). P = $\left(\frac{100 \times S.I.}{R \times T}\right)$; R = $\left(\frac{100 \times S.I.}{P \times T}\right)$ and T = $\left(\frac{100 \times S.I.}{P \times R}\right)$.

Find the simple interest on ₹200 for 5 years at 6% per annum.

We know,

for a principal P, rate of interest R and time T,

$$\text{Simple Interest} = \frac{P \times R \times T}{100}$$

Here, P = 200, R = 6 and T = 5

$$\text{Simple Interest} = \frac{200 \times 6 \times 5}{100}$$

$$= 2 \times 6 \times 5$$

$$= ₹60$$

In how many years will Rs1000 amounts to Rs1600 at the rate of 4% per annum simple interest?

Given, $P = Rs\ 1000$, $Amount = Rs\ 1600$, $R = 4\ \%$

We know that,

$$Amount = P + S.I.$$

$$S.I. = Amount - P$$

$$= 1600 - 1000$$

$$= 600\ Rs$$

Now,

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

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

$$= \frac{600 \times 100}{1000 \times 4}$$

$$= 15\ years$$

Therefore, time period will be of $15\ years$.

Arun took a loan of Rs. 1400 with simple interest for as many years as the rate of interest. If he paid Rs.686 as interest at the end of the loan period, what was the rate of interest?

Simple Interest (SI) = P N R / 100

P is the Principal loan amount = Rs.1400

N is the number of years of deposit

R is the rate of interest

It is given that the loan period is as many years as the rate of interest.

So, N = R

Interest at the end of the loan period (SI) = Rs.686

So,

686 = 1400 * R * R /100

R^2 = 686*100 /1400

R^2 = 49

R = 7%

A sum of money becomes 11/10 times in 4 years at what rate percent per annum

Sum = P, T =4, R= rate, After 4 years sum = $\frac{11}{10}P$

$$\text{S.I} = \frac{11}{10}P - P = \frac{P}{10}$$

$$\text{S.I} = \frac{P}{10} = \frac{P \times 4 \times R}{100} = \frac{10}{4} = 2\frac{1}{2}\% = R$$

A man borrows Rs 750 at 4% per annum and Rs.700 at 5% per annum for the same period. If he pays a sum of Rs.195 as total interest, find the time for which he borrowed the sum.

$$\frac{750 \times 4 \times n}{100} + \frac{700 \times 5 \times n}{100} = 195$$

$$30n + 35n = 195$$

$$65n = 195$$

$$n = \frac{195}{65} = 3$$

If the amount of Rs 450 in 4 years is Rs 540, what sum will amount to Rs 637.5 in 5yrs at the same rate of interest.

$$\frac{450 \times 4 \times R}{100} = 90 \Rightarrow R = 5\%$$

$$\frac{x \times 5 \times 5}{100} = 637.50 - x$$

$$\frac{x}{4} = 637.50 - x$$

$$5x = 637.50 \times 4$$

$$= 127.5 \times 4$$

$$= 510$$

A person borrows Rs 5000 for two years at 4% per annum simple interest. He immediately lends to another person at $6\frac{1}{4}\%$ per annum for 2 years. Find his gain in the transaction per year.

First case:

P = Rs. 5000, R = 4%, T = 2 years

Interest paid by him = Rs $\frac{5000 \times 4 \times 2}{100}$ = Rs 400

Second case:

P = Rs 5000, R = $\frac{25}{4}\%$, T = 2 years

Interest he received = Rs $\frac{5000 \times 6\frac{1}{4} \times 2}{100}$ = Rs $\frac{5000 \times 25 \times 2}{100 \times 4}$ = Rs 625

$\therefore$ his gain for two years = Rs 625 – Rs 400 = Rs 225

His gain per year = Rs $\frac{225}{2}$ = Rs 112.50

Divide Rs. 1586 in three parts such a way that their amounts at the end of 2, 3 and 4 years at 5% per annum simple interest be equal.

The ratio in which the sum was divided $= \frac{1}{r_1 t_1} : \frac{1}{r_2 t_2} : \frac{1}{r_3 t_3}$

$= \frac{1}{5 \times 2} : \frac{1}{5 \times 3} : \frac{1}{5 \times 4}$

$= \frac{1}{2} : \frac{1}{3} : \frac{1}{4}$

$= 6 : 4 : 3$

Hence, 1st part $= \text{Rs. } \frac{6}{13} \times 1586 = \text{Rs. } 732$

2^{nd} part $= \text{Rs. } \frac{4}{13} \times 1586 = \text{Rs. } 488$

3^{rd} part $= \text{Rs. } \frac{3}{13} \times 1586 = \text{Rs. } 366$

Adam borrowed some money at the rate of 6% p.a. for the first two years, at the rate of 9% p.a. for the next three years, and at the rate of 14% p.a. for the period beyond five years. If he pays a total interest of Rs 11,400 at the end of nine-year, how much money did he borrow?

Let the sum borrowed be x. Then,

$$\left(\frac{x \times 6 \times 2}{100}\right) + \left(\frac{x \times 9 \times 3}{100}\right) + \left(\frac{x \times 14 \times 4}{100}\right) = 11400$$

$$\Rightarrow \left(\frac{3x}{25} + \frac{27x}{100} + \frac{14x}{25}\right) = 11400 \Rightarrow \frac{95x}{100} = 11400$$

$$\Rightarrow x = \left(\frac{11400 \times 100}{95}\right) = 12000.$$

Hence, sum borrowed = Rs 12,000.

A sum of Rs. 1550 is lent out into two parts, one at 8% and another one at 6%. If the total annual income is Rs. 106, find the money lent at each rate.

Let the money lent at 8% be Rs. x. then,

$$\frac{x \times 8 \times 1}{100} + \frac{(1550 - x) \times 6 \times 1}{100} = 106$$

or $2x + 9300 = 10600$ or $x = 650$

Money lent at 6% = 1550-650 =900

A certain sum will be doubled in 15 years on simple interest at the rate_____

Given:

A = 2P

T = 15 years

$\therefore$ S.I = A – P = 2P – P = P

$\because \mathrm{S.I} = \frac{\mathrm{P}\times\mathrm{R}\times\mathrm{T}}{100}$

$\Rightarrow P = \frac{P\times R\times 15}{100}$

$\Rightarrow R = \frac{100}{15} = \frac{20}{3} = 6\frac{2}{3}$

$\therefore R = 6\frac{2}{3}\ \%\ p.a$