21. SIMPLE INTEREST

IMPORTANT FACTS AND FORMULA

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 a 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) S.I. = (P*R*T)/100

(ii) P=(100*S.I)/(R*T) ;R=(100*S.I)/(P*T) and T=(100*S.I)/(P*R)

SOLVED EXAMPLES

Ex. 1. Find the simple interest on Rs. 68,000 at 16 2/3% per annum for 9 months.

Sol. P = Rs.68000,R = 50/3% p.a and T = 9/12 years = 3/4years.

$\therefore$ S.I. = (P*R*T)/100 = Rs.$\left(68{,}000*(50/3)*(3/4)*(1/100)\right)$= Rs.8500

Ex. 2. Find the simple interest on Rs. 3000 at 6 1/4% per annum for the period from 4th Feb., 2005 to 18th April, 2005.

Sol. Time = (24+31+18)days = 73 days = 73/365 years = 1/5 years.

P = Rs.3000 and R = 6 ¼ %p.a = 25/4%p.a

$\therefore$ S.I. = Rs.$\left(3{,}000*(25/4)*(1/5)*(1/100)\right)$= Rs.37.50.

Remark : The day on which money is deposited is not counted while the day on which money is withdrawn is counted .

Ex. 3. A sum at simple interests at 13 ½ % per annum amounts to Rs.2502.50 after 4 years find the sum.

Sol. Let sum be Rs. x then , S.I.=Rs.$\left(x*(27/2)*4*(1/100)\right)$ = Rs.27x/50

$\therefore$ amount = $\left(\text{Rs. } x+(27x/50)\right)$ = Rs.77x/50

$\therefore$ 77x/50 = 2502.50 $\Leftrightarrow$ x = $\frac{2502.50 * 50}{77}$ = 1625

Hence , sum = Rs.1625.

Ex. 4. A sum of Rs. 800 amounts to Rs. 920 in 8 years at simple intere interest rate is increased by 8%, it would amount to bow mucb ?

Sol. S.l. = Rs. (920 - 800) = Rs. 120; p = Rs. 800, T = 3 yrs. _

. R = $\left((100 \text{ x } 120)/(800*3)\right)$ % = 5%.

New rate = (5 + 3)% = 8%.
New S.l. = Rs. (800*8*3)/100 = Rs. 192.

: New amount = Rs.(800+192) = Rs. 992.

Ex. 5. 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. 1£ he pays a total interest of Rs. 11, 400 at the end of nine years how much money did he borrow ?

Sol. Let the sum borrowed be x. Then,

(x*2*6)/100 + (x*9*3)/100 + (x*14*4)/100 = 11400

$\Leftrightarrow$ $\left(3x/25 + 27x/100 + 14x / 25\right)$ = 11400 $\Leftrightarrow$ 95x/100 = 11400 $\Leftrightarrow$ x = (11400*100)/95 = 12000.

Hence , sum borrowed = Rs.12,000.

Ex. 6. A certain sum of money amounts to Rs. 1008 in 2 years and to Rs.1164 in 3 ½ years. Find the sum and rate of interests.

Sol.. S.I. for 1 ½ years = Rs.(1164-1008) = Rs.156.

S.l. for 2 years = Rs.(156*(2/3)*2)=Rs.208

Principal = Rs. (1008 - 208) = Rs. 800.

Now, P = 800, T = 2 and S.l. = 208.

Rate =(100* 208)/(800*2)% = 13%

Ex. 7. At what rate percent per annum will a sum of money double in 16 years.

Sol.. Let principal = P. Then, S.l. = P and T = 16 yrs.

∴ Rate = (100 x P)/(P*16)% = 6 ¼ % p.a.

Ex. 8. The simple interest on a sum of money is 4/9 of the principal .Find the rate percent and time, if both are numerically equal.

Sol. Let sum = Rs. x. Then, S.l. = Rs. 4x/9

Let rate = R% and time = R years.

Then, (x*R*R)/100=4x/9 or R^2 =400/9 or R = 20/3 = 6 2/3.

∴ Rate = 6 2/3 % and Time = 6 2/3 years = 6 years 8 months.

Ex. 9. The simple interest on a certain sum of money for 2 l/2 years at 12% per annum is Rs. 40 less tban the simple interest on the same sum for 3 ½ years at 10% per annum. Find the sum.

Sol. Let the sum be Rs. *x* Then, $\left((x*10*7)/(100*2)\right) - \left((x*12*5)/(100*2)\right) = 40$

⇔ (7x/20)-(3x/10)=40
⇔*x* = (40 * 20) = 800.

Hence, the sum is Rs. 800.

Ex. 10. A sum was put at simple interest at a certain rate for 3 years. Had it been put at 2% higher rate, it would have fetched Rs. 360 more. Find the sum.

Sol. Let sum = P and original rate = R.

Then, $\left[\left(P*(R+2)*3\right)/100\right] - \left[\left(P*R*3\right)/100\right] = 360.$

⇔ 3PR + 6P - 3PR = 36000 ⇔ 6P=36000 ⇔ P=6000

Hence, sum = Rs. 6000.

Ex. 11. What annual instalment will discharge a debt of Rs. 1092 due in 3 years at 12% simple interest?

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Sol .Let each Instalment be Rs. *x*

Then, $\left(x+\left((x*12*1)/100\right)\right) + \left(x+\left((x*12*2)/100\right)\right) + x = 1092$

$\Leftrightarrow$ $((28x/25) + (31x/25) + x) = 1092$ $\Leftrightarrow$ $(28x+31x+25x)=(1092*25)$

$\Leftrightarrow$ $x= (1092*25)/84 = Rs.325.$

$\therefore$ Each instalment = Rs. 325.

Ex. 12. 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.

Sol. Let the sum lent at 8% be Rs. x and that at 6% be Rs. (1550 - *x).*

$\therefore \left((x*8*1)/100\right) + \left((1550-x)*6*1\right)/100=106$

$\Leftrightarrow 8x + 9300 - 6x=10600 \Leftrightarrow 2x = 1300 \Leftrightarrow x = 650.$

$\therefore$ Money lent at 8% = Rs. 650. Money lent at 6% = Rs. (1550 - 650) = Rs. 900.