Simple Interest & Compound Interest

A. Simple Interest:

principal – P.

Time – T

Rate of Interest – R.

Total Amount – A

$A = P + SI$

$$\text{Simple Interest (SI)} = \frac{PTR}{100}$$

Q1: What is the Simple Interest on Rs. 1000 for 5 years at the rate of 8% per annum? Also find the final value payable back.

$P = 1000$ Rs.

$T = 5$ years

$R = 8\%$ p.a.

$$SI = \frac{PTR}{100} = \frac{1000 \times 5 \times 8}{100} = 400 \text{ Rs.}$$

Amount = Principal + Interest (SI)

$= 1000 + 400$

$= 1400$.

Q2: A certain amount of money doubles itself every 4 yrs at a certain simple Interest. In how much time will it become six times itself.

Instant Method.:

* Substract '1' from the number of times that you want (Here six times)

  i.e. $6 - 1 = 5$

* Multiply itself by the time at which it becomes double. (4 yrs).

  i.e. $5 \times 4 = 20$

Hence the amount becomes '6' times in 20 yrs

Q3. A certain Amount of money becomes 3540 Rs. in 3 yrs. at 6% Interest rate. In how many years will it become Rs. 4260 at 7% Interest rate.

Case 1: $A = 3540$, $P = ?$, $T = 3$ yrs, $R = 6\%$.

$$A = P + SI$$

$$= P + \frac{PTR}{100}$$

$$A = \frac{100P + PTR}{100}$$

$$100 \times A = P(100 + TR)$$

$$\boxed{P = \frac{100 \times A}{100 + TR}} = \frac{100 \times 3540}{100 + 3 \times 6}$$

$$= \frac{100 \times 3540}{118}$$

$$= 3000$$

$P = 3000$

Case 2:

$A = 4260$

$P = 3000$ (from case 1)

$SI = 7\%$

$T = ?$

$$P = \frac{100 \times A}{100 + TR}$$

$$3000 = \frac{100 \times 4260}{100 + T \times 7}$$

$$100 + 7 \times T = \frac{4260\cancel{00}}{30\cancel{00}} = 142$$

$$7T = 42$$

$$T = \frac{42}{7} = 6 \text{ yrs}$$

Q4. An amount was invested at a simple Interest rate for 2 yrs. Had it been put at 4% higher rate, it would have fetched Rs. 400 more. Find the invested amount.

$$SI = \frac{P \times 2 \times R}{100} \quad \text{— (1)}$$

$$(SI + 400) = \frac{P \times 2 \times (R+4)}{100} \quad \text{— (2)}$$

$$\frac{SI}{(SI+400)} = \frac{\frac{P \times 2 \times R}{100}}{\frac{P \times 2 \times (R+4)}{100}}$$

$$SI \times P \times 2 \times (R+4) = P \times 2 \times R \times (SI + 400)$$

$$SI \times R + 4 \times SI$$

$$SI = \frac{2PR}{100}$$

$$SI + 400 = \frac{2P(R+4)}{100}$$

$$400 = \frac{2P(R+4)}{100} - \frac{2PR}{100}$$

$$= \frac{2PR}{100} + \frac{8P}{100} - \frac{2PR}{100}$$

$$P = \frac{400 \times 100}{8}$$

$$= 5000$$

Use direct formula:

$$\text{Principal} = \frac{\text{Additional Interest} \times 100}{\text{Additional rate} \times \text{time}}$$

$$= \frac{400 \times 100}{4 \times 2} = 5000$$

Q5. Find the simple Interest on Rs. 4000 at 3% per annum for 2 years. Also find the amount.

$P = 4000$ Rs.

$T = 2$ yrs.

$R = 3\%$ p.a.

$$SI = \frac{PTR}{100} = \frac{4000 \times 2 \times 3}{100} = \underline{240 \text{ Rs}}$$

$$A = P + SI = 4000 + 240 = \underline{4240}.$$

Q6. Saniya Invested Rs. 10,000 in a savings bank account at a rate of interest 2% per annum. Find simple interest & amount earned by Saniya if the amount was kept in bank for 4 years.

$P = 10,000$ Rs.

$T = 4$ yrs.

$R = 2\%$ p.a.

$$SI = \frac{10,000 \times 4 \times 2}{100} = 800 \text{ Rs.}$$

$$A = 10,000 + 800 = 10,800 \text{ Rs.}$$

Q7. Calculate the simple Interest on Rs. 9200 at 8% p.a. for 8 Months.

$8M = 8/12$ Yrs.

$$SI = \frac{9200 \times 8 \times 8/12}{100}$$

$$= \frac{1472}{3} = \underline{490.67}.$$

Q8: Calculate the Simple Interest on 7400 Rs. at 10% p.a. for 9 months

$$SI = \frac{7400 \times 10 \times 9/12}{100} = 740 \text{ Rs.}$$

$$= 185 \text{ Rs.}$$

Q9 Seema borrowed Rs. 3400 at the rate of 8% p.a. for 225 days. Find the Simple Interest.

$$SI = \frac{3400 \times 8 \times \frac{225}{365}}{100}$$

$$= \frac{272 \times 45}{73}$$

$$= \frac{12240}{73}$$

$$= 167\frac{49}{73}$$

$$= 167.67$$

Q10 Narayan Invested 4500 at the rate of 6% p.a. for 300 days. Find the amount he got backs.

$$SI = \frac{4500 \times 6 \times \frac{300}{365}}{100}$$

$$= \frac{270 \times 60}{73}$$

$$= \frac{16200}{73}$$

$$= 221\frac{16}{27} = 221.92$$

$$A = 4721.92$$

Q 11. If the simple Interest is Rs. 390 at 3% p.a. for 2 years. Find the principal & total amount?

$$SI = \frac{PTR}{100}$$

$$390 = \frac{P \times 6}{100}$$

$$P = 6500$$

$$A = 6500 + 390 = 6890$$

Q12: If the simple Interest is Rs. 500 at 4% p.a. for 2 years. Find the principal & amount.

$$500 = \frac{P \times 4 \times 2}{100}$$

$$\frac{500 \times 100}{8} = P$$

$$P = 6250$$

$$A = 6750$$

Q13: Kiran payed an amount of Rs. 2300 to a bank with a simple interest of 300 Rs. for 3 years. Find the principal & Rate of Interest.

$$P = 2300 - 300 = 2000$$

$$300 = \frac{2000 \times 3 \times R}{100} \quad = 5\%$$

Q14: Sanjay invested an amount of Rs. 4500 to bank with a simple Interest of 500 Rs. for 5 yrs. Find the principal & Rate of Interest.

$$\therefore P = A - SI$$

$$= 4500 - 500 = 4000$$

$$500 = \frac{4000 \times 5 \times R}{100} = 2.5\% \text{ p.a.}$$

Q 15. Find time when, Principal = 1500 Rs., Simple Interest = 450 Rs.
Rate = 5% p.a.

$$450 = \frac{1500 \times 5 \times T}{100} = 6 \text{ yrs}$$

Q 16. Find time when Principal = 3500 Rs, Simple Interest = 700 Rs.
Rate = 4% p.a.

$$700 = \frac{3500 \times 4 \times T}{100} \qquad T = 5 \text{ years}$$

EXERCISE:

I. Find the Amount & Simple Interest of the following

a. P = Rs. 4500, R = 3% p.a.
T = 2 years, A = ? S.I. = ?

b. P = Rs. 6800, R = 4% p.a.
T = 3 years, A = ? S.I. = ?

c. P = Rs. 2500, R = 3% p.a.
T = 8 months, A = ? S.I. = ?

d. P = Rs. 3000, R = 1% p.a.
T = 6 months, S.I. = ?

e. P = 5500 Rs., R = 3% p.a.
T = 150 days, S.I. = ?

f. P = 2000 Rs., R = 5% p.a.
T = 350 days, S.I. = ?

g. S.I. = Rs. 600, R = 4% p.a.
T = 4 years, P = ? A = ?

h. S.I. = Rs. 400, R = 2% p.a.
T = 5 years, P = ? A = ?

i. S.I. = Rs. 340, P = 4000 Rs.
T = 5 years, R = ? A = ?

j. S.I. = Rs. 280, P = Rs. 2800
T = 3 years, R = ? A = ?

k. S.I. = Rs. 460, P = Rs. 7000.
R = 2% p.a., T = ? A = ?

l. S.I. = Rs. 520, P = Rs. 3500
R = 4% p.a., T = ? A = ?

II. Solve the Following

a. A loan of Rs. 10,000 has been issued for 6 years. Calculate the amount to be repaid to the lender, if simple Interest is charged at 5% per year.

b. A woman has deposited Rs. 6000 in a saving account. Bank pays an interest at a rate of 9% per year. Find the amount of Interest that will be earned over 12 years.

c. Calculate the simple Interest on Rs. 8000 at 7% p.a. for 6 months.

d. Sneha Invested Rs. 1500 at the rate of 6% p.a. for 7 years & 3 months. Find the simple Interest.

e. Krishna Invested Rs. 6000 at the rate of 4% p.a. for 200 days. Find the amount he got back.

f. Chaitra borrowed Rs. 5000 at the rate of 2% p.a. for 120 days. Find the amount she has to pay after 120 days.

g. Find the principal & Amount when, time is 4 years, Interest is Rs. 400 & rate is 5% p.a.

h. Find the principal & Amount which gives an Interest of Rs. 516 at the rate of 8% for 5 years.

i. Find the rate of interest & amount when, principal is Rs. 6000, Interest is 900 & time is 7 years.

j. Find the rate of interest & amount when, Principal is Rs. 3500, Interest is Rs. 300 & time is 5 years.

k. Find the time & amount when principal = Rs. 500, Rate = 7.5% p.a., S.I. = 150 Rs.

l. Find the time & amount when principal = 7000 Rs., Rate = 4% p.a., S.I. = Rs. 400.