Interest & Discount

IMPORTANT FORMULA AND EQUATIONS

Principal:

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

Interest:

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

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

Key notes on Simple interest

- Definition of Amount:Is two equal principals are deposited for t1 and t2 years at r1% and r2% per annum such that the difference between their interests is D, then the principal can be obtained by P = Rs. D * 100 / r1t1 - r2t2.
- SI = A * R * T / 100 + R * T
- P = 100 * A / 100 + R * T
- If a principal P becomes 'a' times of itself in T1 years at R1% rate per annum and 'b' times in T2 years at R2%,
- then (i) a - 1 / T1 = b - 1 / T2
- (ii) a - 1 / R1 = b - 1 / R2
- If a person deposits Rs.x1 in a bank at r1% per annum and Rs.x2 at r2% per annum, then the interest for the whole sum is [x1r1 + x2r2 / x1 + x2]%.

- Is two equal principals are deposited for t1 and t2 years at r1% and r2% per annum such that the difference between their interests is D, then the principal can be obtained by P = Rs. D * 100 / r1t1 - r2t2.

- If some Principal of money at simple interest amounts to Rs. A 1 in T 1 years and Rs A 2 in T 2 years, then the sum and rate of interests are

  Principal $= \frac{A_1T_2 - A_2T_1}{T_2 - T_1}$

  Rate $= \frac{(A_2 - A_1) \times 100}{A_2T_1 - A_1T_2}$

- A sum of money becomes n times itself in T years at simple interest , then the rate of interest is

  Rate $= \frac{100(n-1)}{T}\%$

- If a sum of money becomes n times in T years at S.I then it will be m times of itself in ..... years

  Required time $= \frac{(m-1) \times T}{(n-1)}$ years

- If S.I on a sum of money is $\frac{1}{x}$ th of the principal and the time T is equal to the rate percent R then

  Rate = Time $= \sqrt{100\frac{1}{x}}$

- A certain sum is at S.I at a certain rate for T years. And if it had been put at R 1 % higher rate, then it would fetch Rs. x more Then the Principal $= \frac{x \times 100}{T \times R_1}$

- The annual payment that will discharge a debt of Rs. P due in T years at the rate of interest R% per annum is Annual payment $= \frac{100P}{100T + \frac{RT(T-1)}{2}}$

- Let the rate of interest for first t 1 years is r 1 % per annum, for the next t 2 years is r 2 % per annum and for the period beyond that is r 3 %

  Suppose all together the simple interest for t 3 years is Rs. I .Then

  Principal $= \frac{100 \times I}{t_1r_1 + t_2r_2 + (t_3 - t_1 - t_2)r_3}$

- The simple interest on a certain sum of money at r 1 % per annum for t 1 years is Rs. m .The interest on the same sum for t 2 years at r 2 % per annum is n

  Then the sum $= \frac{(m-n) \times 100}{r_1t_1 - r_2t_2}$