COMPOUND INTEREST

Compound interest

- **Principal**: The amount of money borrowed from someone or lent out to someone for a certain period is called principal.

- **Interest** : Extra money paid for the amount of money borrowed is called Interest.

- **Compound interest:** Compound interest is the interest that applies not only to the initial principal of an investment or a loan, but also to the accumulated interest from previous periods.

❖ **Let's Principal = P,   Rate = R%,   Time = N years.**

- **When interest is compounded annually :**

$$\text{Amount} = P\left[1 + \frac{R}{100}\right]^{N}$$

12 MONTHS

- **When interest is compounded Half-yearly :**

$$\text{Amount} = P\left[1 + \frac{\left(\frac{R}{2}\right)}{100}\right]^{2N}$$

6 MONTHS

- **When interest is compounded Quarterly :**

$$\text{Amount} = P\left[1 + \frac{\left(\frac{R}{4}\right)}{100}\right]^{4N}$$

3 MONTHS

- **When interest is compounded Annually but time is in fraction, say $3\frac{2}{5}$ years.**

$$\text{Amount} = P\left[1 + \frac{R}{100}\right]^3 * \left[1 + \frac{\left[\frac{2}{5}\right]R}{100}\right]$$

- **When rates are different for different years , say R1%, R2%, R3% for 1st , 2nd and 3rd year respectively.**

$$\text{Then Amount} = P\left[1 + \frac{R_1}{100}\right] * \left[1 + \frac{R_2}{100}\right] * \left[1 + \frac{R_3}{100}\right]$$

- **If the difference between Compound Interest and Simple Interest given**

  For 2 years:

  $$\text{Difference} = P\left[\frac{R}{100}\right]^2$$

  For 3 years:

  $$\text{Difference} = P\left[\frac{R}{100}\right]^2 * \left[\frac{300+R}{100}\right]$$

BASIC PROBLEMS:

1) Find the C.I on 10000 .
   - (i)   R% = 10%, for 2 years **Ans: 2100**
   - (ii)   R% = 10%, for 3 years **Ans: 3310**
   - (iii) Find the $1/11^{th}$ of the C.I received on the sum of 10000 if the compound interest rate is 20% for 2 years. **Ans: 400**

2) Find the compound interest (CI) on Rs. 12,600 for 2 years at 10% per annum compounded annually. **Ans: 2646**

3) A sum becomes Rs. 1,352 in 2 years at 4% per annum compound interest. The sum is **Ans: 1250**

4) A certain sum of money yields Rs. 1261 as compound interest for 3 years at 5% per annum. The sum is **Ans: 8000**

MODEL : 1

1) Find compound interest on Rs.10,000 at 12% per annum for 2 years 5 months, compounded annually (**approx**).
   - **a) 2965**   **b) 3171**   **c) 3256**   **d) 3393**

2) Find compound interest on Rs.8000 at 15% per annum for 2 years 4 months, compounded annually.
   - **a) 3109**   **b) 3239**   **c) 3456**   **d) 2968**

3) Find the compound interest on Rs 48,000 for one year at 8% per annum when compounded half-yearly.

   a) 3145.60   b) 3256.86   c) 3916.80   d) 3569.42

4) The compound interest on Rs.16,000 for 9 months at 20% per annum, interest being compounded quarterly, is

   a) 2428   b) 2522   c) 2689   d) 2722

5) If the rate of interest be 4% per annum for first year, 5% per annum for second year and 10% per annum for third year, then the compound interest of Rs.10,000 for 3 years will be

   a) 2156   b) 2024   c) 2018   d) 2012

MODEL : 2

1) A sum of Rs. 2000 amounts to Rs. 4000 in two years at compound interest. In how many years will the same amount become Rs.8000 ?

   a) 6 years   b) 4 years   c) 8 years   d) 5 years

2) A sum of money on compound interest amounts to Rs.10648 in 3 years and Rs. 9680 in 2 years. The rate of interest per annum is :

   a) 10%   b) 8%   c) 6%   d) 12%

3) The compound interest on a certain sum of money at 5% per annum for 2 years is Rs.246. The simple interest on the same sum for 3 years at 6% per annum is

a) 452   **b) 432**   **c) 456**   **d) 521**

4) A sum of money doubles itself at compound interest in 15 years. In how many years will it becomes eight times ?

a) 45 years   **b) 52 years**   **c) 48 years**   **d) 54 years**

5) A sum of money triple itself in 3 years at C.I in how many years it becomes 9 times itself in C.I ?

a) 5 years   **b) 8 years**   **c) 6 years**   **d) 9 years**

<mark>MODEL : 3</mark>

1) Find the difference between C.I and S.I for 2years on the sum of 2000 at the rate of 10% per annum.

a) 35   b) 20   c) 40   d) 60

2) If the difference between the compound interest, compounded every six months, and the simple interest on a certain sum of money at the rate of 12% per annum for one year is Rs. 36. The sum is :

a)12000   b) 36000   c) 10000   d) 15000

3) The difference between S.I & C.I (compounded annually) on Rs.40,000 for 3 years at 5% per annum is:

   a) 450 b) 310 c) 305 d) 390

4) Find the difference between the compound interest and the simple interest on Rs.32,000 at 10% p.a. for 4 years.

   a) 1958.4 b) 2051.2 c) 1972 d) 1941.6

5) A builder borrows Rs. 2550 to be paid back with compound interest at the rate of 4% per annum by the end of 2 years in two equal yearly instalments. How much will each instalment be ?

   a) 1352 b) 1456 c) 1396 d) 1242

6) A man saves Rs. 2000 at the end of each year and invests the money at 5% compound interest. At the end of 3 years he will have ?

   a) 6305 b) 6250 c) 6456 d) 6600