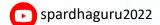
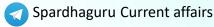
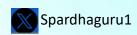


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COMPOUND INTEREST

INTRODUCTION

the previous In chapter, understood that when interest on a given principal for each year is same, it is called simple interest. But if the period of interest is one year and it is not paid as soon as it falls due but is added to the principal, so that the amount at the end of the period becomes the principal for the next year, then this interest is called Compound Interest (C.I.).

II. COMPOUND INTEREST

Money is said to be lent at compound interest, if the interest instead of being paid over to the lender at the end of a year or fixed period becomes due and is added to the principal thus the amount after such period becomes the principal for the next period and so on. After a specified period, the difference between the amount and the original principal is called the compound interest (C.I.).

III. SOME USEFUL RELATIONS

1. C.I. =
$$P\{\left(1 + \frac{R}{100}\right)^n - 1\}$$

3. A = P
$$\left(1 + \frac{R}{100}\right)^n$$

4. Each annual instalment compounded annually is given by

Loan amount =
$$\frac{P}{\left(1 + \frac{R}{100}\right)^n} = P\left(\frac{100}{100 + R}\right)^n$$

Where P = Principal or present worth

R = Rate percent per annum

n = number of periods

A = Amount

C.I. = Compound interest annually

IV. DIFFERENCE BETWEEN COMPOUND INTEREST (C.I.) AND SIMPLE INTEREST (S.I.)

We know

$$S.I. = \frac{PRT}{100}$$



C.I. =P
$$\{\left(1 + \frac{R}{100}\right)^n - 1\}$$
 ...(ii)

Subtracting equation (i) from (ii)

C.I. - S.I. = P
$$\left\{ \left(1 + \frac{R}{100}\right)^n - 1 \right\} - \frac{PRT}{100}$$

C.I. – S.I. =
$$P\left\{ \left(\frac{100+R}{100} \right)^n - \frac{RT}{100} - 1 \right\}$$

V. SHORT CUT METHODS TO SOLVE SPECIAL TYPES OF PROBLEMS

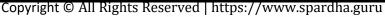
Case I: When the interest compounded half-yearly, then amount is given by

$$A = P \left[1 + \frac{\frac{R}{2}}{100} \right]^{2n}$$

$$A = P \left[\frac{200 + R}{200} \right]^{2n}$$

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the Case When compounded quarterly, then amount is given by

$$A = P \left[1 + \frac{\frac{R}{4}}{100} \right]^{4n}$$

$$A = P \left[\frac{400 + R}{400} \right]^{4n}$$

Case III. When the rate of interest for the 1st, 2nd and 3rd year are R_1 %, R_2 %, and R_3 % respectively and vice versa, then amount is given by

$$A = P \left(1 + \frac{R_1}{100} \right) \left(1 + \frac{R_2}{100} \right) \left(1 + \frac{R_3}{100} \right)$$

Case IV. If a principal becomes 'P' times in 'n' years, the rate of compound interest is given by

$$R = 100 \left[P^{\frac{1}{n}} - 1 \right]$$

Case V. If time is given in mixed fraction (say $n \frac{k}{m}$ years) and interest is compounded annually, then amount is given by

$$A = P\left(1 + \frac{R}{100}\right)^n \left(1 + \frac{\frac{k}{m}R}{100}\right)$$

$$A = P \left(1 + \frac{R}{100}\right)^n \left(\frac{100m + kR}{100m}\right)$$

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Case VI. If principal becomes Amount (A_1) in n years at compound interest,

then after m years, the principal becomes

$$A_2 = \frac{(A_1)^{\frac{m}{n}}}{(P)^{\frac{m}{n}-1}}$$

Where m > n

 A_1 = amount after n years

 A_2 = amount after m years

SOME IMPORTANT POINTS

- 1. Compound interest is always more than simple interest.
- 2. The time period after which the interest is added each time to form a new principal is called CONVERSION PERIOD.
- 3. Conversion period may be annually, half-yearly, quarterly or monthly.
- Spanding 11 4. There is no difference between simple interest and compound interest on any sum at the same rate per annum for one year, if the interest is compounded annually.
 - 5. The amount of the previous year is the principal for the successive year.
 - 6. The difference between consecutive amounts is the interest on the proceeding years amount for 1 year.
 - difference 7. The between the compound interest and the simple

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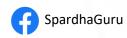
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interest for 2 years is equal to the simple interest for 1 year on 1 year's interest

C.I. – S.I. =
$$\frac{R \times S.I.}{2 \times 100}$$

Where T = 2 years

Or C.I. – S.I. =
$$P(\frac{R}{100})^2$$

8. Similarly, the difference between the compound interest and the simple interest for 3 years is given b

C.I. – S.I. =
$$\frac{PR^3(300+R)}{(100)^3}$$

C.I. – S.I. =
$$\frac{R(300+R)S.I.}{3(100)^2}$$



- 1) Find the compound Interest on Rs. 2000 for 2 years at 10%.
 - a) 420
- b) 400
- C) 380
- d) 26420

- Find the C.I on Rs. 7500, at 4% P.A for 2 years.
 - a) 612
- b) 600
- 370
- d) 650
- 3) Kamal borrows Rs. 500 from bank. If the bank charges interest at 6% P.A. How much amount shall he pay after 2 years?
 - a) 561.8
- b) 562.9
- b) 562.8
- d) 562.9

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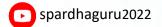






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- 4) Find the CI on Rs. 8000 at 15% PA for 2 years 4 months. CI annually.
 - a) 3109
- b) 5619
- b) 11109
- d) 4239

- 7) Find the Compound Interest on Rs. 2400 for 2 ½ years at 5% PA. CI annually.
 - a) 2712.15
- b) 312.15
- c) 300
- d) 312
- 8) What will be the Compound Interest on sum of Rs. 7200 at 5% to per annum in 2 years?
 - a) 7938
- b) 738
- c) 765
- d) 712

- 5) Find the compound Interest on Rs. 4000 for 1.5 years at 10% interest payable after half year
 - a) 650.50
- b) 630.50
- b) 620.30
- d) 610.50
- 9) What will be the Compound Interest on Rs. 18600 for 2 years the rate of interest for first year being 8% and for the second year being 15%?
 - a) 4501.2
- b) 4501.3
 - c) 4601.2
- d) 6021.3

- 6) Find the CI on Rs. 16000 at 20% PA for 9 months. CI annually
 - a) 2522
- b) 1522
- b) 1562
- d) 362

- How much will a sum of Rs. 6300 10) amounts in a span of 2 years at 5% per annum rate of CI.
 - a) 6945.75. b) 6945.25
 - c) 2345.75 d) 5925.75

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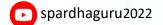




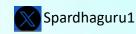


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- 11) The cost price of car is Rs. 400000. If its price decreases 10% every year what will be the cost of car after 3 vears?
 - a) 291600 b) 298600
 - c) 392100 d) 287600
- The population of a city increases at 12) the rate of 15% per annum. If its population was 4000 at the end of the year 2009. What will be its population at the end of the year 2011?
 - a) 5794
- b) 5290
- b) 1279
- d) 5298

- A sum amounts to Rs. 9680 in 2 14) years and Rs. 10648 in 3 years Cl annually. Find the rate of interest per annum.
 - a) 10%
- b) 20%
- c) 15%
- d) 12%

- 15) If Rs. 750 amounts to Rs. 1000 in 5 years, then how much will it amounts Spardhaguru Into in 10 years at SI? Limited
 - a) 500
- b) 1250
- c) 700
- d) 600

- 13) The Compound Interest for 6th and 7th year is Rs. 1320 and Rs. 1440 respectively. Find the rate%.
 - a) 9.09%
- b) 9.01%
- c) 9.092% d) 9.032%

- What is the CI on a sum of Rs. 5000 **16)** at the rate of 10% per annum for 2 vears?
 - a) 1050
- b) 1250
- c) 1210
- d) 1801

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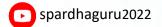
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- 17) The rate of interest on a sum of money is 4% for the first 3 years, 6% for the next 2 years. 8% for the next 4 years. If SI occurred by the sum the total principal years is 13, 440, then find the sum.
 - a) 28000
- b) 26000
- c) 24000
- d) 22000

- 2) In what time Rs. 12000 will amount to Rs. 13230 at 5% CI?
 - a) 3
- b) 4
- c) 2 d) 1
- 3) A sum of money doubled itself at compounded Interest in 15 years. In how many years will it becomes eight times.
 - a) 30
- b) 15
- c) 45
- d) 12

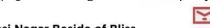
- 4) At what rate should Vimal lend Rs. 80000 at CI, so that it may amount to Rs. 97240.50 in 4 years?
 - a) 3%
- b) 5%
- c) 2% d) 1%

Special Question

- 1) In what time will Rs. 1000 becomes Rs. 1331 at 10% PA. CI Annually.
 - a) 3
- b) 4
- c) 2
- d) 1

- 5) The difference between the Compound Interest and the Simple Interest on a sum of money for 2 years at 12 ½ % per annum is Rs. 150 Find the sum.
 - a) 9600 b) 96000
 - c) 960 d) 960.50

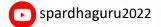






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6) If the difference between the CI and SI on a sum of money at 5% per annum for 2 years is Rs. 16. The amount is?

- a) 6400
- b) 6200
- c) 6500
- d) 6100

7) If the difference between the CI and SI on certain sum of money for 3 years at 5% is Rs. 61. Find the sum.

- a) 4880000 b) 588000
- c) 2180000 d) 648000

8) At what rate of Compound Interest will a sum of money become 25 / 16 times of itself in 2 years?

- a) 25%
- b) 125% ardhaguru India Private Limited
- c) 75%
- d) 50%

9) A sum of Rs. 8400 is borrowed to be paid back in 2 years by two equal instalments at 10% CI. Find Instalment.

- a) 4840
- b) 4820
- c) 4620

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d) 4610

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