Board –CBSE	Class –9	Topic – COMPOUND INTEREST (USING FORMULA)-SOLVED EXAMPLES

1. Find the amount and compound interest on ₹ 40000 for 2 years at 9% per annum, interest being payable annually.

Solution

Given $P = ₹\ 40000, r = 9$ and $n = 2$

Using the formula, $A = P\left(1 + \dfrac{r}{100}\right)^n$, we get

$$A = ₹\ 40000\left(1 + \dfrac{9}{100}\right)^2 = ₹\ 40000 \times \left(\dfrac{109}{100}\right)^2$$

$$= ₹\left(40000 \times \dfrac{109}{100} \times \dfrac{109}{100}\right) = ₹\ 47524.$$

$$\text{C.I.} = A - P = ₹\ 47524 - ₹\ 40000 = ₹\ 7524\ .$$

2. Find the amount and compound interest on ₹ 16000 for 3 years at 15% per annum, interest compounded annually.

Solution

Here $P = ₹\ 16000, r = 15$ and $n = 3$

Using the formula, $A = P\left(1 + \dfrac{r}{100}\right)^n$, we get

$$A = ₹\ 16000\left(1 + \dfrac{15}{100}\right)^3 = ₹\ 16000 \times \left(\dfrac{115}{100}\right)^3$$

$$= ₹\ 16000 \times \left(\dfrac{23}{20}\right)^3 = ₹\left(16000 \times \dfrac{23}{20} \times \dfrac{23}{20} \times \dfrac{23}{20}\right)$$

$$= ₹\ 24334$$

$$\text{C.I.} = A - P = ₹\ 24334 - ₹\ 16000 = ₹\ 8334\ .$$

3. Find the amount and compound interest on ₹ 30000 for 4 years at 10% per annum, interest compounded yearly.

Solution

Here $P = ₹\ 30000, r = 10$ and $n = 4.$

Using the formula, $A = P\left(1 + \dfrac{r}{100}\right)^n$, we get

$$A = ₹\,30000 \left(1 + \frac{10}{100}\right)^4 = ₹\,30000 \times \left(\frac{11}{10}\right)^4$$

$$= ₹\left(30000 \times \frac{11}{10} \times \frac{11}{10} \times \frac{11}{10} \times \frac{11}{10}\right) = ₹\,43923$$

C.I. = A − P = ₹ 43923 − ₹ 30000 = ₹ 13923 .

4. Calculate the interest earned and the amount due if a sum of ₹ 12500 is invested for 1 year at 12% per annum, interest being compounded semi-annually.

Solution

Since the rate of interest is 12% per annum, therefore, the rate of interest per conversion period (half-yearly) $= \frac{1}{2}$ of 12% = 6%

As the money is invested for 1 year, therefore,
n(the number of conversion periods) = 2
Here, P = ₹ 12500, r = 6 and n = 2
Using the formula, $A = P\left(1 + \frac{r}{100}\right)^n$, we get

$$A = ₹\,12500 \left(1 + \frac{6}{100}\right)^2 = ₹\,12500 \times \left(\frac{106}{100}\right)^2$$
$$= ₹\left(12500 \times \frac{53}{50} \times \frac{53}{50}\right) = ₹\,14045$$

C.I. = A − P = ₹ 14045 − ₹ 12500 = ₹ 1545 .

5. Find the amount and the compound interest on ₹ 24000 at 10% per annum for $1\frac{1}{2}$ years, compound interest reckoned half-yearly.
Solution
Since the rate of interest is 10% per annum, therefore, the rate of interest per conversion period (half-yearly) $= \frac{1}{2}$ of 10% = 5%

As the money is invested for $1\frac{1}{2}$ year, therefore,
n(the number of conversion periods) = 3
Here, P = ₹ 24000, r = 5 and n = 3
Using the formula, $A = P\left(1 + \frac{r}{100}\right)^n$, we get
$$A = ₹\,24000 \left(1 + \frac{5}{100}\right)^3 = ₹\,24000 \times \left(\frac{21}{20}\right)^3$$
$$= ₹\left(24000 \times \frac{21}{20} \times \frac{21}{20} \times \frac{21}{20}\right) = ₹\,27783.$$
C.I. = A − P = ₹ 27783 − ₹ 24000 = ₹ 3783 .

6. Find the amount of Rs. 12500 for 2 years compounded annually, the rate of interest being 15% for the first year and 16% for the second year.

Solution

Principal (P) = Rs. 12500

Rate (r_1) = 15% for first year and r_2 = 16% for second year period (n) = 2 years

$$\text{Amount } = P\left(1 + \frac{r_1}{100}\right)\left(1 + \frac{r_2}{100}\right)$$

$$= \text{Rs. } 12500\left(1 + \frac{15}{100}\right)\left(1 + \frac{16}{100}\right)$$

$$= \text{Rs. } 12500 \times \frac{115}{100} \times \frac{116}{100}$$

$$= \text{Rs. } 16675$$

7. Calculate the amount and compound interest on Rs. 5120 at $12\frac{1}{2}\%$ per annum for $2\frac{1}{5}$ years.

Solution

Principal (P) = Rs. 5120

Rate (r) = $12\frac{1}{2}\% = \frac{25}{2}\%$ p.a

Period (n) = $2\frac{1}{5}$ years

$$\text{Amount} = P\left(1 + \frac{25}{2\times100}\right)^2\left(1 + \frac{25}{2\times100\times5}\right)^1$$

$$= \text{Rs. } 5120 \times \left(\frac{9}{8}\right)^2\left(\frac{41}{40}\right)$$

$$= \text{Rs. } 5120 \times \frac{9}{8} \times \frac{9}{8} \times \frac{41}{40}$$

$$= \text{Rs. } 6642$$

Compound interest $= A - P$

$$= \text{Rs. } 6642 - \text{Rs. } 5120 = \text{Rs. } 1522$$

8. Sahil borrowed Rs. 15625 from Canara Bank to buy a refrigerator. If the rate of interest be 16% per annum compounded annually, what payment he will have to make after 2 years 3 months ?

Solution

Principal (P) = Rs. 15625

Rate (r) = 16% p.a.

Period (n) = 2 years, 3 months = $2\frac{1}{4}$ years

Amount (A) = $P\left(1 + \frac{r}{100}\right)^n$

$$= \text{Rs. } 15625 \left(1 + \frac{16}{100}\right)^2 \left(1 + \frac{16}{4 \times 100}\right)$$

$$= 15625 \left(\frac{29}{25}\right)^2 \left(\frac{26}{25}\right)$$

$$= \text{Rs. } 15625 \times \frac{29}{25} \times \frac{29}{25} \times \frac{26}{25}$$

$$= \text{Rs. } 21866$$

Hence, he will have to pay Rs. 21866

9. Mohan Lal took a loan of Rs. 25600 from a bank to renovate his house. If the rate of interest be $13\frac{3}{4}\%$ per annum, find the compound interest, he will pay after 2 years.

Solution

Principal loan (P) = Rs. 25600

Rate (r) $= 13\frac{3}{4} = \frac{55}{4}\%$ p.a.

Period (n) = 2 years

Amount (A) $= P\left(1 + \frac{r}{100}\right)^n$

$$= 25600 \times \left(1 + \frac{55}{100 \times 4}\right)^2$$

$$= \text{Rs. } 25600 \times \left(\frac{91}{80}\right)^2$$

$$= \text{Rs. } 25600 \times \frac{91}{80} \times \frac{91}{80}$$

$$= \text{Rs. } 33124$$

Compound Interest $= A - P = \text{Rs. } 33124 - \text{Rs. } 25600$

$$= \text{Rs. } 7524$$

10. Find the compound interest on Rs. 31250 at 12% per annum for $2\frac{1}{2}$ years.

Principal (P) = Rs. 31250

Solution

Rate (r) = 12% p.a.

Period (n) $= 2\frac{1}{2}$ years

$$\therefore \text{ Amount } = P\left(1 + \frac{r}{100}\right)^n$$

$$= 31250\left(1 + \frac{12}{100}\right)^2\left(1 + \frac{12}{2 \times 100}\right)^1$$

$$= 31250 \times \left(\frac{28}{25}\right)^2\left(\frac{53}{50}\right)$$

$$= \text{ Rs. } 31250 \times \frac{28}{25} \times \frac{28}{25} \times \frac{53}{50}$$

$$= 41552$$

$\therefore$ Compound interest $= A - P$

$$= \text{Rs. } 41552 - \text{Rs. } 31250$$

$$= \text{Rs. } 10302$$