



EPEA516

ANALYTICAL SKILLS II

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Learning Outcomes



After this lecture, you will be able to

- solve problems based on relation between compound and simple interest.

Problem 1

- What will be the difference between simple and compound interest on a sum of Rs. 30,000 put for 2 years at 5% p.a.?
- $P = \text{Rs. } 30,000$
- $R = 5\% \text{ p.a.}$
- $n = 2 \text{ years}$
- $\text{C.I.} - \text{S.I.} = ?$
- $\text{C.I.} - \text{S.I.} = P \left[\frac{R}{100} \right]^2$

Problem 1

- $P = 30,000$; $R = 5\%$ p.a.; $n = 2$ years; and C.I. – S.I. = ?

- $$\text{C.I.} - \text{S.I.} = P \left[\frac{R}{100} \right]^2$$

$$= 30000 \times \left[\frac{5}{100} \right]^2$$

$$= \frac{30000 \times 5 \times 5}{10000}$$

$$\text{C.I.} - \text{S.I.} = \text{Rs. } 75$$

Problem 2

- If the difference between compound interest & simple interest on a certain sum of money for 2 years at 5% p.a. is Rs. 100, find the sum.
- $n = 2$
- $R = 5\%$ p.a.
- $C.I. - S.I. = \text{Rs. } 100$
- $P = ?$
- $C.I. - S.I. = P \left[\frac{R}{100} \right]^2$

Problem 2

- $n = 2$, $R = 5\%$ p.a., C.I. – S.I. = Rs. 100, and $P = ?$

- $$\text{C.I.} - \text{S.I.} = P \left[\frac{R}{100} \right]^2$$

- $$100 = P \left[\frac{5}{100} \right]^2$$

- $$100 = P \left[\frac{5 \times 5}{100 \times 100} \right]$$

- $$\frac{\cancel{100}^{20} \times 100 \times 100}{\cancel{5} \times 5} = P$$

- $P = \text{Rs. } 40,000$

Problem 3

- Find the rate percent if the difference between the compound interest and simple interest on Rs. 40,000 for 2 years is Rs. 100.
- $P = \text{Rs. } 40,000$
- $n = 2$
- $\text{C.I.} - \text{S.I.} = \text{Rs. } 100$
- $R = ?$
- $\text{C.I.} - \text{S.I.} = P \left[\frac{R}{100} \right]^2$

Problem 3

- $P = \text{Rs. } 40,000$; $n = 2$; C.I. – S.I. = Rs. 100; and $R = ?$

- $\text{C.I.} - \text{S.I.} = P \left[\frac{R}{100} \right]^2$

- ~~100~~ = ~~40000~~ $\times \left[\frac{R}{100} \right]^2$

- $\frac{1}{400} = \left[\frac{R}{100} \right]^2$

- $\frac{1}{20 \times 20} = \left[\frac{R}{100} \right]^2$

- $\left[\frac{1}{20} \right]^2 = \left[\frac{R}{100} \right]^2$

Problem 3

- $\left[\frac{1}{20}\right]^2 = \left[\frac{R}{100}\right]^2$

- $\left[\frac{1}{20}\right]^2 = \left[\frac{R}{100}\right]^2$

- $\frac{1}{\cancel{20}} = \frac{R}{\cancel{100} \cdot 5}$

- $R = 5\% \text{ p.a.}$

Problem 4

- Find the rate percent if the S.I. on a certain sum of money for 2 years is Rs. 4,000 and difference between the compound interest and simple interest is Rs. 100.
- $n = 2$
- $C.I. - S.I. = \text{Rs. } 100$
- $S.I. = \text{Rs. } 4,000$
- $R = ?$
- $C.I. - S.I. = \frac{R \times S.I.}{2 \times 100}$

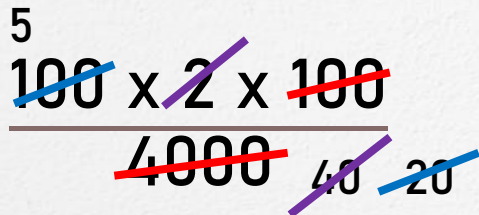
Problem 4

- $n = 2$; C.I. – S.I. = Rs. 100; S.I. = Rs. 4,000; and $R = ?$

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

- $$100 = \frac{R \times 4000}{2 \times 100}$$

- $$R = \frac{100 \times 2 \times 100}{4000}$$



- $R = 5\% \text{ p.a.}$

Problem 5

- What will be the difference between simple and compound interest on a sum of Rs. 8,000 put for 3 years at 5% p.a.?
- $P = 8,000$
- $R = 5\% \text{ p.a.}$
- $n = 3 \text{ years}$
- $\text{C.I.} - \text{S.I.} = ?$
- $\text{C.I.} - \text{S.I.} = P \left\{ \left[\frac{R}{100} \right]^3 + 3 \left[\frac{R}{100} \right]^2 \right\}$

Problem 5

- $P = 8,000$; $R = 5\%$ p.a.; $n = 3$ years; and C.I. – S.I. = ?

$$\begin{aligned}\bullet \text{ C.I.} - \text{S.I.} &= P \left\{ \left[\frac{R}{100} \right]^3 + 3 \left[\frac{R}{100} \right]^2 \right\} \\ &= 8000 \left\{ \left[\frac{\cancel{5}}{\cancel{100}_{20}} \right]^3 + 3 \left[\frac{\cancel{5}}{\cancel{100}_{20}} \right]^2 \right\} \\ &= 8000 \left[\frac{1}{8000} + \frac{3}{400} \right] \\ &= \cancel{8000} \left[\frac{1 + 60}{\cancel{8000}} \right]\end{aligned}$$

$$\text{C.I.} - \text{S.I.} = \text{Rs. } 61$$

Problem 6

- The difference between the compound interest and simple interest on a certain sum of money for 3 years at 10% p.a. is Rs. 93. Find the sum.

- $n = 3$

- $R = 10\% \text{ p.a.}$

- $\text{C.I.} - \text{S.I.} = \text{Rs. } 93$

- $P = ?$

- $\text{C.I.} - \text{S.I.} = P \left\{ \left[\frac{R}{100} \right]^3 + 3 \left[\frac{R}{100} \right]^2 \right\}$

Problem 6

- $n = 3$, $R = 10\%$ p.a., C.I. – S.I. = Rs. 93, and $P = ?$

- $$\text{C.I.} - \text{S.I.} = P \left\{ \left[\frac{R}{100} \right]^3 + 3 \left[\frac{R}{100} \right]^2 \right\}$$

- $$93 = P \left\{ \left[\frac{\cancel{10}}{\cancel{100}} \right]^3 + 3 \left[\frac{\cancel{10}}{\cancel{100}} \right]^2 \right\}$$

- $$93 = P \left[\frac{1}{1000} + \frac{3}{100} \right]$$

- $$93 = P \left[\frac{1 + 30}{1000} \right]$$

Problem 6

- $93 = P \left[\frac{1 + 30}{1000} \right]$

- $93 = P \left[\frac{31}{1000} \right]$

- $P = \frac{93 \times 1000}{31}$

- $P = \text{Rs. } 3000$

Problem 7

- The difference between compound and simple interests on a certain sum of money at the interest rate of 10% per annum for $1\frac{1}{2}$ years is Rs. 183, when the interest is compounded semi-annually. Find the sum of money.
- $n = 3$ ($1\frac{1}{2}$ years = 3 half years)
- $R = 10\%$ p.a. ($\frac{R}{2} = \frac{10}{2} \% = 5\%$ half yearly)
- C.I. – S.I. = Rs. 183
- $P = ?$

Problem 7

- $n = 3$, $\frac{R}{2} = 5\%$, C.I. – S.I. = Rs. 183, and $P = ?$

- $$\text{C.I.} - \text{S.I.} = P \left\{ \left[\frac{\frac{R}{2}}{100} \right]^3 + 3 \left[\frac{\frac{R}{2}}{100} \right]^2 \right\}$$

- $$183 = P \left\{ \left[\frac{\cancel{5}}{\cancel{100}} \right]^3 + 3 \left[\frac{\cancel{5}}{\cancel{100}} \right]^2 \right\}$$

$20 \qquad 20$

- $$183 = P \left[\frac{1}{8000} + \frac{3}{400} \right]$$

- $$183 = P \left[\frac{1 + 60}{8000} \right]$$

Problem 7

- $183 = P \left[\frac{1 + 60}{8000} \right]$

- $183 = P \left[\frac{61}{8000} \right]$

- $P = \frac{\overset{3}{\cancel{183}} \times 8000}{\cancel{61}}$

- $P = \text{Rs. } 24000$

Conclusion

- For 2 years at R% per annum

- In terms of P and R

- $$\text{C.I.} - \text{S.I.} = P \left[\frac{R}{100} \right]^2$$

- In terms of S.I. and R

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

Conclusion

- For 3 years at R% per annum
 - In terms of P and R

- $$\text{C.I.} - \text{S.I.} = P \left\{ \left[\frac{R}{100} \right]^3 + 3 \left[\frac{R}{100} \right]^2 \right\}$$

- In terms of S.I. and R

- $$\text{C.I.} - \text{S.I.} = \frac{\text{S.I.}}{3} \left\{ \left[\frac{R}{100} \right]^2 + 3 \left[\frac{R}{100} \right] \right\}$$

Summary

- Computation of
 - Difference between C.I. and S.I.
 - Principal
 - Rate

That's all for now...