

if the Rate of Interest for first 3 years is 6% p.a. for the next 4 years is 7% p.a. and for the period beyond 7 years is 7.5% p.a. If a man lent out ₹ 1200 for 11 years. Find the total interest earned by him?

Solution:- 3 yrs — $6\% \times 3 = 18\%$

4 yrs — $7\% \times 4 = 28\%$

4 yrs — $7.5\% \times 4 = 30\%$

76% of P

Simple Interest = 76% of P = 76% of 1200

= $(75\% + 1\%)$ of 1200

= $\frac{3}{4} \times 1200 + 12 = 912$ ANS.

एक व्यक्ति एक निश्चित धन राशि बैंक में जमा करता है। यदि ब्याज की दर प्रथम दो वर्ष 3% वार्षिक और अगले तीन वर्ष तक 8% वार्षिक और अन्तिम 1 वर्ष 10% वार्षिक साधारण ब्याज हो तो और अगर 6 साल में कुल 1520 रु. साधारण ब्याज प्राप्त हुआ हो तो मूलधन ज्ञात करो ?

Solution:- 2 yrs → $2 \times 3\% = 6\%$

3 yrs → $3 \times 8\% = 24\%$

1 yrs → $1 \times 10\% = 10\%$

SR → 40% of P

40% → 1520

100% (P) → $\frac{1520}{40} \times 100 = 3800$ ANS.

A man lent 2000 partially at 5% p.a. and balance at 4% p.a. If he receives ₹ 92 as annual interest. Find the amount lent at 5%?

Solution:- I (BASIC)

Let x ₹ invested @ 5%.

$$\Rightarrow 5\% \text{ of } x + (2000 - x)4\% = 92$$

$$\Rightarrow 5x - 4x - 8000 = 9200$$

$$\Rightarrow x = 1200 \text{ ANS}$$

II (Alligation)

$$R\% = \frac{92}{2000} \times 100 = 4.6\%$$

$$\begin{array}{ccc} 4\% & & 5\% \\ & \swarrow \searrow & \\ & 4.6\% & \\ & \swarrow \searrow & \\ .4 & & .6 \\ 2 & : & 3 \end{array} = \frac{2000 \times 3}{5} = 1200$$

III (रामदादा)

Let whole amt @

$$SI = \frac{2000 \times 4}{100} = 80$$

$$\text{gap} = 92 - 80 = 12$$

$$\begin{array}{lcl} 5\% - 4\% & \rightarrow & 12 \\ 1\% & \rightarrow & 12 \\ 100\% & \rightarrow & 1200 \end{array}$$

A man lent ₹ 1600 part of which he lent at 4% and rest at 5% p.a. SI. If the total interest Received was ₹ 700 in one year, the money lent at 4% was?

Solution:- I (Alligation)

$$\begin{aligned} \text{overall } R\% &= \frac{700}{1600} \times 100 \\ &= \frac{350}{80} \end{aligned}$$

$$\begin{array}{ccc} 80 \times 4\% & & 5\% \times 80 \\ & \swarrow \searrow & \\ & \frac{350}{80} & \\ & \swarrow \searrow & \\ 50 & & 30 \\ 5 & : & 3 \end{array}$$

$$\begin{aligned} \text{at } 4\% & \\ &= \frac{1600 \times 5}{8} \\ &= 10,000 \text{ ANS.} \end{aligned}$$

II (रामदादा)

Let all (16000) @ 5%.

$$SI = \frac{16000 \times 5}{100} = 800$$

$$\text{gap } 800 - 700 = 100$$

$$5\% - 4\% \rightarrow 100$$

$$1\% \rightarrow 100$$

$$100\% \rightarrow 10000$$

(जिसको मानेंगे वो नहीं आएगा दूसरा आएगा)

Sunil borrowed a sum of 30,000. He took a part of it at 12% and remaining at 10%. At the end of two years he returned 36480. What amount was borrowed at 12% Rate?

Solution:- SI for 2 yr = 6480

" " 1 yr = 3240

Let all (30,000) invested at 10%.

$$SI = 30,000 \times 10\% = 3000$$

$$\text{gap} = 240$$

$$12\% - 10\% = 2\%$$

$$2\% \rightarrow 240$$

$$100\% \rightarrow 12000$$

(जिसको मानेंगे वो नहीं आएगा)

A sum of ₹ 14400 is divided into 3 parts such that 1st part is invested at 2% p.a. for 3 years and 2nd part @ 3% p.a. for 4 years and 3rd part at 4% p.a. for 5 years. If simple interest of all the 3 parts are equal find Principal of each part?

Solution:- let principal of 3 parts is P_1, P_2 & P_3

SI₁

SI₂

SI₃

$$\text{let } 6\% \text{ of } P_1 = 12\% \text{ of } P_2 = 20\% \text{ of } P_3 = 60 \text{ [मानें]}$$

$$\Rightarrow P_1 : P_2 : P_3 = 10 : 5 : 3$$

$$P_1 = \frac{14400}{18} \times 10 = 8000, P_2 = \frac{14400}{18} \times 5 = 4000, P_3 = 2400$$

A sum of 18750 is left by will by a father to be divided between two sons of 12 and 14 years of age so that when they attain maturity at 18, the amount received by each at 5% p.a. SI will be same. Find the sum allotted to both at present.

Solution:- A_1

A_2

$$(100 + 5\% \times 6) \text{ of } P_1 = (100 + 5\% \times 4) \text{ of } P_2$$

$$130\% \text{ of } P_1 = 120\% \text{ of } P_2$$

$$13P_1 = 12P_2 \Rightarrow \frac{P_1}{P_2} = \frac{12}{13} \text{ OR } P_1 : P_2 = 12 : 13$$

$$\therefore P_1 = \frac{18750}{25} \times 12 = 9000, P_2 = \frac{18750}{25} \times 13 = 9750$$

with a given Rate of interest, the Ratio of the Principal and Amount for a certain period of the time is 4:5. After 3 years with the same Rate of interest the ratio of Principal and amount becomes 5:7. The Rate of interest is?

Solution:- (Principal is always same in SI)

P	A	I	Time
4	5	1	T yrs
5	7	2	T+3 yr

we will make P same [Lcm 20]

P	A	I	Time
20 = 4 × 5	5 × 5 = 25	5	T
20 = 5 × 4	7 × 4 = 28	8	T+3

$$I \text{ on } ₹ 20 \text{ for } 3 \text{ yr} = 8 - 5 = 3$$

$$R\% = \frac{3 \times 100}{20 \times 3} = \underline{\underline{5\%}}$$

if a Person invested some amount at the rate of 12% p.a. SI and remaining at 10% p.a. SI, he receives yearly interest ₹130. Had he interchanged the amount invested he would have received ₹134. How much money did he invest at different rates?

a) 500 @ 10%, 800 @ 12%

c) 800 @ 10%, 400 @ 12%

b) 700 @ 10%, 600 @ 12%

d) 700 @ 10%, 500 @ 12%

Solution:- I (BASIC)

$$12\% \text{ of } X + 10\% \text{ of } Y = 130$$

$$10\% \text{ of } X + 12\% \text{ of } Y = 134$$

$$\Rightarrow X = 500, Y = 700$$

Option D is CORRECT

II (TRICKY)

$$\text{Diff. in 2 Rates} = 2\%$$

$$\text{Diff in Interest} = ₹ 4$$

$$\text{Diff in Amount} = \frac{4}{2} \times 100 = 200$$

only diff of 200 in option D

D is ✓

एक निश्चित धन राशि, एक निश्चित समय के लिए, एक निश्चित साधारण व्याज की दर पर निवेश किया जाता है। यदि मूलधन को 20% बढ़ा दिया जाए और उसने दर को $\frac{6}{5}$ गुणा कर दिया जाए और समय को $\frac{2}{3}$ कर दिया जाए तो नया साधारण व्याज 2400 हो जाता है। प्रारंभिक साधारण व्याज ज्ञात करें।

Solution:- [जो Effect Principal, Rate, Time पर पड़ेगा वही effect व्याज पर पड़ेगा]

$$\therefore \text{New SI} = \text{old SI} \times \frac{120}{100} \times \frac{6}{5} \times \frac{2}{3}$$

$$2400 = \text{old SI} \times \frac{120}{100} \times \frac{6}{5} \times \frac{2}{3}$$

$$\Rightarrow \text{old SI} = 2500 \text{ ₹ Ans.}$$

एक निश्चित धन राशि एक निश्चित समय के लिए के लिए निवेश की जाती है। यदि साधारण व्याज की दर 5% वार्षिक होता तो मिफाधन 80 रु होता, जब व्याज की दर 2% होता तो मिफाधन 40 रु होता तो समय क्या था?

Solution:- I (BASIC)

$$\text{let } P = 100 \%$$

$$\text{SI} = RT\% = St\% \text{ फी } St\%$$

$$\frac{100 + St}{100 + 2t} = \frac{80}{40}$$

$$\Rightarrow 100 + St = 200 + 4t$$

$$\Rightarrow \boxed{t = 100 \text{ yrs}}$$

II (TRICKY)

$$t = \frac{A_1 - A_2}{A_1 R_2 - A_2 R_1} \times 100$$

$$= \frac{80 - 40}{200 - 100} \times 100$$

$$= \frac{40}{40} \times 100$$

$$= 100 \text{ yrs}$$

INSTALLMENT [किशन]

$$\# \quad X = \frac{100 D}{100T + \frac{R \times T(T-1)}{2}}$$

where $X \rightarrow$ installment [equal]

$T \rightarrow$ Time $R \rightarrow$ Rate (दर)

$D \rightarrow$ Debt (ऋण) Amount

OR Equate Future Value (Amount) मिशन

FOR MONTHLY you can use it

$$P + \frac{P \times R \times T}{12 \times 100} = X \times T + \frac{R \times X}{12 \times 100} [1 + 2 + \dots + (T-1)]$$

what annual installment will discharge a debt of ₹ 2360 due in four years at 12% p.a. Simple interest?

Solution:- I [FORMULA]

$$\begin{aligned} X &= \frac{100 D}{100T + \frac{RT(T-1)}{2}} \\ &= \frac{100 \times 2360}{100 \times 4 + \frac{12 \times 4 \times 3}{2}} \\ &= \frac{2360 \times 100}{472} = 500 \text{ ₹ } \underline{\text{Ans.}} \end{aligned}$$

OR II Let each I = 100
[पहली किशन पर 3 साल, दूसरी पर 2 साल, तीसरी पर 1 साल और चौथी पर 0 साल का ब्याज लगाया]

$$100 + 12 \times 3 = 136\%$$

$$100 + 12 \times 2 = 124\%$$

$$100 + 12 \times 1 = 112\%$$

$$100 + 12 \times 0 = 100\%$$

$$\underline{472\%}$$

$$\therefore 472\% \rightarrow 2360$$

$$100\% \rightarrow 500 \text{ ₹ } \underline{\text{Ans.}}$$

1740 ₹ की राशि 5 वरार वार्षिक किरता में देय है। यदि प्रत्येक किरत पर शेष समय के लिए 8% की दर से साधारण व्याज देय हो तो प्रत्येक किरत की राशि ज्ञात करो?

Solution:- I (FORMULA)

$$X = \frac{100 \times 1740}{100 \times 5 + \frac{8 \times 5 \times 4}{2}}$$

$$= \frac{100 \times 1740}{580} = 300 \text{ ₹}$$

II माना प्रत्येक किरत = 100%

$$\begin{aligned} 100 + 4 \times 8\% &= 132\% \\ 100 + 3 \times 8\% &= 124\% \\ 100 + 2 \times 8\% &= 116\% \\ 100 + 1 \times 8\% &= 108\% \\ 100 + 0 \times 8\% &= 100\% \end{aligned}$$

$$\frac{580\%}{580\%}$$

III rd

$$5X + \frac{X \times 8}{100} [1+2+3+4] = 1740$$

$$\Rightarrow 58X = 17400$$

$$\Rightarrow X = 300 \text{ ₹}$$

$$\begin{aligned} 580\% &\rightarrow 1740 \\ \Rightarrow 100\% &\rightarrow \frac{1740}{580} \times 100 = 300 \end{aligned}$$

12800 की राशि 3 वार्षिक किरता में देय है। पहली किरत की राशि दूसरी किरत की राशि की आधी और तीसरी की $\frac{1}{3}$ है। यदि प्रत्येक किरत पर शेष समय के लिए 10% वार्षिक व्याज देय हो तो प्रत्येक किरत की राशि ज्ञात करो?

Solution:- $P_1 : P_2 : P_3$ we will find first

$$P_1 = \frac{P_2}{2} = \frac{P_3}{3} \Rightarrow P_1 : P_2 : P_3 = 1 : 2 : 3$$

OR 100 200 300

$$100 + \frac{100 \times 10 \times 2}{100} = 120\%$$

$$200 + \frac{200 \times 10 \times 1}{100} = 220\%$$

$$300 + 0 = 300\%$$

$$\frac{640\%}{640\%}$$

[पहली किरत पर 2 वर्ष का,
दूसरी पर 1 वर्ष का, और
तीसरी पर 0 वर्ष का व्याज होगा]

$$640\% \rightarrow 12800$$

$$100\% \rightarrow 2000$$

$$200\% \rightarrow 4000$$

$$300\% \rightarrow 6000$$

(4)

cash price of a mobile is 1500 ₹. but a man purchased for ₹ 350 cash down payment and 3 equal monthly installment of ₹ 400 each. Find the Rate of Interest?

Solution: - $\text{Rem} = 1500 - 350 = 1150$
Find equivalent 1 month P

$$\begin{array}{l|l} 1150 - 400 & \text{also } 400 \times 3 = 1200 \\ 750 - 400 & \text{but Rem} = 1150 \\ 350 & \Rightarrow SI = 50 \\ \hline 2250 & \end{array}$$

$$\therefore \frac{2250 \times R \times 1}{100 \times 12} = 50 \Rightarrow R = 26\frac{2}{3}\%$$

OR

$$P + \frac{PRT}{12 \times 100} = XT + \frac{RX}{12 \times 100} [1+2+\dots+(n-1)]$$

$$1150 + \frac{1150 \times R \times 3}{12 \times 100} = 400 \times 3 + \frac{400R}{1200} [9+1]$$

$$1150 + \frac{115R}{40} = 1200 + R$$

$$\Rightarrow 75R = 2000$$

$$R = 26\frac{2}{3}\% \text{ Ans.}$$

1 व्यक्ति 10 रु० कर्ज लेता है और वह 1 रु० मासिक बिलों में 11 महीनों में चुकाता है, व्याज की दर क्या होगी?

Solution: - equivalent principle for 1 month
पहले महीने 10 रु० पर, दूसरे महीने 9 रु० पर and so on
व्याज लगाया क्योंकि वो हर महीने 1 रु० दे रहा है।

10
9
8
7
6
5
4
3
2
1
0

$$SI = \frac{55 \times R \times 1}{100 \times 12} = 1 [11-10]$$

$$\Rightarrow R = \frac{240}{11} \% = 21\frac{9}{11}\%$$

$$\text{II } P + \frac{PTR}{12 \times 100} = NX + \frac{RX}{12 \times 100} [1+2+\dots+(n-1)]$$

$$X = 1, N = 11, P = 10, T = 11$$

$$10 + \frac{10 \times 11 \times R}{100} = 1 \times 11 + \frac{R \times 1}{12 \times 100} [1+2+\dots+10] = 21\frac{9}{11}\%$$



Compound Interest

COMPOUND INTEREST

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

$$\text{COMPOUND Interest (CI)} = A - P$$

$$= P \left[1 + \frac{R}{100} \right]^T - P = P \left\{ \left(1 + \frac{R}{100} \right)^T - 1 \right\}$$

IN Compound Interest principle keep on changing / compounding / updating after specific period of time according to term specified like yearly / half yearly / Quarterly etc.

IN simple words we can say that compound interest is interest on interest or principle keep on compounding (updating)

FIRST year Simple Interest and compound interest are equal.

$$[SI_{\text{first yr}} = CI_{\text{first year}}]$$

After one year $CI > SI$

If Rate of Interest ARE Different

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

# INTEREST COMPOUNDED	New Rate	New Time	Amount
Half yearly	$R/2$	$2T$	$P \left[1 + \frac{R}{2 \times 100} \right]^{2T}$
Quarterly	$R/4$	$4T$	$P \left[1 + \frac{R}{4 \times 100} \right]^{4T}$
monthly	$R/12$	$12T$	$P \left[1 + \frac{R}{12 \times 100} \right]^{12T}$

When Interest is compounded annually but time is in fraction. e.g. $T = 2\frac{2}{5}$ yrs, then

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

Difference B/w Simple and Compound Interest

e.g. $P = 1000$, $R = 10\%$, $T = 3$ yrs

	SIMPLE INTEREST		COMPOUND INTEREST	
	P	I	P	I
1st yr.	1000	100	1000	100 → Same
2nd yr.	1000	100	1100	110
3rd yr.	1000	100	1210	121
		300		331

So we can see that In Simple Interest P as well as I is same for all years but in case of CI both P & I keep on updating coz in CI Interest also become principle for Next year

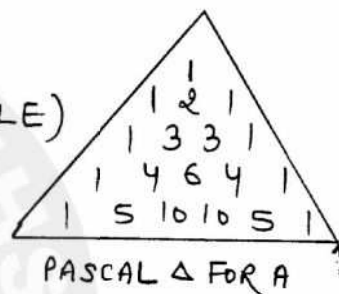
Different Techniques For Calculating CI

If $P = 20000$, $R = 10\%$ Per Annum, $T = 3$ yrs
find the compound interest $CI = ?$

Technique 1 (FORMULA METHOD)

$$CI = P \left[\left(1 + \frac{R}{100} \right)^T - 1 \right] = 20000 \left[\left(1 + \frac{10}{100} \right)^3 - 1 \right] = 6620$$

Technique 2 (PASCAL'S TRIANGLE)



$$CI \text{ FOR } 2 \text{ yrs} = 2A + B$$

$$CI \text{ FOR } 3 \text{ yrs} = 3A + 3B + C$$

$$CI \text{ FOR } 4 \text{ yrs} = 4A + 6B + 4C + D$$

$$CI \text{ FOR } 5 \text{ yrs} = 5A + 10B + 10C + 5D + E$$

where $A = R\%$ of Principle [$R\%$ is Rate]

$B = R\%$ of A

$C = R\%$ of B , $D = R\%$ of C , $E = R\%$ of D

$$\text{For Amount } A_2 = P + 2A + B$$

$$A_3 = P + 3A + 3B + C$$

$$A_4 = P + 4A + 6B + 4C + D$$

$$\text{Here } CI_3 = 3 \left[\underset{\substack{\downarrow \\ A = 2000}}{10\% \text{ of } 20000} \right] + 3 \left[\underset{\substack{\downarrow \\ B = 200}}{10\% \text{ of } 2000} \right] + \left[\underset{\substack{\downarrow \\ C}}{10\% \text{ of } 200} \right]$$

$$= 3 \times 2000 + 3 \times 200 + 20 = 6620 \text{ Ans.}$$

EXAMPLE SOLVED BY PASCAL TRIANGLE

$P = 5000$, $R = 5\%$, $T = 3 \text{ yrs}$ $CI = ?$

$$CI_3 = 3A + 3B + C$$

$$A = 5\% \text{ of } 5000 = 250$$

$$B = 5\% \text{ of } A = 5\% \text{ of } 250 = 12.5$$

$$C = 5\% \text{ of } B = 5\% \text{ of } 12.5 = .625$$

$$\Rightarrow CI_3 = 3 \times 250 + 3 \times 12.5 + .625 = 788.125 \text{ ANS.}$$

$P = 25000$, $R = 12\%$, $T = 3 \text{ yrs}$, $CI = ?$

$$CI = 3(A) + 3(B) + 1(C)$$

$$A = 12\% \text{ of } 25000 = 3000$$

$$B = 12\% \text{ of } A = 12\% \text{ of } 3000 = 360$$

$$C = 12\% \text{ of } B = 12\% \text{ of } 360 = 43.2$$

$$\Rightarrow CI = 3 \times 3000 + 3 \times 360 + 43.2 = 10123.2$$

$P = 25000$, $R = 10\%$, $T = 4 \text{ yrs}$, $CI = ?$

$$CI_4 = 4(A) + 6(B) + 4(C) + 1(D)$$

$$A = 10\% \text{ of } 25000 = 2500$$

$$B = 10\% \text{ of } A = 10\% \text{ of } 2500 = 250$$

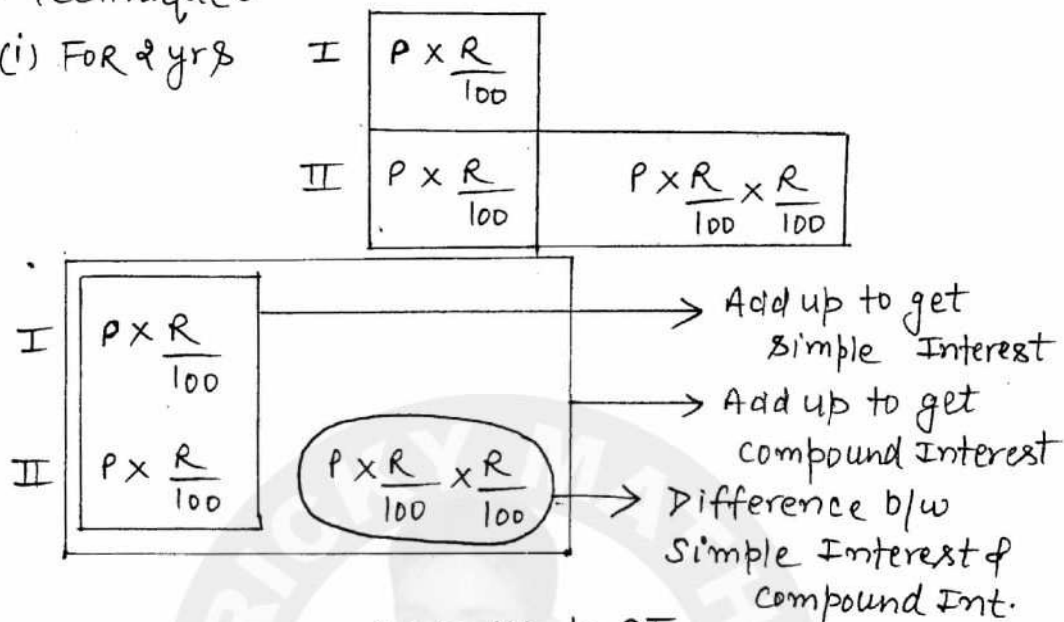
$$C = 10\% \text{ of } B = 10\% \text{ of } 250 = 25$$

$$D = 10\% \text{ of } C = 10\% \text{ of } 25 = 2.5$$

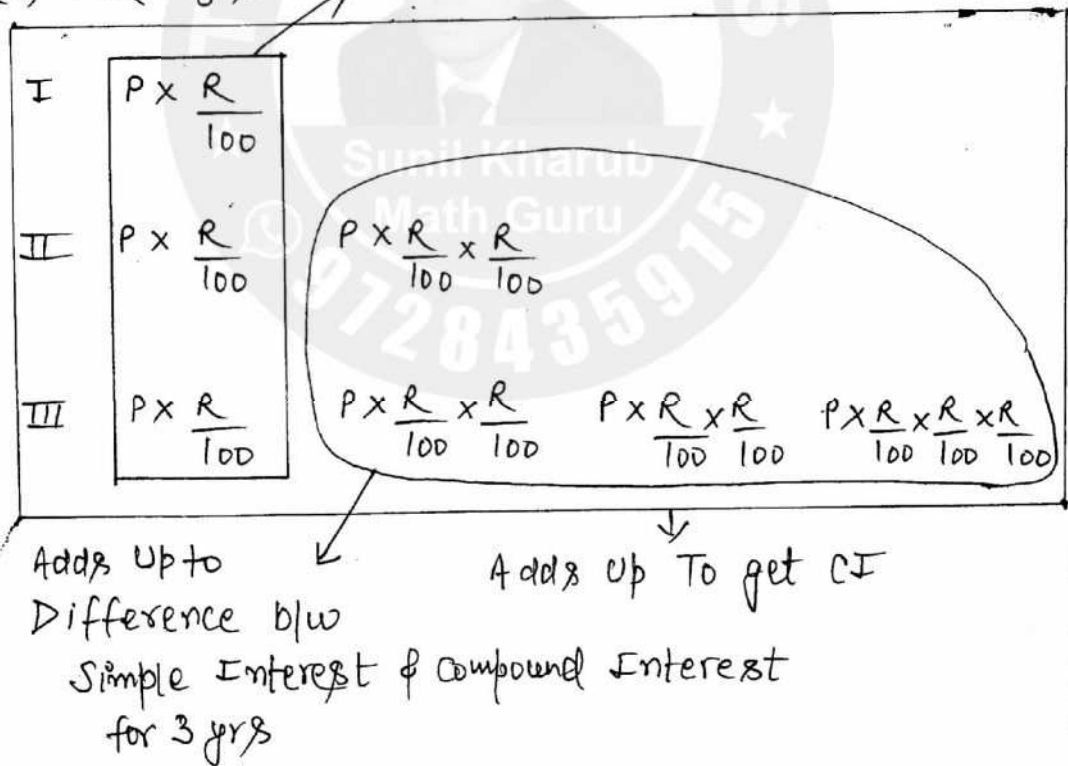
$$CI_4 = 4 \times 2500 + 6 \times 250 + 4 \times 25 + 2.5 = 11602.5 \text{ ANS.}$$

Technique 3

(i) For 2 yrs



(ii) For 3 yrs



$P = 12000$, $R = 10\%$, $T = 2$ yrs, $CI = ?$

I YR 1200 $\xrightarrow{10\%}$
II YR 1200 120

$$CI_2 = 1200 + 1200 + 120 = 2520 \text{ ANS.}$$

Explanation:-

$$1\text{st yr } CI = 1\text{st yr } SI = 10\% \text{ of } 12000 = 1200$$

$$\begin{aligned} 2\text{nd yr } CI &= 10\% \text{ of } 12000 + 10\% \text{ of } 1\text{st yr } CI (1200) \\ &= 1200 + 120 = 1320 \end{aligned}$$

$$CI_2 = CI \text{ 1st YR} + CI \text{ 2nd YR} = 1200 + 1320 = 2520$$

$P = 25000$, $R = 10\%$, $T = 3$ yrs, $CI = ?$

1st yr CI 2500

2nd YR CI 2500 250

3rd YR CI 2500 250 250 25

$$\begin{aligned} CI \text{ for 3 year} &= \text{Add All} = 2500 + 2500 + 1500 + \\ &\quad 250 + 250 + 250 + 25 \\ &= 8275 \text{ ANS.} \end{aligned}$$

$P = 20000$, $R = 10\%$ p.a., $T = 3$ yrs, $CI = ?$

I 2000

II 2000 200

III 2000 200 200 20

Add all to get CI

$$CI_3 = 2000 + 2000 + 2000 + 200 + 200 + 200 + 20 = 6620$$

Technique 4 (Ratio/Fraction Method)

$$R = 10\% = \frac{1 \rightarrow I}{10 \rightarrow P} \Rightarrow A = P + I = 11$$

Try to assume Principle according to denominator of fraction and no. of years.

Here Assumed Principle $= (D)^n$, where

$$D = 10 \quad \{R = \frac{1}{10}\}$$

D = Denominator

n = No of years

$$\text{Principle}_{\text{New/Assumed}} = (10)^3 = 1000$$

$$P = 1000, R = 10\%, T = 3 \text{ yrs}$$

I 100

II 100 + 10

III 100 + 10 + 10 + 1

$$\Rightarrow CI_3 = 331$$

By Unitary method

$$\text{if } P = 1000 \Rightarrow CI = 331$$

$$\text{but } P = 20,000 \Rightarrow CI_3 = \frac{331}{1000} \times 20000 = 6620$$



Technique 5 (SUCCESSIVE PERCENTAGE)

$$R = 10\% = \frac{1}{10} \rightarrow I \Rightarrow A = 11$$

	P	A
I	10	11
II	10	11
III	10	11
<hr/>		
	1000	1331
	$\begin{array}{c} \text{331} \\ \downarrow \\ \text{CI} \end{array}$	

$$\text{If } P = 1000$$

$$\Rightarrow \text{CI} = 331$$

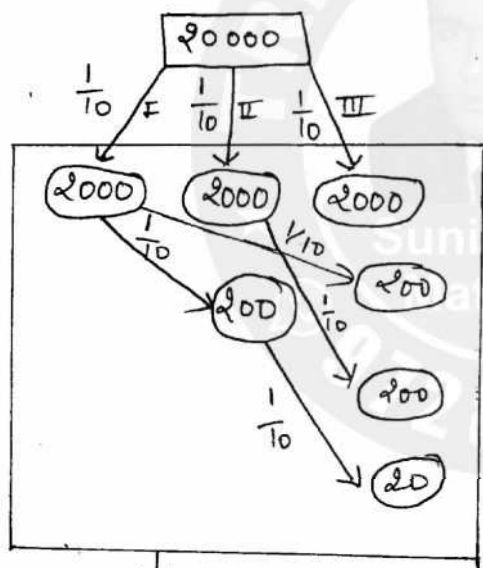
$$\text{but } P = 20000$$

$$\Rightarrow \text{CI} = \frac{331}{1000} \times 20000 = 6620 \text{ ANS.}$$

$$\frac{P}{A} = \frac{10}{11} \times \frac{10}{11} \times \frac{10}{11}$$

$$P : A = 1000 : 1331$$

Technique 6 (TREE METHOD)

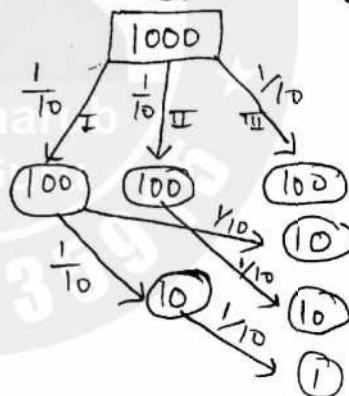


Add all these to get CI

$$\begin{aligned} \text{CI} &= 2000 + 2000 + 2000 + 200 \\ &\quad + 200 + 200 + 20 \\ &= 6620 \text{ ANS.} \end{aligned}$$

$$\text{OR } R = 10\% = \frac{1}{10} \rightarrow I \Rightarrow A = 11$$

$$\text{let } P = (10)^3 = 1000 \{T = 3 \text{ yr}\}$$



Add all present in Circle

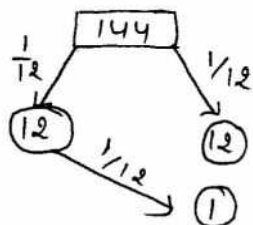
$$\begin{aligned} \text{CI} &= 100 + 100 + 100 + 10 + 10 + 10 + 1 \\ &= 331 \end{aligned}$$

$$\text{If } P = 1000 \Rightarrow \text{CI} = 331$$

$$\begin{aligned} \text{but } P &= 20000 \Rightarrow \text{CI} = \frac{331}{1000} \times 20000 \\ &= 6620 \text{ ANS.} \end{aligned}$$

$P = 28800$, $R = 8\frac{1}{3}\%$, $T = 2 \text{ Yrs}$, $CI = ?$

$$R = 8\frac{1}{3}\% = \frac{1}{12} \rightarrow I \quad \text{let } P = (12)^2 = 144 \quad \{ \text{coz } t=2 \}$$



0	R	I	12
II		12	1
$CI_2 = 12 + 12 + 1 = 25$			

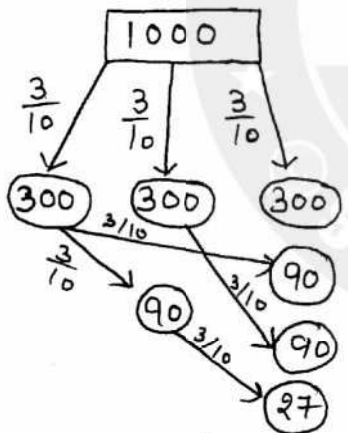
Add all in circle to get $CI = 12 + 12 + 1 = 25$

If $P = 144 \Rightarrow CI = 25$

but $P = 28800 \Rightarrow CI_2 = \frac{25}{144} \times 28800 = 5000 \text{ ANS.}$

$P = 25000$, $R = 30\%$, $T = 3 \text{ Yrs}$, $CI = ?$

$$R = 30\% = \frac{3}{10} \rightarrow I \Rightarrow \text{let } P = (10)^3 = 1000 \quad \{ t=3 \}$$



0	R	I	300
II		300	90
III		300	90 90 27
$CI = 1197$			

0	R	$R = \frac{3}{10} \rightarrow I \Rightarrow A=13$
I	P	A
II	10	13
III	10	13
$(P) \quad 1000 \quad 2197(A)$		
$1197 \rightarrow CI$		

add all in circle
 $CI = 1197$

Now If $P = 1000 \Rightarrow CI_3 = 1197$

but $P = 25000 \Rightarrow CI_3 = \frac{1197}{1000} \times 25000 = 29925 \text{ ANS.}$

$P = 4000$, $R = 5\%$, $T = 3 \text{ yrs}$, $CI = ?$

I 200

II 200 10

III 200 10 10 .5

$$CI = 200 + 200 + 200 + 10 + 10 + 10 + .5 = 630.5 \text{ Ans}$$

OR $R = 5\% = \frac{1}{20} = \frac{21}{20} \rightarrow A$

$P \quad A \quad 20 \quad 20 \rightarrow P$

I 20 21

II 20 21

III 20 21

(P) $8000 - 9261$ (A)

$1261 \rightarrow CI$

If $P = 8000 \Rightarrow CI = 1261$

but $P = 4000 \Rightarrow CI = \frac{1261}{2} = 630.5$

$P = 3600$, $R = 16\frac{2}{3}\%$, $T = 3 \text{ yrs}$ $CI = ?$

$R = 16\frac{2}{3}\% = \frac{1}{6} \rightarrow I \Rightarrow A = 7$ OR $\frac{A}{P} = \frac{7}{6}$

$P \quad A$
I 6 7

II 6 7

III 6 7

(P) $216 \quad 343$ (A)

$127 \rightarrow CI$

If $P = 216 \Rightarrow CI = 127$

but $P = 3600 \Rightarrow CI = \frac{127 \times 3600}{216}$

$= 2116.67 \text{ Ans.}$

$A = 4096$, $R = 14\frac{2}{7}\%$, $T = 2 \text{ yrs}$, $P = ?$

$R = 14\frac{2}{7}\% = \frac{1}{7} \rightarrow I \Rightarrow A = 8$ OR $\frac{A}{P} = \frac{8}{7}$

$P \quad A$
I 7 8

II 7 8

(P) $49 \quad 64$ (A)

If $A = 64 \Rightarrow P = 49$

but $A = 4096 \Rightarrow P = \frac{49}{64} \times 4096$

$= 3136 \text{ Ans}$

$P = 108000$, $R = 16\frac{2}{3}\%$, $T = 2 \text{ yrs}$, $CI = ?$

$R = 16\frac{2}{3}\% = \frac{1}{6} \rightarrow I$ let $P = (6)^2 \{(D)^n\}$, Here $D=6$
 $6 \rightarrow P$ $n=2$
 \downarrow
 No of years

$CI_1 = \frac{1}{6} \text{ of } 36 = 6$ $= 36$

I $6 \searrow \frac{1}{6}$

II $6 \quad 1 \Rightarrow CI_2 = 6 + 6 + 1 = 13$

if $P = 36 \Rightarrow CI_2 = 13$

but $P = 10800 \Rightarrow CI_2 = \frac{13}{36} \times 10800 = 3900 \text{ ANS.}$

$P = 1024000$, $R = 12.5\%$, $T = 3 \text{ yrs}$, $CI = ?$

$R = 12.5\% = \frac{1}{8} \rightarrow I$ let $P = (8)^3 = 512 \{ \because T = 3 \text{ yrs} \}$
 $8 \rightarrow P$

$CI_1 = \frac{1}{8} \times 512 = 64$

I $64 \searrow \frac{1}{8}$

II $64 \quad 8 \searrow \frac{1}{8}$

III $64 \quad 8 \quad 8 \rightarrow 1$

$CI_3 = 64 + 64 + 64 + 8 + 8 + 8 + 1$
 $= 217$

\Rightarrow If $P = 512 \Rightarrow CI = 217$

but $P = 1024000 \Rightarrow CI = \frac{217}{512} \times 1024000$

$= 434000 \text{ ANS.}$

Explanation \rightarrow Always assume $P = (D)^n$

where $D = \text{denominator of fraction}$, $n = \text{no of yrs}$

e.g If $R = 30\% = \frac{3}{10}$, $T = 3 \text{ yrs}$

Assume $P = (10)^3 = 1000$

Technique 7 (Linear Method)

$$\underset{P}{20000} \xrightarrow[2000]{10\% \uparrow} 22000 \xrightarrow[2200]{10\% \uparrow} 24200 \xrightarrow[2420]{10\% \uparrow} 26620 \underset{A_3}{}$$

$$CI_3 = A_3 - P = 26620 - 20000 = 6620 \text{ ANS}$$

Technique 8 (Net Percentage Change)

$$a + b + \frac{ab}{100}$$

$$\text{Here } a = b = 10\% \Rightarrow 10 + 10 + \frac{10 \times 10}{100} = 21\%$$

$$\text{again } a = 21, b = 10 \Rightarrow 21 + 10 + \frac{21 \times 10}{100} = 33.1\%$$

33.1% is equivalent Rate of 3 yrs

$$\Rightarrow CI_3 = 33.1\% \text{ of } 20000 = 6620 \text{ ANS.}$$

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$P = 7500$ $R = 4\%$ $T = 2 \text{ YRS}$ $CI = ?$, $A = ?$

Solution:- I (Ratio)

$$R\% = 4\% = \frac{1 - I}{25 - P} \Rightarrow A = 26$$

$$\text{I} \quad \begin{array}{c} P \\ 25 \end{array} \rightarrow \begin{array}{c} A \\ 26 \end{array}$$

$$\text{II} \quad 25 \rightarrow 26$$

$$625 \rightarrow 676$$

$$\begin{array}{c|c} \times 12 & \times 12 \\ \hline 7500 & 8112 \end{array}$$

$$CI = A - P = 612 \text{ ANS.}$$

II (TRICKY)

$$R = 4\% = \frac{1}{25}$$

$$\text{let } P = (25)^2 = (10)^2 = 625$$

$$\text{I} \quad 25$$

$$\text{II} \quad 25 + 1$$

$$\Rightarrow \text{If } P = 625 \Rightarrow A = 676$$

$$\begin{array}{c|c} \times 12 & \times 12 \\ \hline 7500 & 8112 \end{array}$$

$$\Rightarrow CI = 8112 - 7500 = 612 \text{ ANS.}$$

$P = 20000$, $R = 5\%$, $T = 3 \text{ YRS}$, $A = ?$

Solution:- I (Ratio)

$$R\% = 5\% = \frac{1 - I}{20 - P} \Rightarrow A = 21$$

$$\text{I} \quad \begin{array}{c} P \\ 20 \end{array} \rightarrow \begin{array}{c} A \\ 21 \end{array}$$

$$\text{II} \quad 20 \rightarrow 21$$

$$\text{III} \quad 20 \rightarrow 21$$

$$8000 \rightarrow 9261$$

$$\begin{array}{c|c} \times 2.5 & \times 2.5 \\ \hline 20000 & 23152.50 \end{array}$$

II (TRICKY)

$$\text{Let } P = 5\% = \frac{1}{20} = 6000$$

$$\text{I} \quad 300$$

$$\text{II} \quad 300 + 15$$

$$\text{III} \quad 300 + 15 + 15 + 3$$

$$\text{If } P \rightarrow 6000 \Rightarrow A = 6948$$

$$\text{If } P \rightarrow 20000 \Rightarrow A = \frac{6948}{6000} \times 20000 = 23152.50 \text{ ANS.}$$

$P = 1920$ $R = 12\frac{1}{2}\%$ $T = 2 \text{ YRS}$ $CI = ?$

$$\text{let } P = \frac{N}{P} = (1)^2 \quad R\% = 12.5\% = \frac{1}{8}$$

$$\Rightarrow \text{let } P = (8)^2 = 64$$

$$\text{I} \quad 8$$

$$\text{II} \quad 8 + 1$$

$$\Rightarrow \text{If } CI = 17 \Rightarrow P = 64$$

$$\times 30$$

$$510 \text{ ANS.}$$

$$\times 30$$

$$1920$$

$P = 20000$, $R = 10\%$, $T = 2\frac{2}{5}$, $CI = ?$, $A = ?$
 $R\% = 10\% = \frac{1}{10}$ 20000

Let $P = (10)^3 = 1000$

I 100

II 100 + 10

III $(100 + 10 + 10 + 1) \times \frac{2}{5}$

$P = 1000 \Rightarrow A = 1258.4$

$\Rightarrow \begin{array}{r} | \times 20 \\ 20000 \end{array} \quad \begin{array}{r} | \times 20 \\ 25168 \end{array}$

$P = 8000$, $R = 5\%$, $T = 1 \text{ YR } 73 \text{ days}$, $CI = ?$
 Solution:- $73 \text{ days} = \frac{1}{5} \text{ YR}$, $P = 8000$

I 400

II $(400 + 20) \times \frac{1}{5} = 84 \Rightarrow CI = 400 + 84 = \underline{\underline{484}}$

$P = 50000$, $R_1 = 7\%$, $R_2 = 8\%$, $T = 2$, $CI = ?$

$R_1 = \frac{7}{100}$, $R_2 = \frac{8}{100} \Rightarrow \text{let } P = 2500$

I 175

II 200 + 14

$\Rightarrow \text{LF } P = 50000 \Rightarrow CI = 389$
 $\begin{array}{r} | \times 20 \\ 50,000 \end{array} \quad \begin{array}{r} | \times 20 \\ 7780 \end{array}$

7780 Ans.

$R = 4\%$ p.a. CI of end year = 208, $P = ?$

Let $P = R\% = 4\% = \frac{1}{25} = (25)^2 = 625$

I 25

II $(25 + 1) = 26$

Let $CI_2 = 26 \Rightarrow P = 625$

$\begin{array}{r} | \times 8 \\ 208 \end{array}$

$| \times 8$

5000 Ans

माना P का CI 208 है
 CI 208 है

$R\% = 4\% = \frac{1}{25}$

$\therefore \text{माना } P = (25)^2 = 625$

625

$\begin{array}{r} 26 \times 8 \\ 25 \end{array} \Rightarrow$

25

25

$1 \rightarrow 5000$

$R = 10\%$, 3rd year CI = 72.60, $P = ?$

Solution:- $R = 10\% = \frac{1}{10} \Rightarrow P = (10)^3 = 1000$

I 100

II $100 + 10$

III $(100 + 10 + 10 + 1) = 121$

IF $CI_3 = 121 \Rightarrow P = 1000$

$\times \frac{6}{10}$

$\times \frac{6}{10}$

72.60

600 Ans.

$R = 5\%$, CI for third year = 220.50, $P = ?$

Solution:- $R = 5\% = \frac{1}{20} \Rightarrow P = (20)^3 = 8000$

I 400

II $400 + 20$

III $(400 + 20 + 20 + 1) = 441$

IF $CI_3 = 441 \Rightarrow P = 8000$

$\times \frac{1}{2}$

$\times \frac{1}{2}$

220.50

4000 Ans

$R = 10\%$, CI for fourth year = 665.50, $P = ?$

Solution:- $R\% = \frac{1}{10} \Rightarrow P = (10)^4 = 10000$

I 1000

II $1000 + 100$

III $1000 + 100 + 100 + 10$

IV $(1000 + 100 + 100 + 10 + 100 + 10 + 10 + 1) = 1331$

IF $CI_4 = 1331 \Rightarrow P$

\Rightarrow

$\times \frac{1}{2} = 10000$

665.50

$\times \frac{1}{2}$

5000

CI for 2nd year = 440, $R_1 = 10\%$, $R_2 = 20\%$, $P = ?$

Solution:- let $P = 2500$ [LCM of $\frac{1}{10}$ & $\frac{1}{5}$]

I 250

II $(500 + 50) = 550 \Rightarrow$

IF $CI_2 = 550 \Rightarrow P = 250$

$\times \frac{4}{5}$

440

$\times \frac{4}{5}$

2000

CI FOR 3rd year = 330, $R_1 = 10\%$, $R_2 = 20\%$, $R_3 = 5\%$
 $P = ?$

Solution:- Let $P = 1000$

$$\text{If } CI_3 = 330 \Rightarrow P = 1000$$

$$I = 100$$

$$II \quad 100 + 20$$

$$III \quad (50 + 5 + 10 + 1) = 66$$

$$\begin{array}{c} \times 5 \\ \times 5 \\ 330 \end{array} \quad \boxed{5000} \text{ Ans.}$$

III किसी राशि पर 2 साल का SI 480 रु है और CI 492 रु है तो ब्याज की दर और मूल धन ज्ञात करें।

Solution:- SI FOR 2 year = 480

$$\Rightarrow \text{SI FOR 1 year} = 240$$

$$\text{SI FOR 1st year} = \text{CI FOR 1st year} = \frac{480}{2} = 240$$

$$\text{CI FOR 2nd year} = 492 - 240 = 252$$

$$\text{Diff of CI} = 252 - 240 = 12$$

$$\therefore \frac{240 \times R \times 1}{100} = 12 \Rightarrow R = 5\% \quad \boxed{P = 4800}$$

किसी राशि पर 3 साल का साधारण ब्याज 1200 रु है और वी साल का CI 820. Find the Rate.

Solution:- SI FOR 3 year = 1200

$$\Rightarrow \text{CI FOR 1st year} = \text{SI FOR 1st year} = \frac{1200}{3} = 400$$

$$I \quad 400$$

$$II \quad \boxed{400 + 20} \Rightarrow R = \frac{20}{400} \times 100 = 5\% \text{ Ans.}$$

$$CI_2 = 820 - 400 = 420$$

एक व्यक्ति 390300 रु की राशि को अपने दो पुत्रों में इस प्रकार निवेश करता है कि जब वे दोनों 18 वर्ष के हों तो उनको बराबर धन मिले। यदि उनकी आयु क्रमशः 13 वर्ष और 15 वर्ष है। यदि वार्षिक दर 4% वार्षिक चक्रवृद्धि हो तो प्रत्येक बेटे का हिस्सा बताइए।

Solution:- I (BASIC)

$$P_1 \left[1 + \frac{4}{100} \right]^5 = P_2 \left[1 + \frac{4}{100} \right]^3$$

$$P_1 \left[\frac{26}{25} \right]^2 = P_2$$

$$\Rightarrow \frac{P_1}{P_2} = \frac{625}{676} \Rightarrow P_1 = \frac{390300}{1301} \times 625 = 187500$$

$$P_2 = \frac{390300}{1301} \times 676 = 202800$$

II (TRICKY)

$$\text{Rate} = 4\% = \frac{1}{25}$$

1st SON 2nd SON

$$(26)^2 : (25)^2$$

$$\begin{array}{ccc} 676 & 625 & 1301 \\ | \times 300 & | \times 300 & | \times 300 \end{array}$$

$$202800 \quad 187500 \quad 390300$$

$P = ?$, $R = 12.5\%$, $T = 3 \text{ yr}$
 $CI = 4340$ (TOTAL)

Solution:- $R = 12.5\% = \frac{1}{8}$

$$\text{Let } P = (D)^3 = (8)^3 = 512$$

I 64

II 64 8

III 64 8 8 1

$$\text{If } CI \rightarrow 64 + 64 + 64 + 8 + 8 + 8 + 1 = 217 \Rightarrow P = 512$$

$$\begin{array}{cc} 20 \times & \times 20 \\ 4340 & 10240 \end{array}$$

$R = 14 \frac{2}{7}\%$, $T = 2 \text{ year}$

CI FOR 2nd YEAR = 720

$P = ?$

Solution:- $R = 14 \frac{2}{7}\% = \frac{1}{7}$

$$\text{Let } P = (D)^2 = (7)^2 = 49$$

I = 7

II $\boxed{7 + 1} = 8$

$$\text{If } CI \rightarrow 8 \Rightarrow P = 49$$

$$\begin{array}{cc} \times 90 & \times 90 \\ 720 & 4410 \end{array}$$

Difference between CI and SI

$$T = 2 \text{ years}$$

$$D = \frac{P R^2}{100^2}$$

$$T = 3 \text{ years}$$

$$D = \frac{P R^2}{100^2} \times \frac{(300 + R)}{100}$$

where $D = \text{Diff between CI \& SI} = \text{CI} - \text{SI}$

$D = 48$, $T = 2 \text{ years}$, $R = 20\%$, $P = ?$

Solution:- I

$$R = 20\% = \frac{1}{5}$$

$$\text{Let } P = (D)^2 = 25$$

I $\boxed{5}$

II $\boxed{5} + (1) \rightarrow D$
SI

If $D = 1 \Rightarrow P = 25$

$$\begin{array}{r} 48 \times | \\ 48 \end{array} \quad \begin{array}{r} | \times 48 \\ 1200 \text{ ANS.} \end{array}$$

II

$$R = 20\% = \frac{1}{5}$$

$$P : D$$

$$(5)^2 : (1)^2$$

$$25 : 1$$

$$\begin{array}{r} | \times 48 \\ 1200 \end{array} \quad \begin{array}{r} | \times 48 \\ 48 \end{array}$$

$$\begin{array}{r} 1200 \\ 48 \end{array}$$

III (FORMULA)

$$D = \frac{P R^2}{100}$$

$$48 = \frac{P \times (20)^2}{100}$$

$$\Rightarrow P = 1200 \text{ ANS.}$$

$P = 2500$, $T = 2 \text{ yrs}$
 $\text{CI} - \text{SI} = ?$, $R = 6\%$

Solution:- $R\% = \frac{6}{100} = \frac{3}{50}$

$$\text{Let } P = (D)^2 = (50)^2 = 2500$$

I 150

II $150 + (9) \rightarrow D$

II $D = \frac{P R^2}{100^2} = \frac{2500 \times (6)^2}{100^2}$
 $= 9$

III $P : D$

$$(50)^2 : (3)^2$$

$$2500 : (9) \rightarrow D$$

$P = 1250$, $T = 2 \text{ years}$
 $\text{CI} - \text{SI} = 2$, $R = ?$

Solution:-

(I) Let Rate of $\% = R$

I $\frac{1250 \times R}{100}$

II $\frac{1250 \times R}{100} + \boxed{\frac{1250 \times R}{100} \times \frac{R}{100}} \xrightarrow{D}$

$$\frac{R^2}{8} = 2 \Rightarrow R = 4\% \text{ ANS.}$$

II (FORMULA) $D = \frac{P R^2}{100^2}$

$$2 = \frac{1250 \times R^2}{100^2} \Rightarrow R^2 = 16$$

$$\Rightarrow R = 4\%$$

$P = 16000$, $R = 5\%$, $T = 3$ years, $CI - SI = D = ?$

Solution: (I) Let $P = (D)^3 = 8000$ II (TRICKY)

I 400

II $400 + 20$

III $400 + 20 + 20 + 1$ — D

IF $P = 8000 \Rightarrow D = 61$

$| \times 2$

16000

$| \times 2$

122

$$5\% = \frac{1}{20}$$

P D

$$D = \frac{PR^2}{100^2} \times \frac{300+R}{100}$$

$$= \frac{16000 \times 5^2}{100^2} \times \frac{305}{100} = 122 \text{ ANS.}$$

$P = 8000$, $T = 3$ years

$D = CI - SI = 61$, $R = ?$

Solution: (TRICKY)

$$\frac{D}{P} = \frac{3R+1}{R^3}$$

$$\frac{61}{8000} = \frac{3R+1}{R^3}$$

equating $R^3 = 8000 \Rightarrow R = 20$

$$\text{Rate} = \frac{1}{R} \times 100 = \frac{1}{20} \times 100 = 5\%$$

$P = 40000$, $R = 5\%$, $T = 4$ yr

$D = CI - SI = ?$

Solution: Let $P = (D)^4 = 160000$

I 80000

II $80000 + 4000$

III $80000 + 4000 + 4000 + 20$

IV $80000 + 4000 + 4000 + 20 + 4000 + 20 + 20 + 1$

IF $P = 160000 \Rightarrow D = 2481$

$| \times \frac{1}{4}$

40000

$| \times \frac{1}{4}$

620.25 ANS.

$P = 2000$, $T = 2$ years

$R_1 = 5\%$, $R_2 = 4\%$

$D = CI - SI = ?$

Solution: $P = 2000$

I 100

II $80 + (4) \rightarrow D$

$P = 5000$, $T = 2$ years

$D = CI - SI = 25$, $R_1 = 10\%$

$R_2 = ?$

Solution: 5000

I 500

$$\text{II } \frac{5000 \times R_2}{100} + \frac{500 \times R_2}{100} = D$$

$$\frac{500 \times R_2}{100} = 25 \Rightarrow R_2 = 5\%$$

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Type 2 (When Rate is Not given)

TRICK Explanation

$$T = 2 \text{ yrs}$$

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

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

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

$$T = 3 \text{ yrs}$$

$$A = P \left[1 + \frac{R}{100} \right]^3$$

$$\frac{A}{P} = \left[1 + \frac{R}{100} \right]^3$$

$$\sqrt[3]{\frac{A}{P}} = \left[1 + \frac{R}{100} \right]$$

↑ 1 year change (SI = CI) ↑

$$\left[1 + \frac{R}{100} \right] \begin{cases} \rightarrow T = 2 \text{ yrs} \Rightarrow \sqrt{\frac{A}{P}} \text{ (वर्गमूल कर देंगे)} \\ \rightarrow T = 3 \text{ yrs} \Rightarrow \sqrt[3]{\frac{A}{P}} \text{ (घनमूल कर देंगे)} \\ \rightarrow T = 4 \text{ yrs} \Rightarrow \sqrt[4]{\frac{A}{P}} \\ \rightarrow T = n \text{ yrs} \Rightarrow \sqrt[n]{\frac{A}{P}} \end{cases}$$

e.g if $1 + \frac{R}{100} = \frac{4}{3} \Rightarrow \frac{R}{100} = \frac{1}{3}$ OR $R = 33.33\%$

OR $1 + \frac{R}{100} = \frac{4}{3} \rightarrow \begin{matrix} A_1 \\ P_1 \end{matrix}$ $I = 1$ $R\% = \frac{1}{3} \times 100 = 33.33\%$

A sum of money becomes 9 times in 2 years at a certain rate of C.I. Find the Rate?

Solution:- I (BASIC)

Let $P=1 \Rightarrow A=9$

$$9 = 1 \left[1 + \frac{R}{100} \right]^2$$

OR $1 + \frac{R}{100} = 3$

$\frac{R}{100} = 2 \Rightarrow R = 200\%$ Ans.

II (TRICKY)

$T=2\text{yrs}$ take square root

$$\left[1 + \frac{R}{100} \right] = \sqrt{\frac{A}{P}} = \frac{3}{1}$$

$\Rightarrow \frac{R}{100} = 2 \Rightarrow R = 200\%$

OR $\sqrt{9} : \sqrt{1} = \frac{A}{P} = \frac{3}{1}$

$R\% = \frac{2}{1} \times 100 = 200\%$

कोई राशि C.I. की दर से 2 साल में 9/4 गुनी हो जाती है। व्याज की दर ज्ञात करें?

Solution $T=2\text{yrs}$, Let $P=1$ OR $A=9/4$

$$1 + \frac{R}{100} = \sqrt{\frac{A}{P}} = \frac{3}{2}$$

$\Rightarrow \frac{R}{100} = \frac{1}{2} \Rightarrow R = 50\%$

$\frac{A}{P} = \frac{9}{4}$

$T=2\text{yrs}$ take sq root

$\sqrt{9} : \sqrt{4} = \frac{A}{P} = \frac{3}{2}$

य 1 साल का ratio

आ जाता है। अब दर का use करो.

$R\% = \frac{1}{2} \times 100 = 50\%$

₹ 8000 becomes 9261 in 3 years at certain rate of compound interest. Find the Rate?

Solution:- I

$T=3\text{yrs}$ take cube root

$$1 + \frac{R}{100} = \sqrt[3]{\frac{9261}{8000}} = \frac{21}{20}$$

$\frac{R}{100} = \frac{1}{20} \Rightarrow R = 5\%$

II

$\frac{A}{P} = \frac{9261}{8000}$

$T=3\text{yrs}$ take cube root

$\sqrt[3]{9261} : \sqrt[3]{8000}$

$21 : 20$

$\left[\frac{A}{P} \right] = 1$

य 3 साल का

P:A आ जाता है। अब हम दर का use करेंगे।

$R\% = \frac{1}{20} \times 100 = 5\%$

A sum of money becomes 25 times in 5 yrs and 36 times in 7 years. Find the Rate of interest?

Solution:— I (BASIC)

let $P = 1₹$

$$\therefore 25 = \left[1 + \frac{R}{100}\right]^5 \quad \text{--- (1)}$$

$$\text{also } 36 = \left[1 + \frac{R}{100}\right]^7 \quad \text{--- (2)}$$

divide (2) by (1), we get

$$\left[1 + \frac{R}{100}\right]^2 = \frac{36}{25} \Rightarrow 1 + \frac{R}{100} = \frac{6}{5}$$

$$\Rightarrow R = 20\% \text{ ANS}$$

II (TRICKY)

$$\begin{array}{l} \text{2 yrs} \left[\begin{array}{l} A_7 (7 \text{ yrs}) \rightarrow 36 \\ A_5 (5 \text{ yrs}) \rightarrow 25 \end{array} \right. \end{array}$$

$$\Rightarrow 1 \text{ yr change} = \sqrt[5]{\frac{36}{25}} = \frac{6}{5} \frac{A}{P}$$

$$A : P \text{ (For 1 yr)}$$

$$\frac{6}{5} \div \frac{5}{1}$$

$$\Rightarrow R\% = \frac{1}{5} \times 100 = 20\%$$

कोई राशि CR की दर से 2 साल में 8 गुणी हो जाती है। और 5 साल में 27 गुणी हो जाती है तो व्याज की दर बताइए?

Solution:—

$$\begin{array}{l} \text{3 yrs} \leftarrow \begin{array}{l} A_5 \xrightarrow{\text{27}} \\ A_2 \xrightarrow{\text{8}} \end{array} \end{array}$$

$$\Rightarrow \text{In 1 year} \rightarrow \sqrt[3]{27} : \sqrt[3]{8} = \frac{3}{2} \frac{A}{P}$$

$$R\% = \frac{1}{2} \times 100 = 50\%$$

कोई राशि CR की दर से 4 साल में 16000 और 7 साल में 18522 हो जाती है। व्याज की दर बताइए?

Solution:—

$$\begin{array}{l} \text{3 yrs} \leftarrow \begin{array}{l} A_7 \xrightarrow{18522} \\ A_4 \xrightarrow{16000} \end{array} \end{array}$$

$$\Rightarrow 1 \text{ yr change } \frac{A}{P} : \frac{P}{A} = \sqrt[3]{\frac{18522}{16000}} = \frac{21}{20}$$

$$R\% = \frac{1}{20} \times 100 = 5\%$$