

COMPOUND INTEREST

चक्रवृद्धि ब्याज

1% ✓
(7-8) लाख
2 लाख
≈ 130%



Year 1



Year 2



Year 3



Year 4



COMPOUND
INTEREST

Conversion of months into Years

12 Months = 1 year (12 महीने = 1 साल)

$$1 \text{ months} \rightarrow \frac{1}{12} \text{ yrs} \checkmark$$

$$3 \text{ months} \rightarrow \frac{3}{12} \text{ yrs} = \frac{1}{4} \text{ yrs} \checkmark$$

$$8 \text{ months} \rightarrow \frac{8}{12} \text{ yrs} = \frac{2}{3} \text{ yrs} \checkmark$$

Conversion of Days into Years :-

365 Day = 1 year (365 दिन = 1 साल)

$$1 \text{ Day} \rightarrow \frac{1}{365} \text{ yrs}$$

$$73 \text{ Day} \rightarrow \frac{73}{365} \text{ yrs} = \frac{1}{5} \text{ yrs}$$

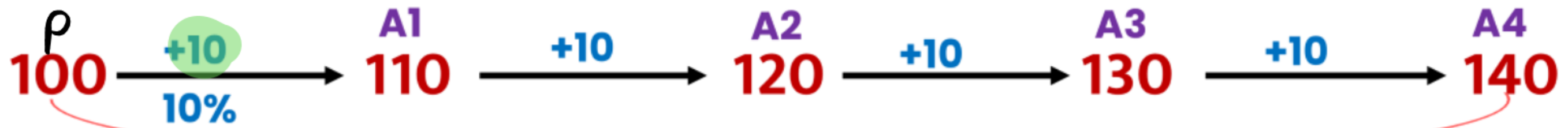
$$146 \text{ Day} \rightarrow \frac{146}{365} \text{ yrs} = \frac{2}{5} \text{ yrs}$$

For S.I



P = 100 R = 10%p.a

T = 4 years



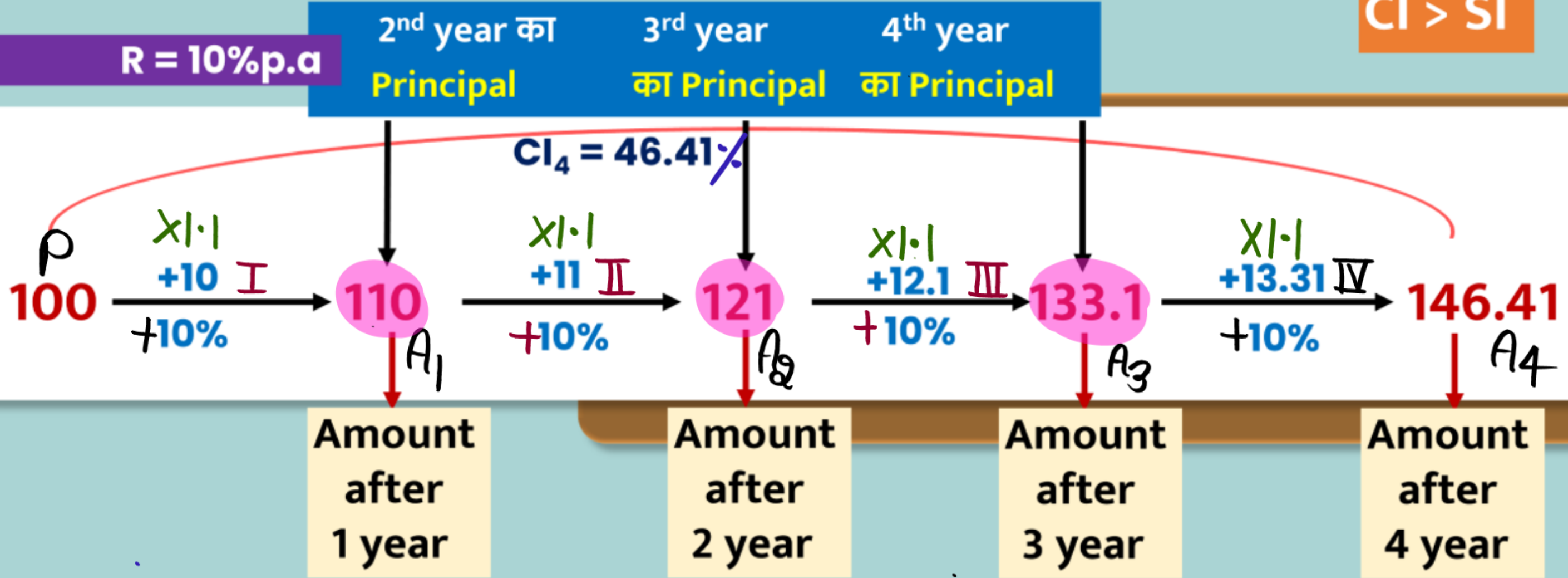
SI₄ = 40%

For C.I

P = 100 R = 10%p.a

10%p.a → $\times 1.1$ or $\times 1.1^4$ m.f

CI > SI



CI₄ = 46.41%

100✓
formula✓
Ratio✓



$$SI_4 = 40\%$$

$$CI_4 = 46.41\%$$

$$\rightarrow +10\%, +10\%$$

$$+10\% \& +10\%$$

$$21\%$$

$$21\%$$

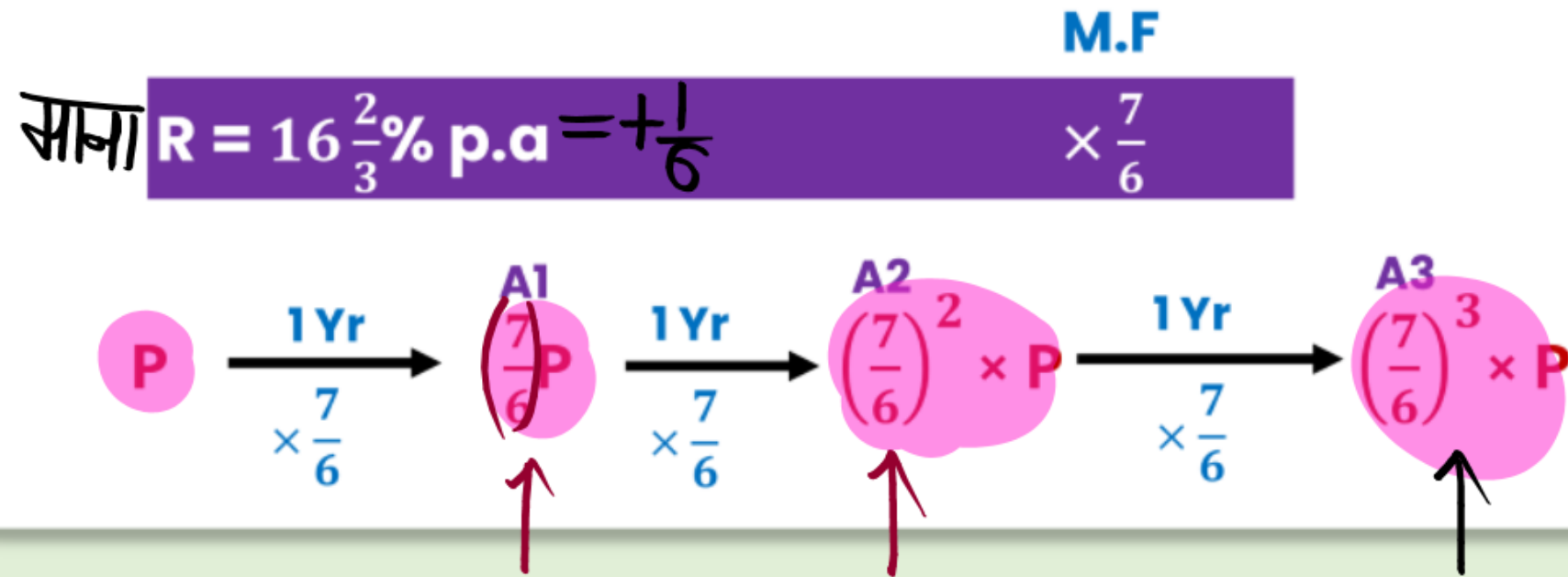
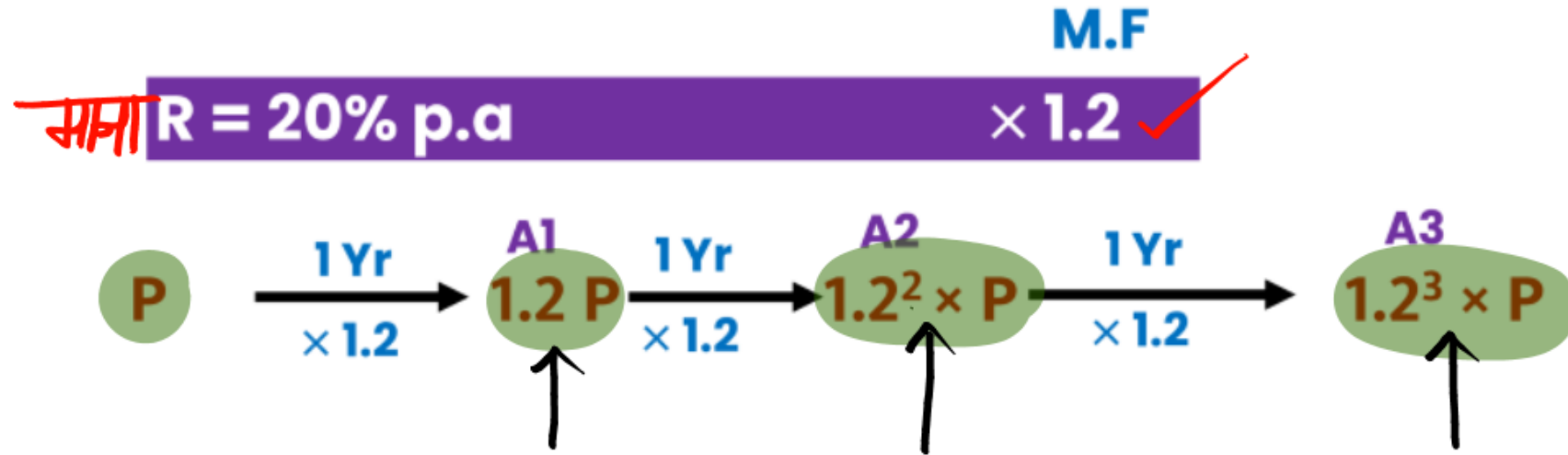
$$46.41\%$$

$$\left(10 + 10 + \frac{10 \times 10}{100}\right)\% = 21\%$$

$$\left(21 + 21 + \frac{21 \times 21}{100}\right)\% = (42 + 4.41)\% = 46.41\%$$



C.I में Amount G.P में होते हैं।

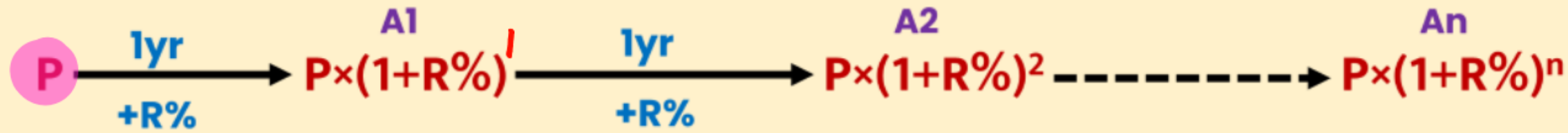


8, 24, 72, 216 - - - -

$\times 3$ $\times 3$ $\times 3$



सम्रा
 $R \text{ a/c} = R\% \text{ p.a}$ M.F
 $\times (1+R\%)$ ✓



P R % p.a C.I yearly

$$A_n = P \times (1 + R\%)^n$$

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

$$CI_n = A_n - P$$

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

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

EXAMPLE

$$+16\frac{2}{3}\% p.a = +\frac{1}{6}$$

$$\frac{A_2}{P} = ? \quad \frac{A_7}{A_3} = ?$$

$$A_2 = P \times \left(\frac{7}{6}\right)^2$$

$$\frac{A_2}{P} = \left(\frac{7}{6}\right)^2 = \frac{49}{36}$$

m.f.
 $\times \frac{7}{6}$

$$\frac{A_4}{P} = \left(\frac{7}{6}\right)^4 = \frac{2401}{1296}$$

$$\frac{A_7}{A_3} = \frac{\cancel{P} \times \left(\frac{7}{6}\right)^7}{\cancel{P} \times \left(\frac{7}{6}\right)^3} = \left(\frac{7}{6}\right)^{7-3}$$

4 years

$$\frac{A_7}{A_3} = \left(\frac{7}{6}\right)^4$$



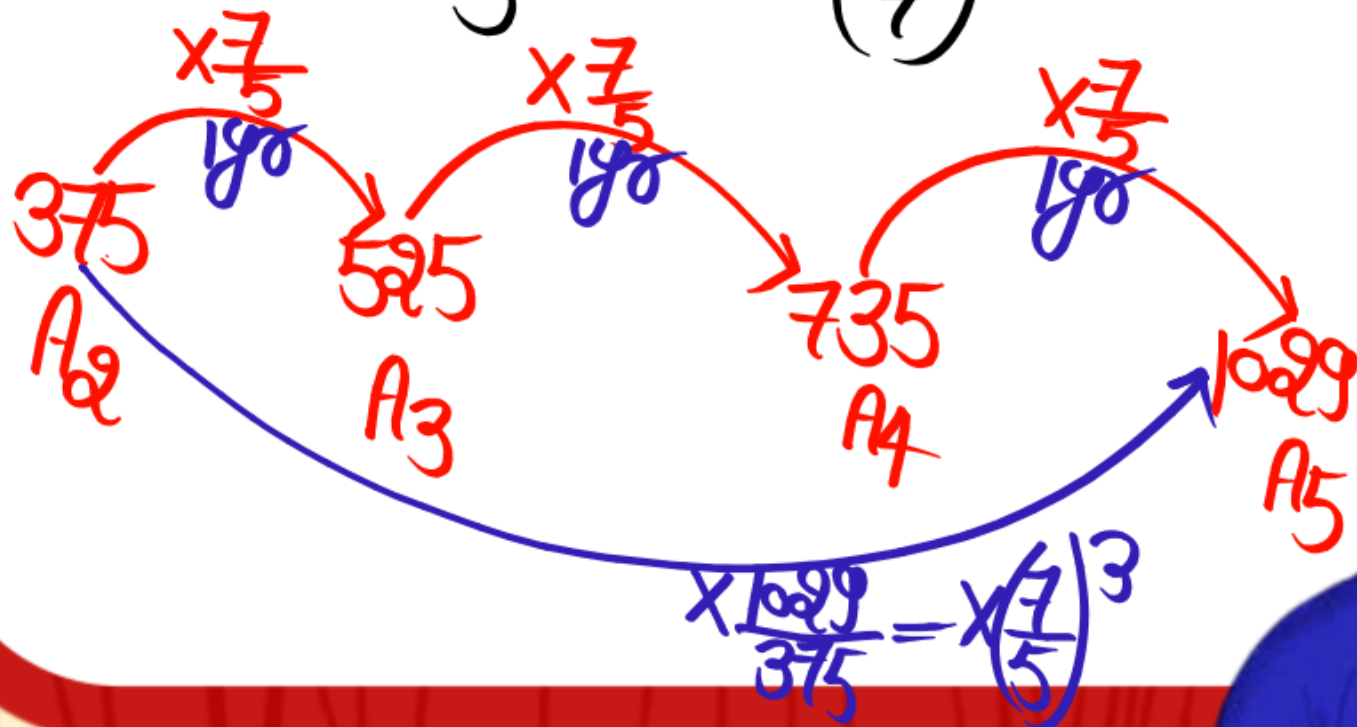
EXAMPLE

$$R = 14\frac{2}{7}\% \text{ p.a.} = +\frac{1}{7}$$

$$A_3 = xRs \text{ माना}$$

$$\rightarrow A_5 = ?$$

$$A_5 = A_3 \left(1 + \frac{1}{7}\right)^2$$



EXAMPLE

$$A_2 = 375Rs$$

$$A_5 = 1029Rs$$

$$Rate = ?$$

अब हमें $\frac{A_5}{A_2} = x \frac{1029}{375} = x \frac{343}{125} = x \left(\frac{7}{5}\right)^3$

180 का MF $\rightarrow x \frac{7}{5}$ $\frac{+2}{5} = 4\% \text{ p.a. Rate}$

P = 100

Rate = 40%p.a

time = 1yr



Yearly
(वार्षिक)
1 year



40%



Half-Yearly
(छमाही)
6 months



44%

Quarterly
(तिमाही)
3 months
 $= \frac{1}{4} \text{ yr}$



+ 46.41%

EXAMPLE

3 yrs $\longrightarrow \times 2$

9 yrs $\rightarrow ? \times 8$

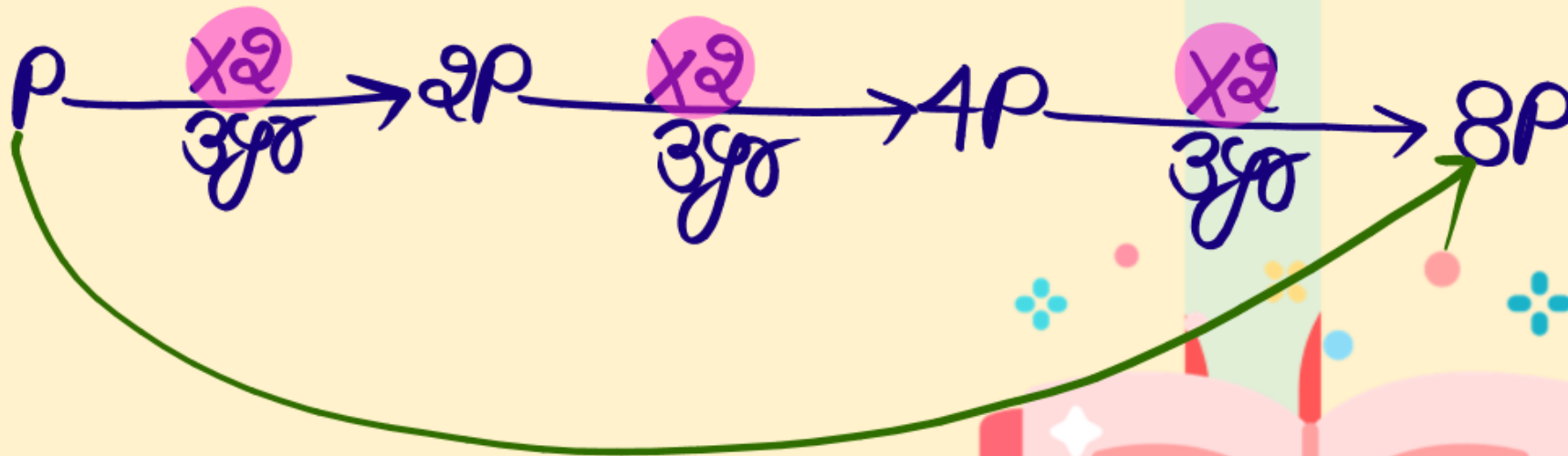


EXAMPLE

15 yrs $\longrightarrow \times 64$

5 yrs $\rightarrow ?$

1 yrs $\rightarrow ?$



$$\begin{array}{l} \text{5 yrs} \longrightarrow \times 3 \\ \text{20 yrs} \longrightarrow \times 3^4 = \times 81 \end{array}$$

$$\text{20 yrs} \longrightarrow \times 3 \times 3 \times 3 \times 3 = \times 81$$

$$\begin{array}{cccc} \times 3 & \times 3 & \times 3 & \times 3 \\ \hline \text{5 yrs} & " & " & " \end{array}$$

$$\text{5 yrs} \longrightarrow \times 3$$

$$\text{1 yr} \longrightarrow \times \sqrt[5]{3}$$

$$\frac{(\sqrt[5]{3} - 1)}{1} \times 100\% = \text{Rate}$$