

A : B

200 250

50

B is how ~~much~~ much % more

than A = $\frac{50}{200} \times 100$

= 25%

$$\frac{\text{Diff}}{\text{Base}} \times 100$$

A is less than B by how much %

= $\frac{50}{250} \times 100$

= 20%

(i) - A is x% more than B. then B is less than by :-

$$\left(\frac{x}{x+100} \times 100 \right) \%$$

(ii) A is x% less than B, then B is more than A by :-

$$\left(\frac{x}{100-x} \times 100 \right) \%$$

eg. 1) A is 25% more than B, then
B is less than A by

$$\left(\frac{25}{100+25} \times 100 \right) \%$$

20%

eg. 2) The Price of vegetable increases by 25%.
By how much % Quantities should be reduced so that we have same total expenditure

Sol

Price \times quantity = Total expenditure

$$\left(\frac{25}{100+25} \times 100 \right)$$

20%

eg. 3) Price of an article is \uparrow by 30%, and con. is \uparrow by 10%, find the eff. on total exp.

Sol/n

Depreciation

eg) Car value in 2014 : 81000

rate of dep = 10%

find value in 2016

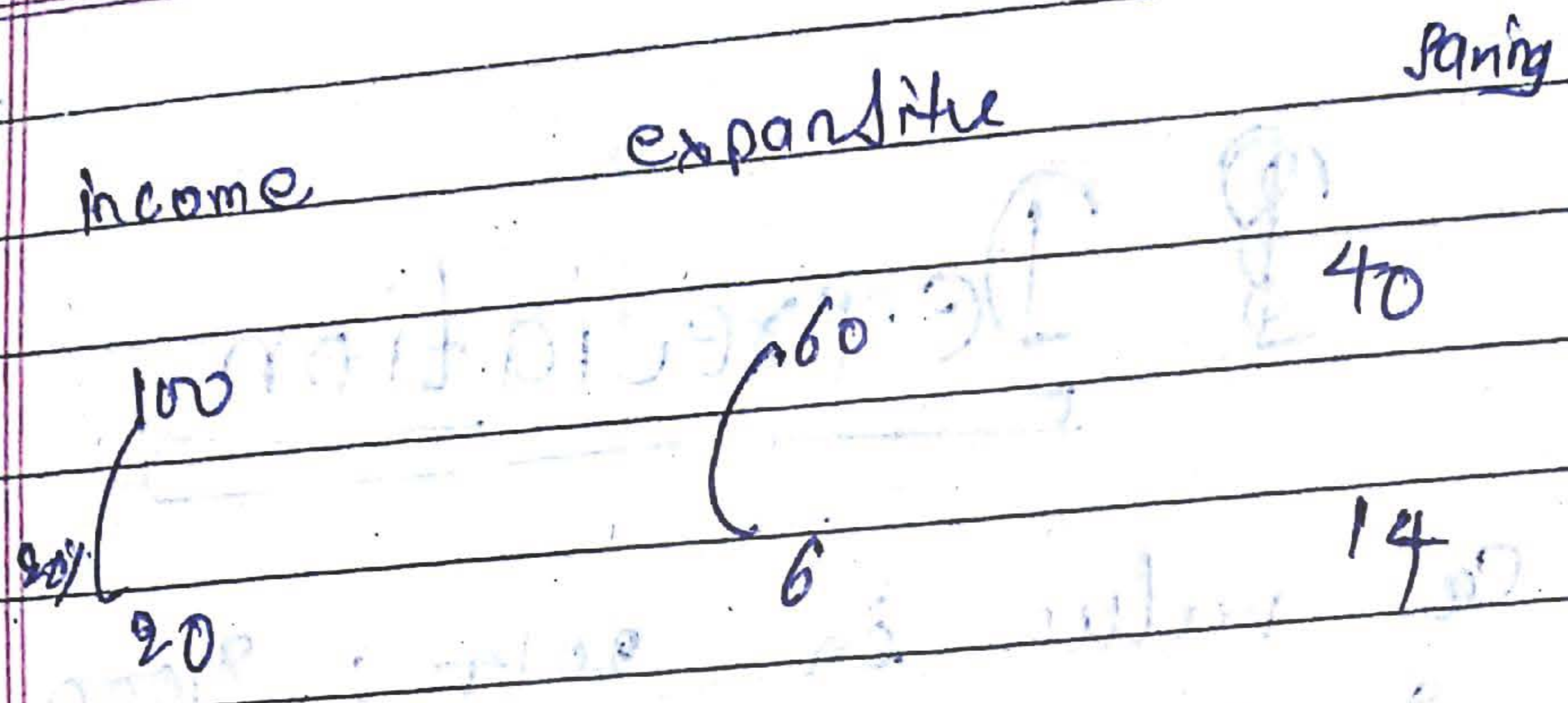
$$\text{value in 2016} = 81000 \times \frac{100-10}{100} \times \frac{100-10}{100}$$

$$= 8$$

$$\text{in 2012} = 81000 \times \frac{100}{100-10} \times \frac{100}{100-10}$$

eg) A person spends 60% of his income, his income is increased by 20%, and his expenditure ↑ by 10%, find % increase in his saving.

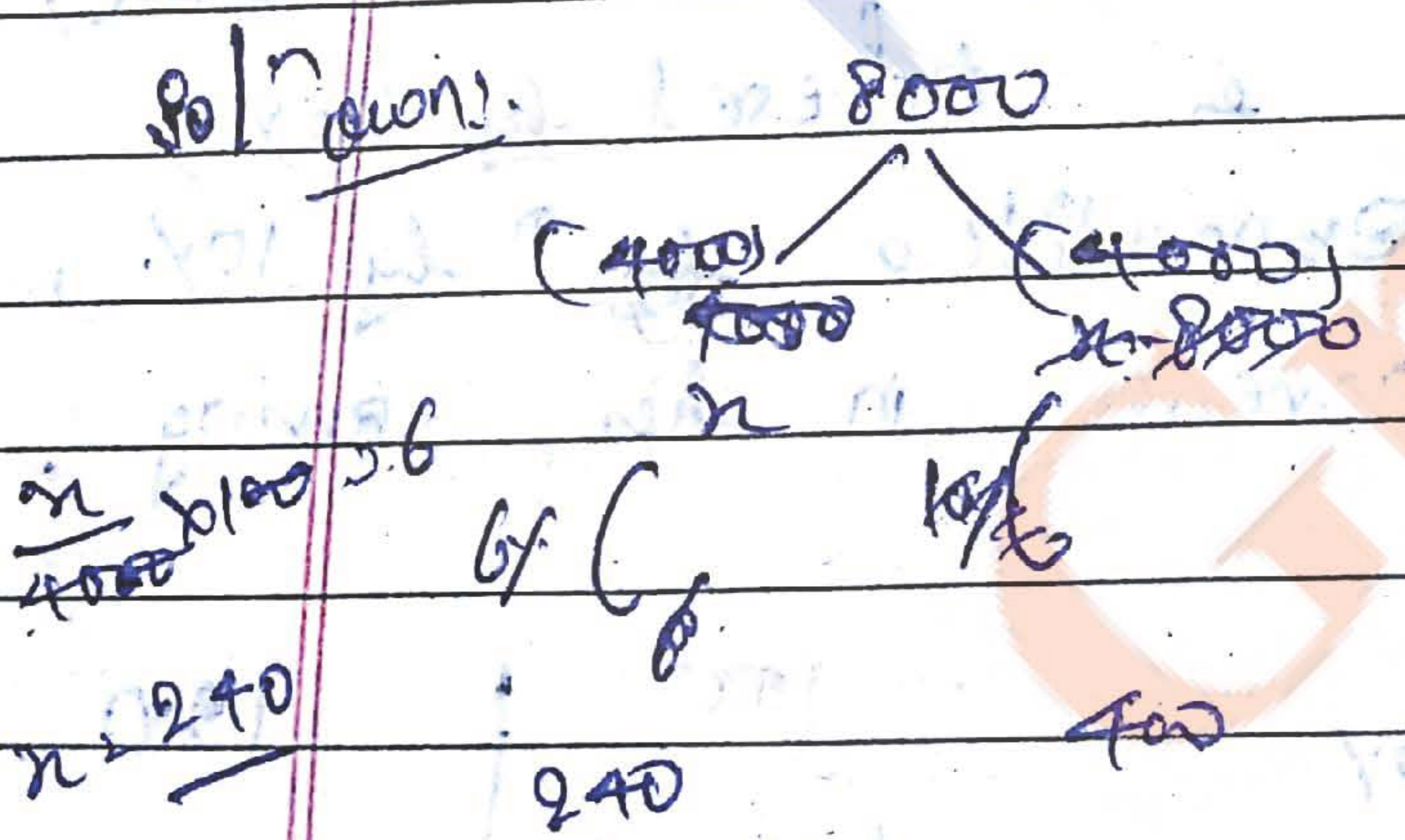
Income	20%	10%	100	120
			spends → 60	
			rest → 40	
			↓	
			36	



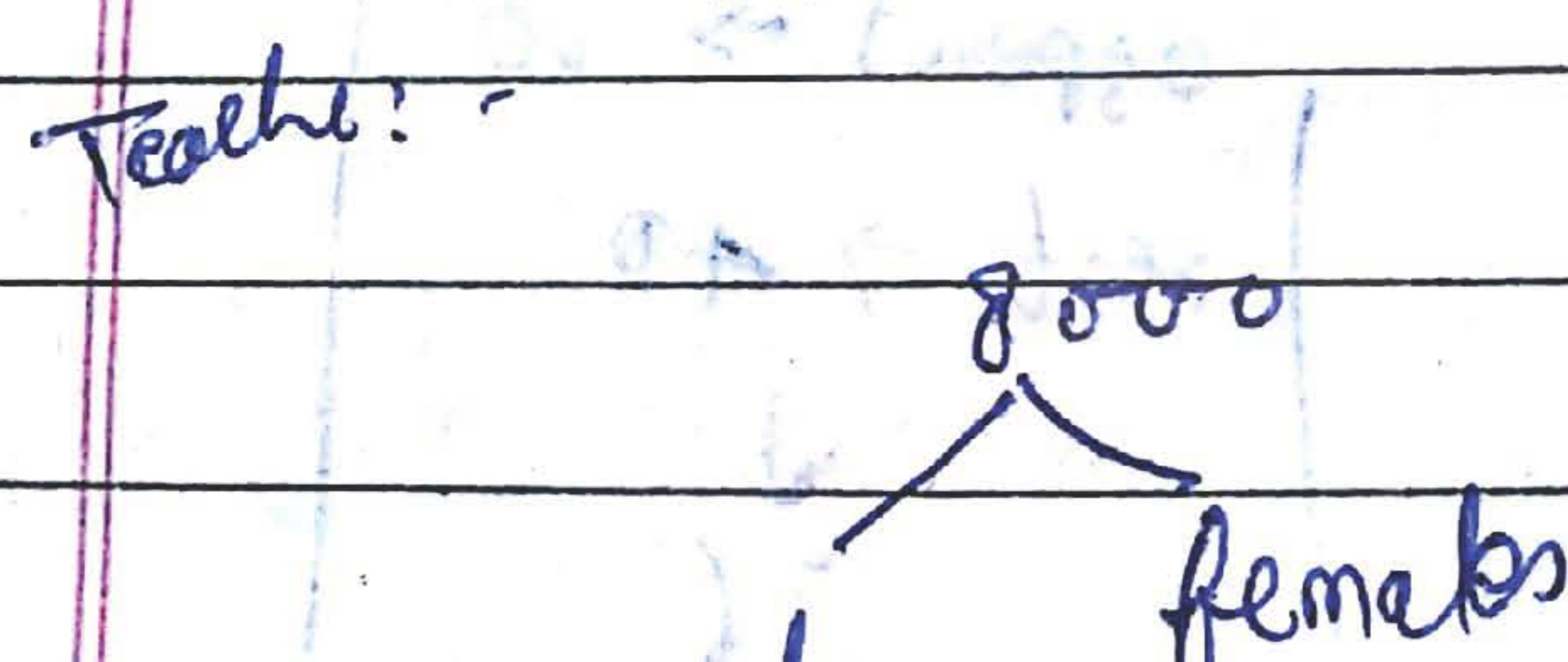
Percentage in saving = $\frac{14}{40} \times 100$
 $= 35\%$

Q1.) Present population of a town is 8000, male ↑ by 10% & female ↑ by 10%. The total population becomes 86%. find the initial population of male and female.

eg 10



Solⁿ

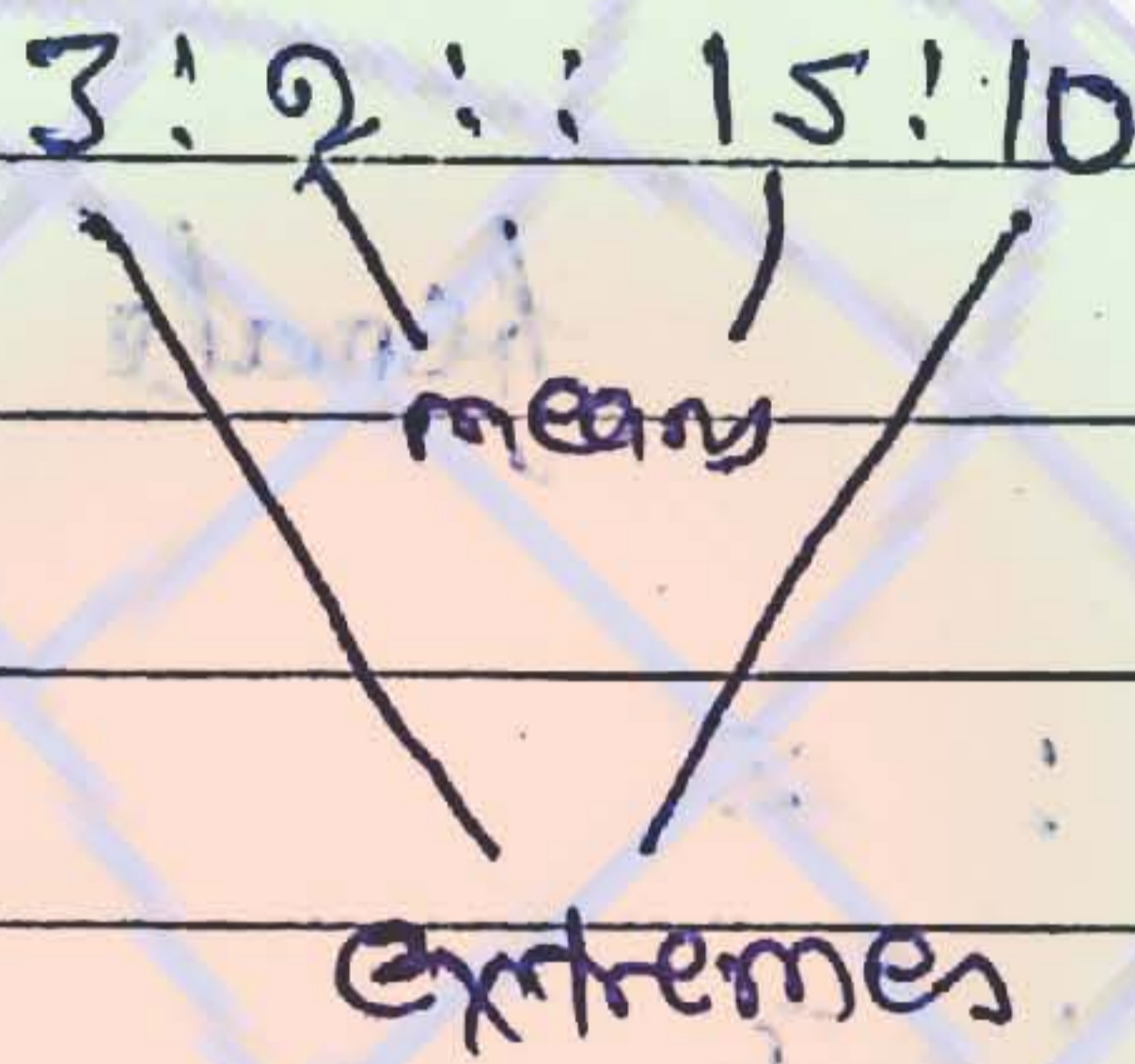


Ratio and Proportion

(i)

$a:b$	$c:d$
$3:2$	$15:10$

A proportion shows equality of two ratios.



(ii)

Product of means = Product of extremes.

(iii)

Find 4th Proportion

$8:8 :: 36:x$

$8 \times x = 8 \times 36$

$(x = 48)$

(iv)

Find 3rd Proportional

$3:6 :: 6:x$

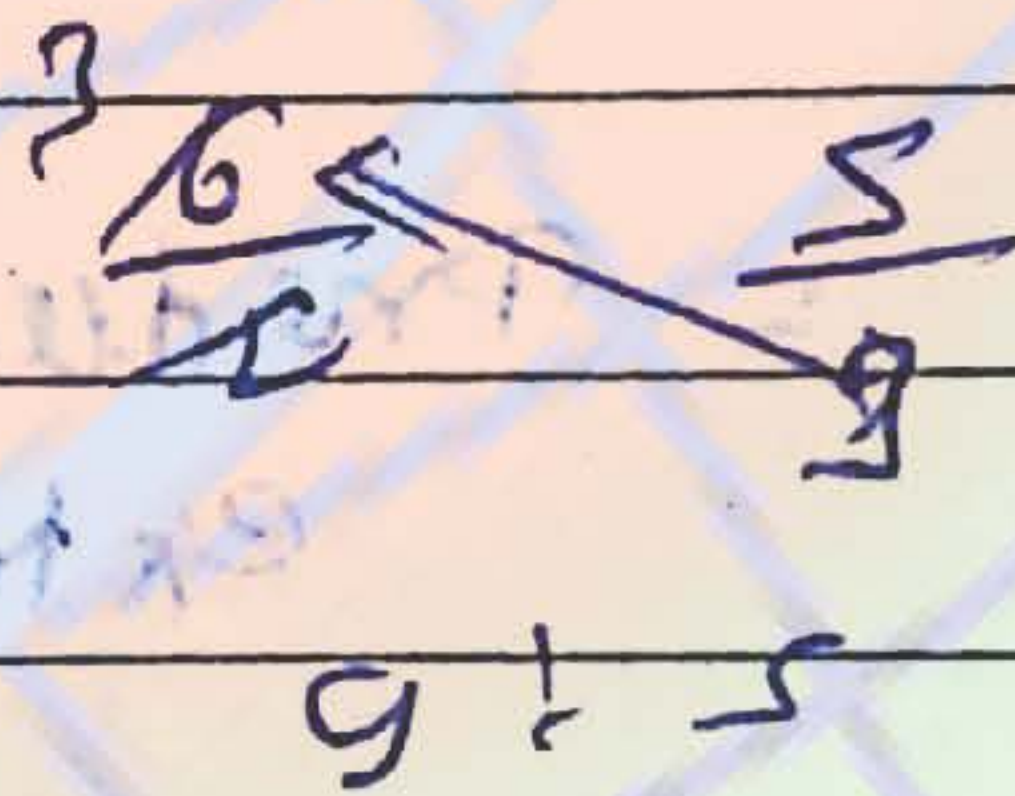
$3:6 :: 6:x$

$3 \times x = 6 \times 6$

(v) The ratio of the total amount is distributed in all males and females is 6:5, the ratio of salaries of male and female is 2:3, find the ratio of the no. of the male and female.

Soln
 G/A: 2:3
 male female

Total Salary - 6:5
 no. of persons - 2:3



eg 2) The initial no. of employees at reduce are in the ratio 3:2, salary of each employ earlier and now is in the ratio of 4:5, by drawing show, company saves 12,000, find initial expenditure initial reduce

Soln
 No. of employees - 3:2
 salary each person - 4:5

Total expenditure - 12:10

1 unit = 6000

Vessels Problem

C-1

$$\boxed{\begin{array}{l} m:W \\ 3:2 \end{array}}$$

$$\boxed{\begin{array}{l} m:W \\ 4:1 \end{array}}$$

mixture
was water

equal quantity is taken out to
make new.

vessel C

$$\boxed{\begin{array}{l} m:W \\ 3+4:2+1 \\ 7:3 \end{array}}$$

C

form of

C-2
C-1

ratio

$$\boxed{\begin{array}{l} m:W \\ 3:2 \end{array}}$$

$$\boxed{\begin{array}{l} m:W \\ 4:3 \end{array}}$$

equal quantity is taken out

vessel C

$$\boxed{\begin{array}{l} m:W \\ \frac{3}{5} : \frac{4}{7} : \frac{2+3}{5+7} \end{array}}$$

$$\frac{21+20}{35} \quad \frac{14+15}{35}$$

$$\frac{41}{35} \quad \frac{29}{35}$$

$$\boxed{41:29}$$

Time and Distance

$$\text{Distance} = \text{Speed} \times \text{time}$$

~~Sheet~~

(i) Speed = 1 km/h

shows : distance is in km and time is in hour.

(ii) Speed = 1 km/h = $\frac{8}{15}$ m/s

1 m/s = $\frac{18}{5}$ km/h

(iii) A train is moving with the speed of 54 km/h, find distance covered by it in 20 sec.

$T = 20 \text{ sec}$

$S = 54 \text{ km/h} \times \frac{5}{18} = 15 \text{ m/s}$

Distance

= 300 m

Compound Interest

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

↳ if interest is compound annually,

$$A = P \left(1 + \frac{R}{200} \right)^{2t}$$

↳ if interest is compound half yearly.

R = rate per annum

t = no. of year

$$A = P \left(1 + \frac{R}{400} \right)^{4t}$$

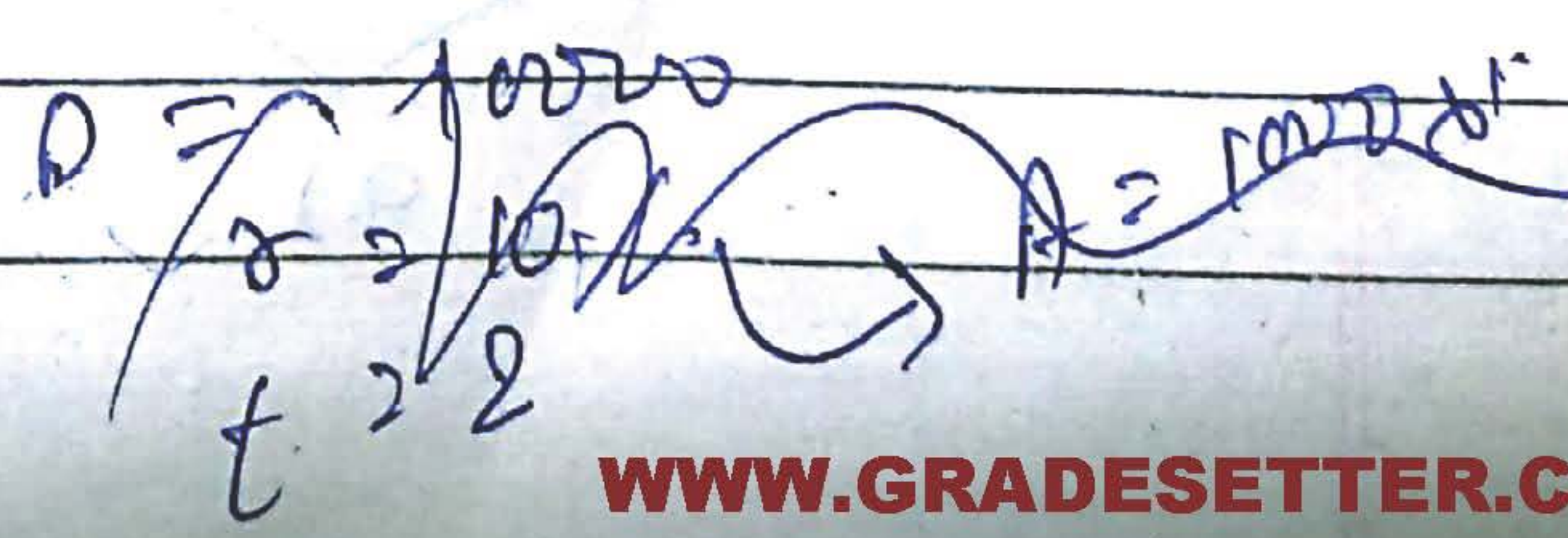
↳ quarterly

$$C.I = A - P$$

↳ R₁ = 10%

↳ R₂ = 20%

↳ R₃ = 30%



* Relation b/w S.I and e.I: =
for 2 years: -

$$\text{Sum} = \frac{\text{diff} \times 100 \times 100}{R \times R} \quad \text{for 2 year}$$

$$\text{diff} = \frac{\text{Sum} \times R \times R}{100 \times 100} = \frac{P \times R^2}{(100)^2}$$

11007

a) The diff b/w the S.I and e.I on a sum of money for 2 years is Rs 632, find the sum. when rate 10%.

Solⁿ

$$\text{Sum} = \frac{\text{diff} \times 100 \times 100}{R \times R}$$

b) The diff b/w e.I and S.I on an amount of Rs 18000 for 2 years was Rs 405, find the rate of interest.

Solⁿ

$$\text{diff} = 405$$

$$A = 18000$$

$$t = 2 \text{ year}$$

$$R = ?$$

$$\text{sum} = \frac{\text{diff} \times 100 \times 100}{R \times R}$$

Squaring

(1)

(i)

$$(98)^2$$

Compare with 100

$$\begin{array}{l} (98)^2 \\ \swarrow \quad \searrow \\ 98-2 = 96 \quad (-2) \end{array}$$

square

$$\underline{96} \quad \underline{0(4)} = 9604 \text{ Ans.}$$

(ii)

$$(97)^2$$

$$(-7)$$

$$\underline{94} \quad \underline{09}$$

(iii)

$$(96)^2$$

$$-4$$

$$\underline{92} \quad \underline{16}$$

Always the digit
in the square full
is the square of
the digit. In case
of square or other
power of two
digit no.

(2) (a)

$$(102)^2$$

$$+2$$

$$\underline{104} \quad \underline{04}$$

$$(b) (105)^2$$

$$+5$$

$$\underline{110} \quad \underline{25}$$

(3) (a) $(80)^2$

\downarrow \uparrow common

(12) $(12+4)$

$80 = 12 + 1 = 77$

77	44

(b)

(4) $(15)^2 = \frac{2}{4} \underline{25}$

\downarrow \uparrow

1×2

$(25)^2 = \frac{6}{2} \underline{25}$

2×3 \uparrow

\downarrow next digit

$(35)^2 = \frac{12}{2} \underline{25}$

3×4 \uparrow

$(45)^2 = \frac{90}{2} \underline{25}$

9×10 \uparrow

\downarrow next digit

(5) $(48)^2$

$(-2) - \text{com. with } 50$

Rest du

Multiplication :-

$$(1) (a) \quad \begin{array}{r} +2 \\ 102 \times 103 \\ \hline +3 = 6 \end{array}$$

$$\begin{array}{r} 105 \mid 06 \\ \hline 102 + 3 = 105 \\ \text{or} \\ 103 + 2 = 105 \end{array}$$

यहाँ 100 तक की संख्या के अग्रलिखित की संख्या को ही Consider करना है।

$$(b) \quad \begin{array}{r} +3 \\ 103 \times 101 \\ \hline +1 = \text{multiply} = 3 \end{array}$$

$$104 \mid 03$$

$$(c) \quad \begin{array}{r} 4 6 \\ 104 \times 106 \end{array}$$

$$110 \mid 24$$

$$(d) \quad \begin{array}{r} +2 +3 \\ 1002 \times 1003 \end{array}$$

$$1005 \mid 006$$

→ thousands base में three digit वाली

$$\frac{m_1 D_1 H_1}{W_1} = \frac{m_2 D_2 H_2}{W_2}$$

m_1 = men under 1st cond.

m_2 = men under 2nd cond.

D_1 = days " " "

D_2

H_1 = hours " " "

W_1 = work " " "

Q.) 12 men complete a piece of work in 16 days
 same work is done by 8 men in how
 many days.

$$\frac{12 \times 16}{8} = 24 \text{ days}$$

Q.L.) 20 men work 9 hours a day to complete
 a piece of work in 12 days.
 Same work done by 24 men 6 hours a
 day. then the work is complete in how
 many days.

$$\frac{m_1 D_1 H_1}{W_1}$$

Q7.) 7 men works 8 hours a day to complete $\frac{1}{3}$ rd piece of work in 36 days,
The rest work done by 24 men, working 6 hours a day in how many days.

$$\frac{7 \times 36 \times 8}{\frac{1}{3}} = \frac{24 \times D_2 \times 6}{\frac{2}{3}}$$

$$28 = D_2$$

Q8.) 32 carpenter works 6 hours a day to make 400 tables in 25 days, then 30 carpenter, works 5 hours a day for 24 days, then how many tables will be make

$$\frac{32 \times 25 \times 6}{400} = \frac{30 \times 24 \times 5}{W_2}$$

$$300 = W_2$$

Q9.) 120 workers can complete a piece of work in 85 days and each worker works 10 hours a day, all workers start the

14-3-21

(1) Natural no - 1, 2, 3, 4, 5 - - - -

(2) whole no - 0, 1, 2, - - - -
 ↑

(3) odd no - 1, 3, 5, 7 - - -

(4) even no - 2, 4, - - -

(5) Prime no - 2, 3, 5, 7, 11, 13, - - -

(6) Rational no - $\frac{p}{q}$, 2, 3, 10, $\frac{5}{2}$, 0.25, 0.333...

(7) Irrational no - can not be written $\frac{p}{q}$
 $\sqrt{2}, \sqrt{5}, \pi, e, 1.7245...$
 non-terminating non-repeating

(8) Real no. - Rational + irrational no.

1.) A no. is continuously divided by 6, 2, 4 leaves the remainders 3, 1, 2 resp.

The same no. is continuously divided by 4, 2, 6. What will be the remainders.

30 |
 7 = 15
 12, 24
 3,

~~6x2x4/2~~

4, 2, 6, 2, 4 = 3, 1, 2

Tricks -

6	81	3
2	19	1
4	6	2
1	1	2

$4+2=6$

जब पर शुरू से '1'
मान लेता है, भरी
trick है,

4	81	1
2	20	0
6	6	4
	1	

Q2. >

A no. is conti. divided by 5, 4, 6,
leaves the rem 4, 3, 4 resp. the same
no. is conti. divided by 6, 4, 5 then
what will be the remainders.

6	219	3
	1	

5	219	4
4	43	3
6	10	4
	1	

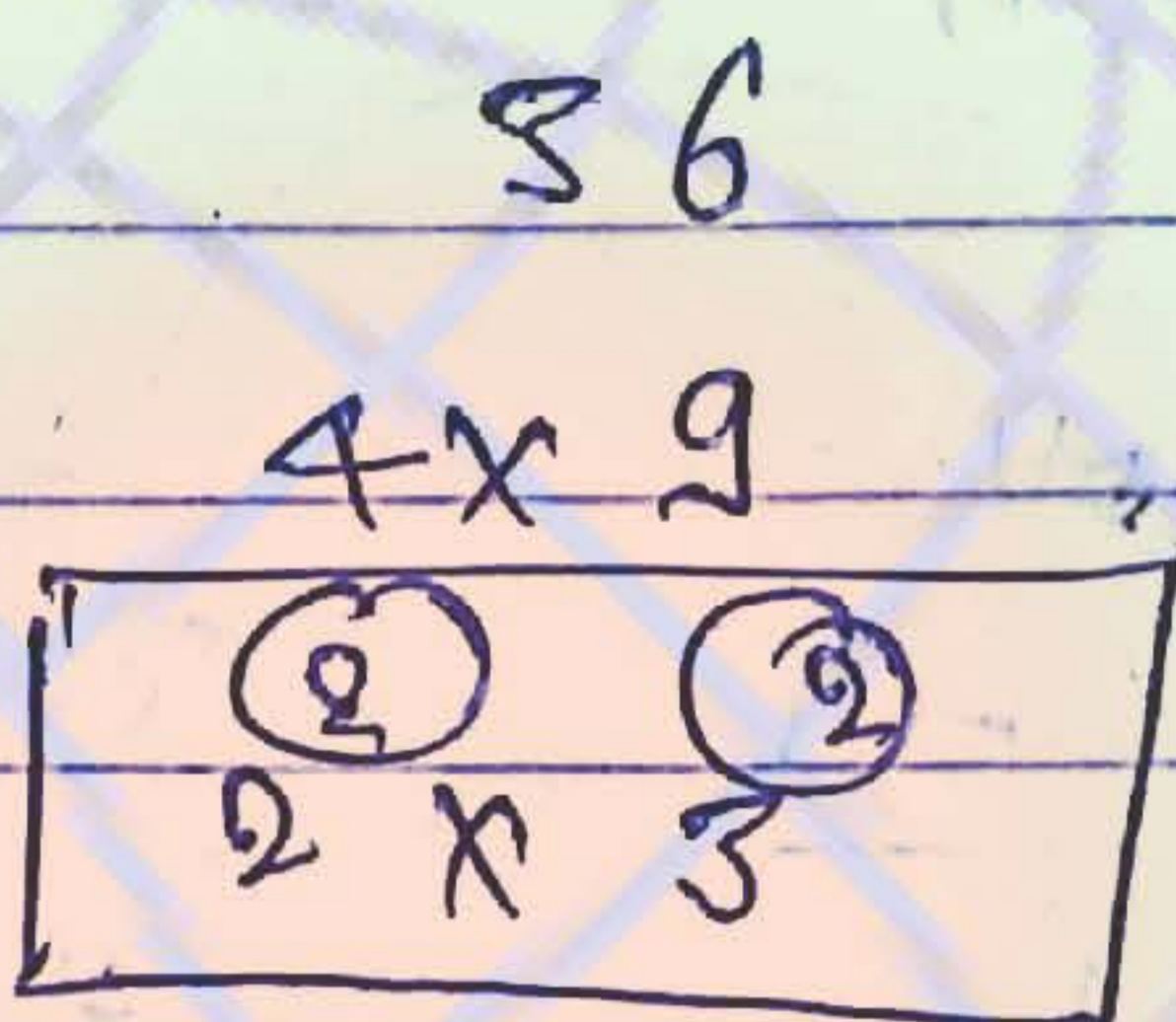
Q. Find the no. of divisors of 36,

(1, 2, 3, 4, 6, 9, 12, 18, 36)

total of divisors

2	36
2	18
3	9
3	3

Trick! -



⇒ 10. सबसे पहले एन 2 ans 3 का Power

$(2+1)(2+1) = 9$

Q. Find no. of divisors of 144



$(4+1)(2+1) = 5 \times 3 = 15$ Ans

2	144
2	72
2	36
2	18
3	9
3	3

Q. Find the no. of divisors of 225 except 1 and itself.

so/7

2	225

225

$(15) \times 2$

(iii) *

Unit - Place Problem:

↳ इसके लिए ही रिके Unit digit मानना है कि last में क्या है।

$$14 \times 5 = 80$$

↳ unit place = 0

Unit - Place

- (1) $(1)^n = 1$
- $(5)^n = 5$
- $(6)^n = 6$

Note: इसमें हम mainly power को ही divide करके check कर लेते हैं।
 जो इसके बाद normally हम 1, 2, या 3 को ही check करते हैं।

Rule for 2:

$$2^4 = 16 = 6 \quad \checkmark$$

$$2^{4n} = 6$$

$$2^1 = 2, \quad 2^2 = 4, \quad 2^3 = 8$$

eg divisible by 4 नहीं होता।
 $2^{44} = 6$ पर 4 के term में 4 है।

4 को ही divide करने की जाके जो remainder बचेगा।

$$\frac{34}{4} = 8$$

Note: → Power 4 की हम base बनाते हैं।

Rule for 3:

$$3^4 = 81 = 1$$

$$3^{4n} = 1$$

$$3^1 = 3, \quad 3^2 = 9, \quad 3^3 = 7$$

eg $3^{24} = 3^3 = 7$

(iv) Divisibility rules -

• Rules divisible by 2! -

last 0, 2, 4, 6, 8

• Divisibility rule of 3! -

sum of digits are divisible by 3

$$432 = 4 + 3 + 2 = 9$$

• By 4! -

last two digit divisible by 4 ✓

$$\begin{array}{r} 11744 \\ \underline{\quad 4} \end{array} = \checkmark$$

• By 5! -

last digit 0, 5 ✓

• By 6! \rightarrow 2, 3

Note! 2 and 3 are
Co-Prime of 6

No. are divisible by 2 and 3 both.

• By 7! -