

Syllabus

- Numerical Ability
- 1) Numerical Computation
 - 2) Numerical estimation
 - 3) Numerical reasoning
 - 4) Data interpretation

- 1.) Number system
- 2.) Percentage
- 3.) Average
- 4.) Speed-time distance
- 5.) Ratio and Proportion
- 6.) Alligation & mixture
- 7.) Base system & Alpha numeric
- 8.) Profit and loss
- 9.) Simple and Compound Interest
- 10.) Time and work

GradeSetter

1. Number system

① $x = \sqrt{3} \times \sqrt{7} \dots \infty \Rightarrow x = \sqrt{3+x} \Rightarrow x^2 - x - 3 = 0$

② $x = 35 \cdot \boxed{034565656} \Rightarrow \frac{03503456 - 35034}{99000}$

और बार-बार repeat करेगा उसके बदले में नीचे से 99 लिखना होता है।

③ 1 is neither prime nor composite,
2 is the smallest and only even prime no.

④ All the prime number except 2 and 3 can be written in the form of $6n+1$ or $6n-1$, vice versa, it's not true.
eg p^2+17 is divisible by $\rightarrow (6n+1)^2+17 = 6(6n^2+2n+3)$
 $\rightarrow (6n-1)^2+17 = 6(6n^2-2n+3)$

⑤ Complex no: -

$\sqrt{a \times b} = \sqrt{a} \times \sqrt{b}$ only valid, when both are not -ve, or atleast one is +ve. अलग-अलग नहीं कर सकते, इसके अलावा इसके अलग-अलग कर सकते हैं।

$i = i, i^2 = -1, i^3 = -i, i^4 = 1$

⑥ Concept of -ve remainders:-



-ve के लिए हमें 4 से घटाकर -1 कर सकते हैं।

7) Divisibility rules -

2: - last digit even/odd

3: → sum → ~~12~~ ~~18~~ ~~24~~ ~~30~~ →

4: last two digit

5: last 5 or 0

6: 2×3 → There should not be any thing common.
 ↳ simply find divisibility of composite no

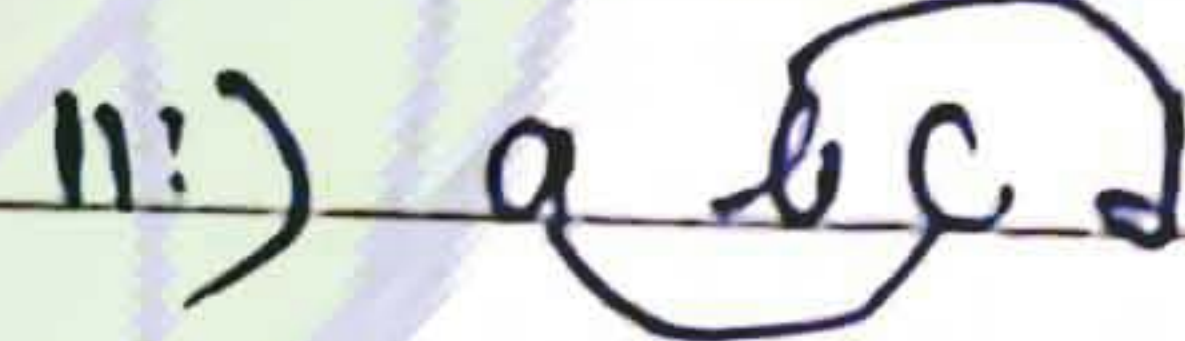
7: multiply the unit place of the given no. by 2, and subtract this result from the remaining number. This process can be repeated n-number of times as you want.

आनेकी-बकरत
 गही है, मिला-
 मिला का काटते
 पके जाये।

(7th case) में घुमा और घुमा
 और subtract करना है (11)

$$\begin{array}{r} 55555 \mid 5 \\ - 10 \\ \hline 5554 \mid 5 \\ - 10 \\ \hline 5544 \mid 4 \\ - 8 \\ \hline 546 \end{array}$$

$5 \times 2 = 10$



Even-odd = Divisibly by 11

12: 4×3

nothing should be common except 1.

remaining - 2x Unit Place

$$\begin{array}{r} 54 \mid 6 \\ - 12 \\ \hline 42 \end{array}$$

42 ✓

13: $4 \times (\text{unit place}) + \text{remaining no.}$

concept:

$4 \times 3 + 1$

remaining no.

$$\begin{array}{r} 55555 \mid 5 \\ + 20 \\ \hline 55575 \\ + 20 \\ \hline 5577 \\ + 28 \\ \hline 585 \end{array}$$

$27 = 7 \times 7 + 2$
 $29 = 7 \times 9 + 2$

- 14: 2 and 7
- 15: 3 and 5
- 16: Last 4 digit div by 16.
- 17: (Unit Place) $\times 12 +$ remaining no.
- 18: 2 and 9
- 19: (Unit place) $\times 2 +$ remaining no.
- 20:

8
(10)
chose

Successive division -

a) $\overline{N} \mid a$

b) $\overline{a} \mid (a_1$

c) $\overline{a_1} \mid (a_2$

\overline{r}

$\overline{r_1}$

$\overline{r_2}$

A no. successively divided by 4, 5 and 6. leaves remainder 3, 2 and 5. then find remainder when order of successive division get reverse

best!

$\overline{4} \mid N \text{ (2)}$

$\overline{5} \mid a_1 \text{ (2)}$

$\overline{6} \mid a_1 \text{ (2)}$

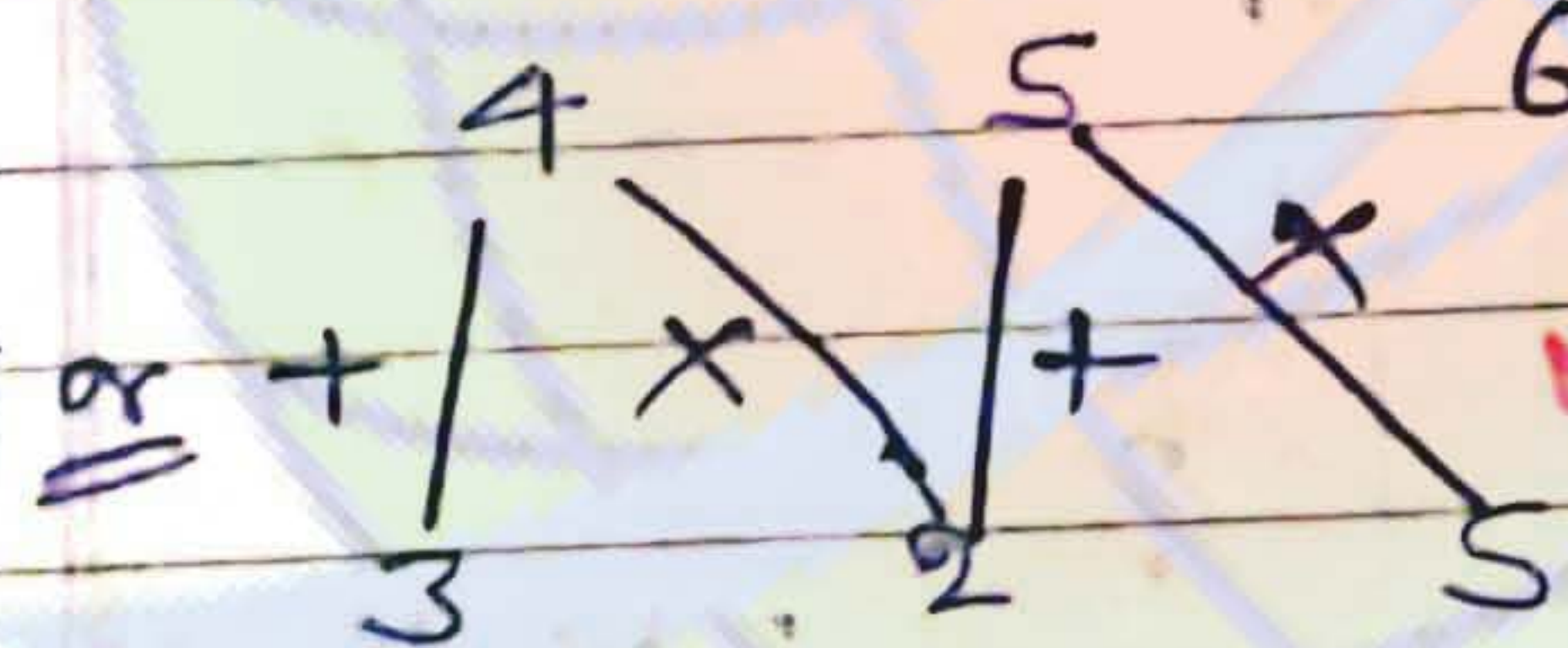
$\overline{3}$

$\overline{2}$

$\overline{5}$

क्यात दे Quotient के अन्तर्गत बाँट देना है।

4	231	3
	57	2
	11	5
	11	
	0	



$= 111 = (5 \times 5 + 2) \times 4 + 3$

Reverse order से operation perform करते चले जायेंगे।
(जो जो operation आते जा रहे हैं, उसे complete करते चले जायेंगे।)

$6 \times 1 + 5 = 11$
trick जल्दी

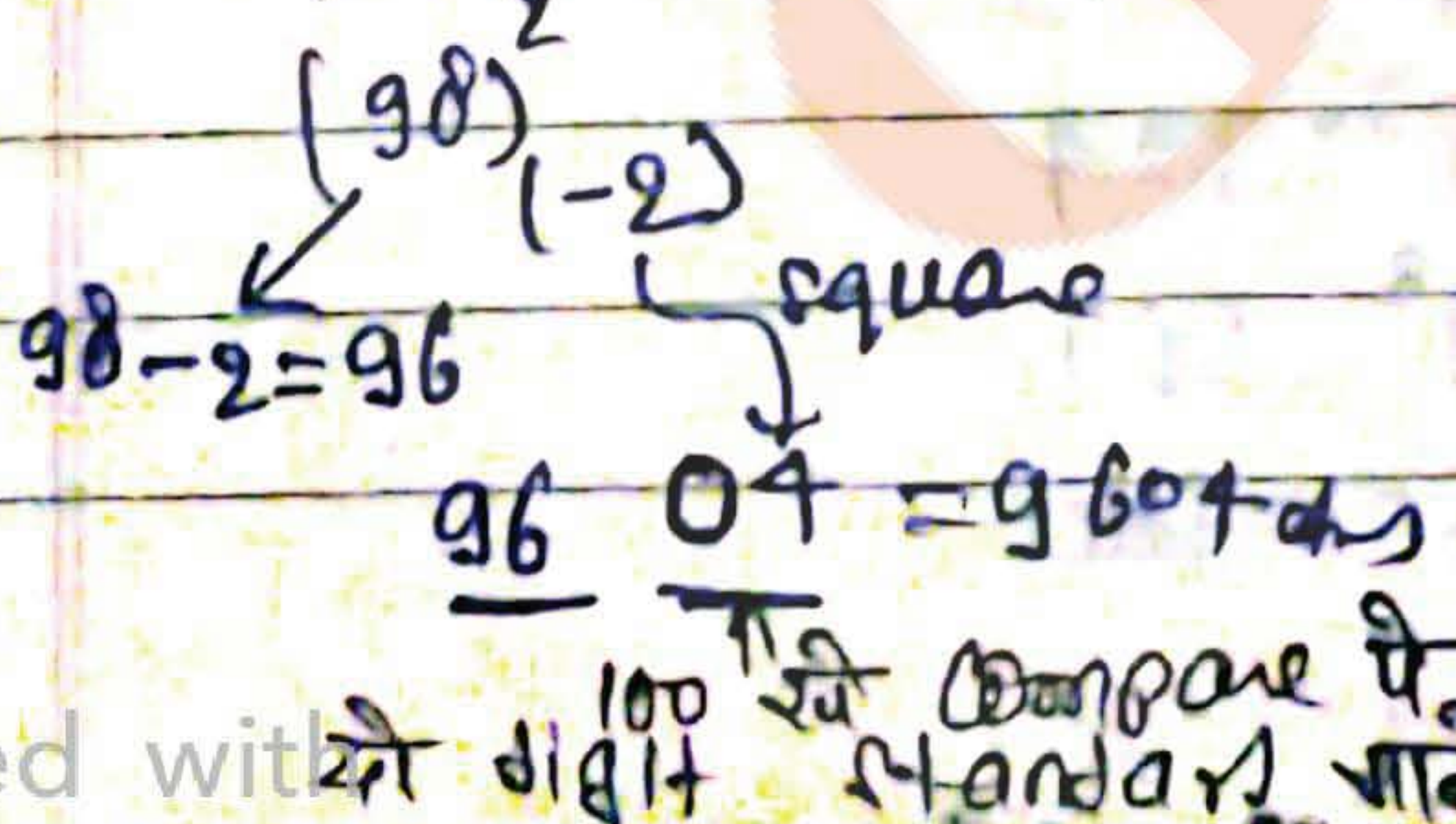
9) Perfect square and perfect cube roots:-

- Perfect square: not contain $[2, 3, 7 \text{ \& } 8]$ at unit place
- Perfect cube: can contain any digit from 0 to 9.

Squaring 1.

a) $(98)^2$

Compare with 100



b) $(105)^2$

$105 + 5 = 110$

$110 \times 5 = 11025 + 4$

Complete no. के अंतिम भाग बदलाने के समय ध्यान रखने।
(Sign same रहेगा)

b) $(15)^2 = \underline{2} \underline{25}$
 1x2

$(95)^2 = \underline{90} \underline{25}$
 9x10

next वाला no. से गुना करें

(c) $(10)^2$

(-2) comp with 50

$10 - 2 = \frac{46}{2} = 23$

जुकी base 50 से कम है, 50 2 से divide करेंगे।

$\rightarrow 23 \quad \leftarrow 04$

50 से जितना कम उसके square.

✓
d)

Shortcut for square of 2-digit number:-

a^2	$2ab$	b^2
-------	-------	-------

$(64)^2$

a^2	$2ab$	b^2	
40	9	6	$= 4096$ Ans
4	4	← carry है	(Carry को जोड़कर ही answer Consider करना है)
← carry है			

Single digit ही Consider करना है, उसके अलावा वाले को carry बनाना है। अट फिर उसके उत्तर जोड़ना है।

$1^2 = 1$	$8^2 = 64$	$15^2 = 225$
$2^2 = 4$	$9^2 = 81$	$16^2 = 256$
$3^2 = 9$	$10^2 = 100$	$17^2 = 289$
$4^2 = 16$	$11^2 = 121$	$18^2 = 324$
$5^2 = 25$	$12^2 = 144$	$19^2 = 361$
$6^2 = 36$	$13^2 = 169$	$20^2 = 400$
$7^2 = 49$	$14^2 = 196$	

(10) A no. is continuously divided by 6, 2, 4 leaves the remainder 3, 1, 2 resp. The same no. is also see continuously divided by 4, 2, 6. What will be the remainders.

6	81	3
2	13	1
4	6	2

6	81	3
2	13	1
4	6	2

4	81	1
2	20	0
6	10	4

Remainder

→ ग्रहण पर "4" मान ले मही निकलें

$4 \times 1 + 2 = 6$

(11) Multiplication:-

$10^2 \times 10^3 = 10^5$

$10^{2+3} = 10^5$ $10^5 | 06 = 10506$

→ 100 से compare में वही digit standard माने, कमीकी दो zero हों.

(12) HCF and LCM

1) HCF/GCD

30	45
3	5
5	3
6	x

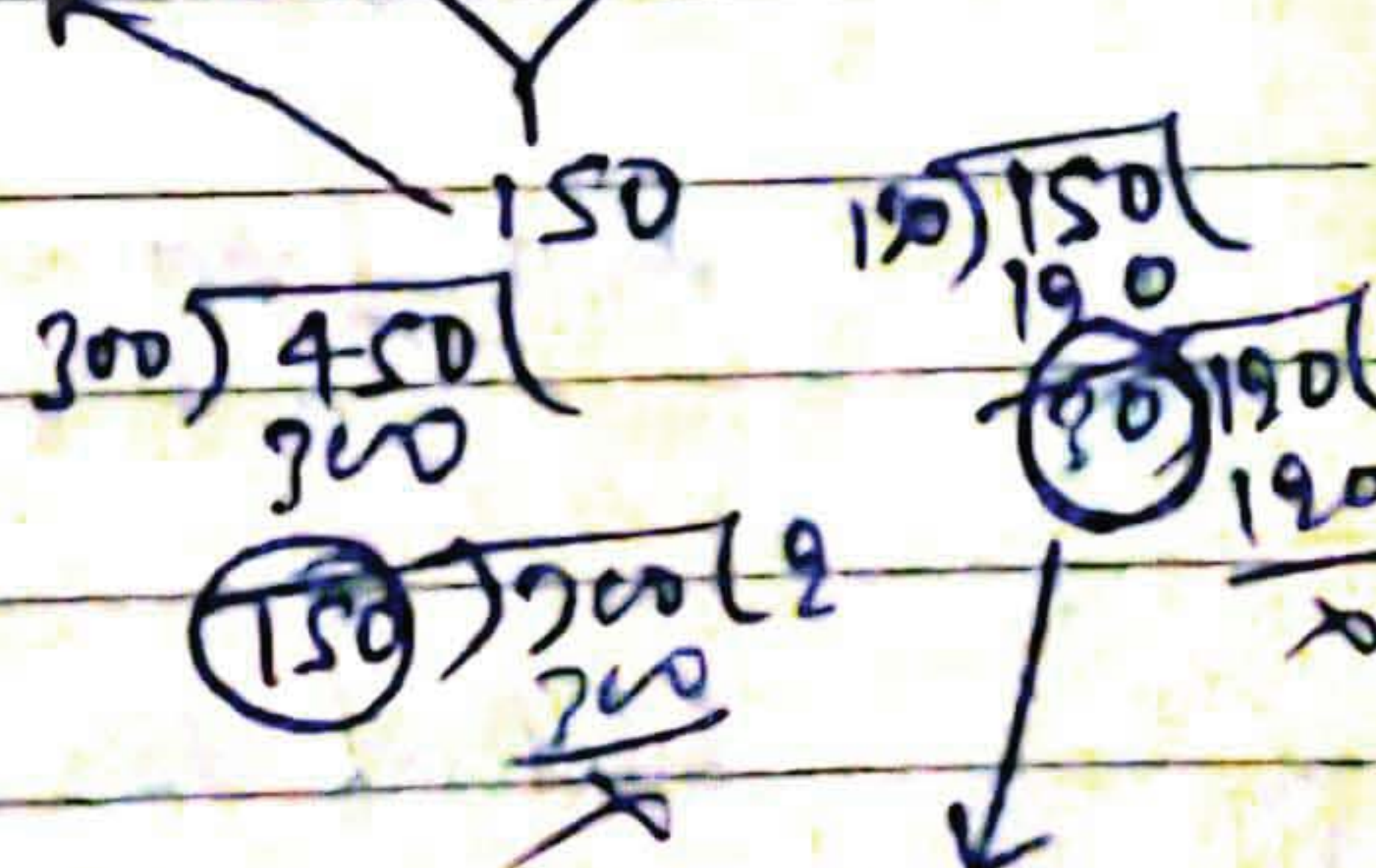
Highest Common factor.

or Greatest Common divisor (GCD)

$15 \times 15 \rightarrow$ H.C.F

check = $\frac{30}{15} : \frac{45}{15} = 2:3$
Nothing is common

$(m-2) \quad 120 - 300 - 450$



H.C.F

(m-3) shortcut method:-

H.C.F	3	120 - 300 - 450
	10	40 - 100 - 150
		4 - 10 - 15

b) L.C.M:-

6	8
12	16
18	24
24	72
30	

least common multiple (L.C.M)

m-2

20	20 - 40 - 60 - 80 - 120 - 180 - 200
20	6 - 9 - 10
3	3 - 9 - 5
	1 - 3 - 5

पै सही value अपने बड़ी value पे कर जा रहे हैं, पै अपने हाथों वाले को completely divide कर रहे हैं।

$$L.C.M = 20 \times 2 \times 3 \times 3 \times 5 = 1800$$

c) If a and b is the ratio of two no. in lowest term then

$$a \times b \times H.C.F = L.C.M$$

d) Product of two numbers = H.C.F x L.C.M

e) Fraction number

$$H.C.F \text{ of two or more fraction} = \frac{H.C.F \text{ of numerators}}{L.C.M \text{ of denominators}}$$

$$L.C.M \text{ of two or more fraction} = \frac{L.C.M \text{ of numerators}}{H.C.F \text{ of denominators}}$$

f) Find the greatest no. of 4 digit number which is divisible by 12, 15, 20

$$\begin{array}{r|l} 3 & 12, 15, 20 \\ \hline 2 & 4, 5, 20 \\ \hline 2 & 2, 5, 10 \\ \hline 5 & 1, 5, 10 \\ \hline & 1, 1, 2 \end{array}$$

L.C.M = $3 \times 2 \times 2 \times 5 = 60$

$$60 \overline{) 9999} \text{ (166}$$

Greatest no = $9999 - 39 = 9960$

$$\underline{39}$$

Find the least no. of 4 digit, which is divisible by 12, 15, 20

L.C.M of 12, 15, 20 = 60

$$60 \overline{) 1000} \text{ (16}$$

$1000 + 20 = 1020$ Ans

logically 10000 se kam ka number jo 12, 15, 20 se divide ho sakta hai

$60 - 40 = 20$ $\underline{40}$

g) Find the least no. which when divided by 12, 15, 20 leaves the remainder 5 in each case

$12 - 15 - 20 \overline{) \text{ L.C.M } = 60}$

$60 + 5 = 65$ Ans

h) Find the largest no. which divide 38, 45, 52 leaves the remainder 2, 3, 4 resp.

$$\begin{array}{r} 38, 45, 52 \\ -2 \quad -3 \quad -4 \end{array}$$

$$\begin{array}{r|l} 6 & 36, 42, 48 \\ \hline & 6, 7, 8 \end{array}$$

H.C.F = 6 Ans

i) If the H.C.F of 2 nos is 6 and their L.C.M is 72, then find these no. ✓

$$\frac{x}{6} \cdot \frac{y}{6} = 72 \Rightarrow xy = 72 \times 6 = 432$$

$$x = 6a, y = 6b$$

$$6a \times 6b = 6 \times 72$$

$$a \times b = 72$$

(6, 72)
(18, 24)
Ans

1	12
3	4

$$\frac{72}{6} = 12$$

There should not be common

~~2~~ 6 common

(13)

Remainder theorem:

a) $\frac{1456}{96} = \frac{2^8 \times 23}{2^5 \times 3 \times 2^3} = -1 + 3 = 2 \times 2^5 = 2 \times 32 = 64$

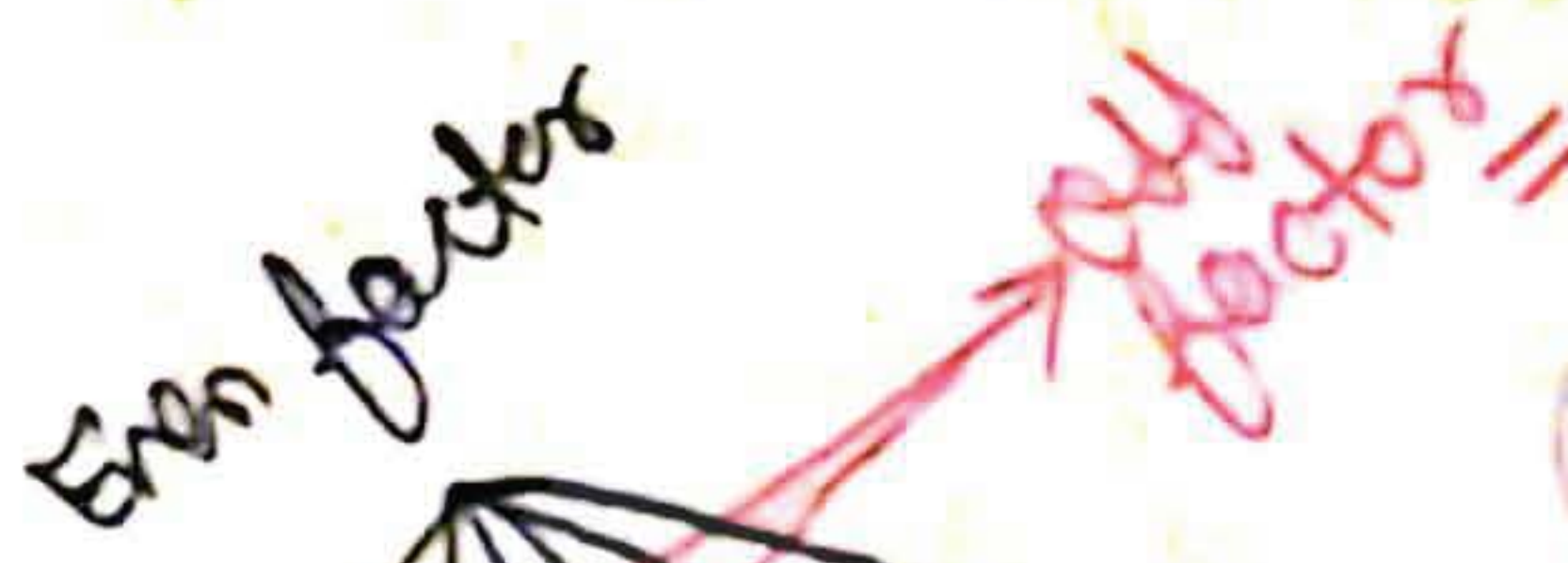
Remainder theorem से निरयकी ली कटि, उसी final remainder से multiply करके।

b) $\frac{(-3)^{1500} - 1}{3} = \frac{(-3)^{500} - 1}{3} = \frac{(3^3)^{500} - 1}{3} = \frac{(27)^{500} - 1}{3}$

(46) $\frac{32^{32} - 1}{7} = \frac{32^{3n+1} - 1}{7} = \frac{1-1}{7} = 0$

14

Factor's of a number



a) 24: 1, 2, 3, 4, 6, 8, 12, 24

$= 2^3 \times 3^1$

Total factor = $(3+1)(1+1) = 8$

No. of Divisors:-

even factor = $3 \times (1+1) = 6$

odd factor = $2 \times (1+1) = 2$

even no. गुड़ी लेना है उनके जगह से निकालें

b) $N = 12^3 \times 15^{22} \times 11^7$

$= 2^{16} \times 3^{12} \times 5^4 \times 11^7$

must be prime no.

Total factor = $(16+1)(12+1)(4+1)(7+1) = 4420$

even factor's = $16 \times (12+1)(4+1)(7+1) = 4160$

even नंबर से किसी को भी गुना करे एवन

odd factor's = $1 \times (12+1)(4+1)(7+1) = 260$

odd के case में even no. पर power वाले को 1 कल दें।

Total factor = even factor + odd factor

Prime factor's = $2^0 3^0 5^0 11^0$

- $2^0 3^1 5^0 11^0$
- $2^1 3^0 5^0 11^0$
- $2^0 3^0 5^1 11^0$
- $2^0 3^0 5^0 11^1$

4 की संख्या एक Prime no. है जो गुणवत्ता की कल दे।

Composite factor = $4420 - 4 = 4415$

2^0	3^0	5^0	11^0
2^2	3^2	5^2	11^2
2^4	3^4	5^4	
2^6	3^6		
2^8	3^8		
2^{10}	3^{10}		
2^{12}	3^{12}		
2^{14}	3^{14}		
2^{16}			

perfect square factor = $3 \times 7 \times 3 \times 2$

perfect cube factor = $6 \times 5 \times 2 \times 2$

cube वाला का भी same तरीके से निकालें।

15 Prime exponent

Power of prime $\frac{20!}{2^x}$

} 20! में एक maximum power/exponent का (आता)

$$20! = 20 \times 19 \times 18 \times 17 \times 16 \times \dots \times 1$$

$$= 2^{18} \times (\dots)$$

Trick:

$$\frac{20}{2} \Rightarrow \frac{10}{2} = \frac{5}{2} = \frac{2}{2} = 1$$

$$= 10 + 5 + 2 + 1 = 18 = 2^{18}$$

Note: This method is applicable only for prime number.

16 Unit Place: -

0, 1, 5, 6

4, 9

2, 3, 7 & 8

cyclicity = 1

cyclicity = 2

cyclicity = 4

eg 1) $2^{2017} = 2^{4n+1}$
 $= 2^1 = 2$

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

$3^{4n+2} = 9$

$3^{4n+3} = 7$

$3^{4n} = 1$

2) $(488)^{489} \times (487)^{488} - (989)^{487}$

$8^1 \times 3 = 9$

to make it take

$14 - 9 = 5$

एकान के द्वारा गुना कागी unit place ही लेना है।।

(17) (18) place problem (Unit - tens and Hundred problem)

→ what happens when we write 100 consecutive natural numbers -

== Every digit comes at unit place in 100 consecutive natural number 10 times.

== Every digit comes at tens place in 100 consecutive natural number 10 times.

• 273 to 572
 $\underbrace{\hspace{10em}}_{300}$

for 3: ~~units~~

Unit: 30
 tens: 30
 hundred: 100
160

'3' comes 160 times b/w
 273 to 572.

Digit sum :-

• 287 - 386
 $\underbrace{\hspace{10em}}_{100}$

Unit = 10 times every digit ✓
~~100~~ = 10 (1 + 2 + 3 + ... + 9)
 = 10 × 45 = 450

tens = 10 times every digit
 = 10 (1 + 2 + 3 + ... + 9)
 = 450

Hundred = 2 × 13 + 3 × 84
 = 26 + 252 = 278

(18) Find No. of Zero's :-

Note: 2 digit se power se 100 se 2 digit se power minimum number of zero's hoga.

Find no. of zero's from right hand side
 $1 \times 2 \times 3 \times \dots \times 120$

$\frac{120}{5} = 24$
 $\frac{24}{5} = 4$
28 zero's

• $26 \times 74 \times 46$

$\frac{26}{5} = 5$ } 6
 $\frac{74}{5} = 14$ } 7
 $\frac{46}{5} = 9$ } 10
 $\frac{5}{5} = 1$ } 6
 $\frac{6}{5} = 1$ } 7
 $\frac{9}{5} = 1$ } 10
 6 + 7 + 10 = 23

• $26 + 74 + 46$
 no of zero = 6
 Addition of each se minimum number of zero's hoga.

2. Percentage

① Six standard concept:

(A) (B)

- what % , how much % / how many. \Rightarrow number से कितने से
- how much % more, how much % less, By what %
A should be increases equal B, By what %
B should be decreases equal A

इसमें difference बता दें

$$\left(\frac{\text{what we compare}}{\text{To whom we compare}} \right) \times 100$$

② Concept of multiplying factor

constant A \rightarrow x% \uparrow y% \uparrow z% \uparrow

येना बढ़ाये ()

$$= A \left(\frac{100+x}{100} \right) \times \left(\frac{100+y}{100} \right) \times \left(\frac{100+z}{100} \right)$$

\Rightarrow जो increase कर रहा है, उसको 100 से जोड़ देना है, जो decrease कर रहा है, उसको 100 से घटा देना है।

Note:

$\left(\frac{100 \pm a}{100} \right)$ or $\left(1 \pm \frac{a}{100} \right)$ is known as multiplying factor.

③ Concept of successive change net % change:-

$$A \xrightarrow{a\%} B \xrightarrow{b\%} C = \left(a + b + \frac{ab}{100} \right) \%$$

- Put a and b with sign
- independent of base as well as order.
- Applicable: - two or more successive change on single variable
- Product of two or more than two variables

Area = $l \times b$; $l \times b \times h$; expenditure = Price \times Quantity
 आय \times मात्रा

④ • To find % of given number

- $x\%$ of given number $N = \frac{x}{100} \times N$

- Number \rightarrow Percentage \Rightarrow multiply by 100
- % \rightarrow number \Rightarrow Divide by 100.

Note एक बात ध्यान में रखें number की % में बदलने के लिए "100" से गुना करना पड़ता है।

• Ratio, Percent & fraction all are equivalent

$4:1 \Rightarrow m = \frac{4}{5}$, $\frac{4}{5} \times 100 = 80\%$
 $m \quad w$ $w = \frac{1}{5}$, $\frac{1}{5} \times 100 = 20\%$
 Ratio fraction Percent

fraction is a number

⑤ Ratio - Percent equivalent:-

$1 = 100\%$	$\frac{1}{11} = 9.09\%$	$22.22\% = \frac{2}{9}$	$\frac{1}{40} = 2.5\%$
$\frac{1}{2} = 50\%$	$\frac{1}{12} = 8.33\%$	$24.24\% = \frac{3}{11}$	
$\frac{1}{3} = 33.33\%$	$\frac{1}{13} = 7.69\%$	$37.5\% = \frac{3}{8}$	
$\frac{1}{4} = 25\%$	$\frac{1}{14} = 7.14\%$	$21.42\% = \frac{3}{14}$	
$\frac{1}{5} = 20\%$	$\frac{1}{15} = 6.67\%$	$54.54\% = \frac{6}{11}$	
$\frac{1}{6} = 16.67\%$	$\frac{1}{16} = 6.25\%$	$87.5\% = \frac{7}{8}$	
$\frac{1}{7} = 14.28\%$	$\frac{1}{17} = 5.88\%$	$62.5\% = \frac{5}{8}$	
$\frac{1}{8} = 12.5\%$	$\frac{1}{18} = 5.55\%$	$28.56 = \frac{2}{7}$	
$\frac{1}{9} = 11.11\%$	$\frac{1}{19} = 5.26\%$	$75\% = \frac{3}{4}$	
$\frac{1}{10} = 10\%$	$\frac{1}{20} = 5\%$	$83.33\% = \frac{5}{6}$	



• 134.5% of 266.67% of 240

$$\begin{array}{l}
 134.5\% \\
 \downarrow \\
 \boxed{100 + 34.5} \\
 \downarrow \\
 1 + \frac{34}{100} = \frac{11}{8}
 \end{array}
 \quad
 \begin{array}{l}
 266.67\% \\
 \downarrow \\
 \boxed{200 + 66.66} \\
 \downarrow \\
 2 + \frac{2}{3} = \frac{8}{3}
 \end{array}
 \quad
 \begin{array}{l}
 \text{So } \frac{11}{8} \times \frac{8}{3} \times 240 \\
 = 88 \text{ \textcircled{2}}
 \end{array}$$

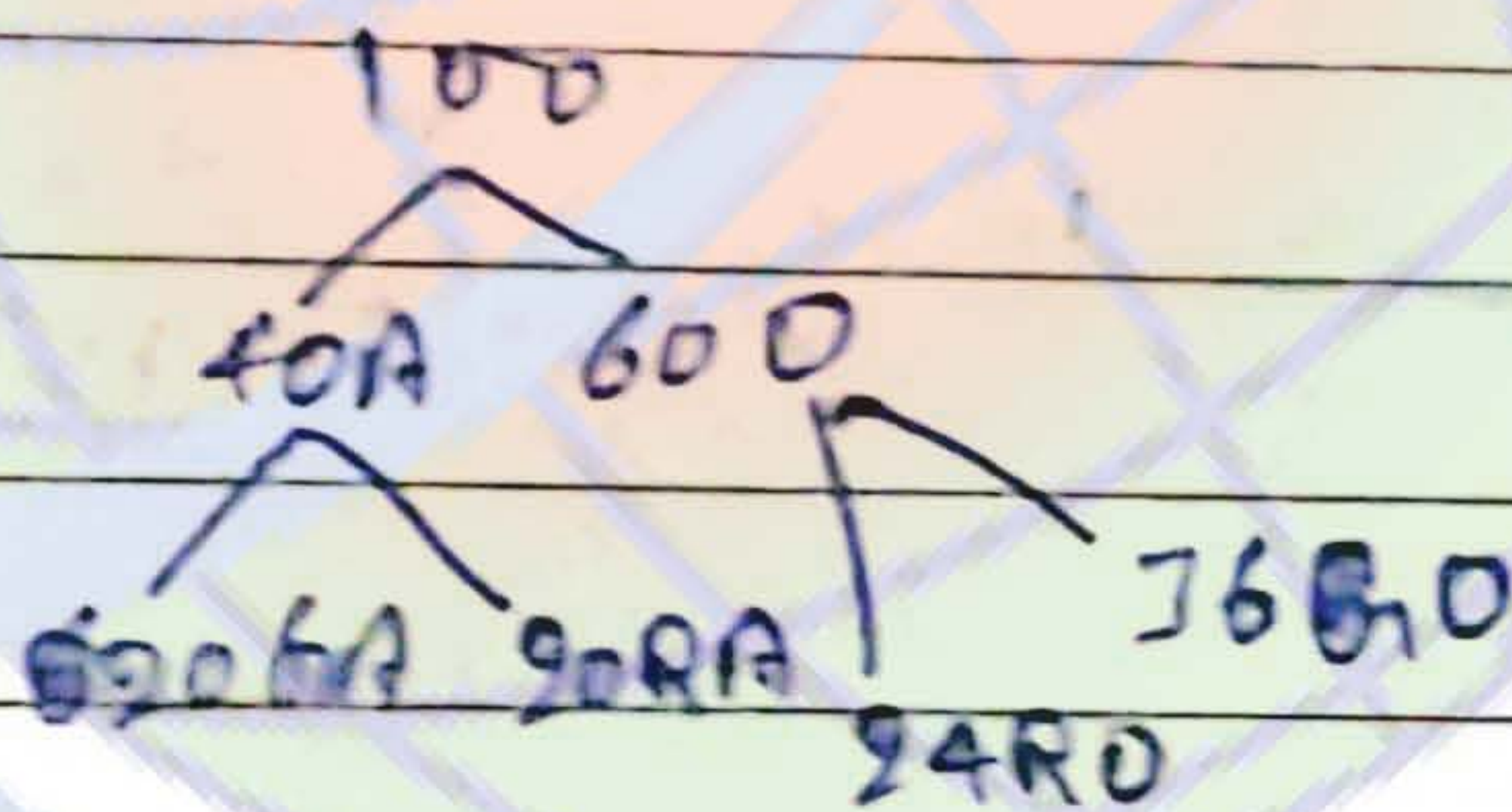
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Concept of Base:-

इसमें इस बात का ध्यान रखना है कि, जिसका कितना % दिया जाना है।

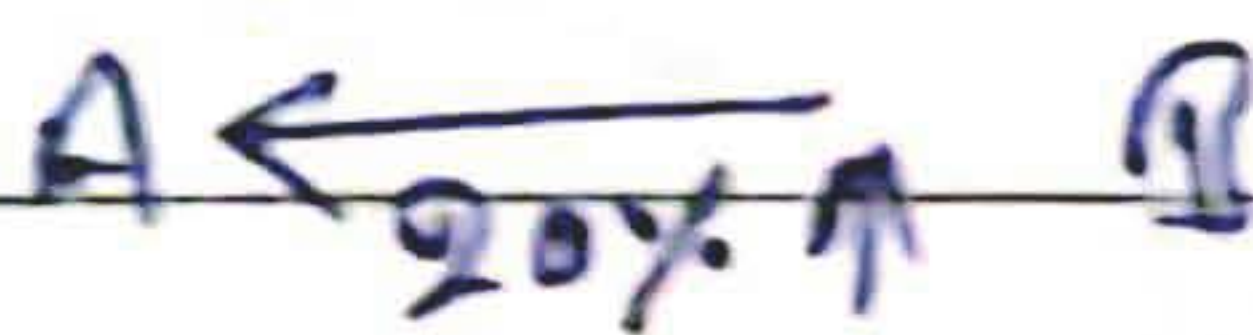
जैसे कि 10%, पर जिसका 10% इस बात का ध्यान रखना है।

- जो इसी बात जिसके concept में निकाला है उसका ही base में लेना है, अथवा नहीं।



7

Concept of base change:-



(If A is 20% more than B, then what % B should be less than A?)

9

120 20 100

$$\frac{20}{120} \times 100 = 16.67\%$$

8

$$\frac{1}{5} \uparrow \quad \frac{1}{6} \downarrow = 16.67\%$$

10



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

$$\frac{1}{6} \times 100 = 16.67\%$$

Note: This concept is applicable in all those situations, where the product of two variables is constant.

① $A = l \times b$; A is constant
 (Constant) $\frac{1}{10} \uparrow$ $\frac{1}{11} \downarrow$; l expands: proportional
 (comb) $\frac{1}{5} \downarrow$ $\frac{1}{4} \uparrow$

② Current Population = P , change = $\delta\%$. Per annum

After n -years = $P \left(1 + \frac{\delta}{100}\right)^n$

n -year ago = $\frac{P}{\left(1 + \frac{\delta}{100}\right)^n}$

③ Percentage change = $\frac{\text{final value} - \text{Initial value}}{\text{Initial value}}$

3. Average

①
$$\text{Avg} = \frac{\text{Sum. of observation}}{\text{No. of observation}}$$

short-trick:

$$\begin{matrix} 12 & 15 & 6 & 9 & 14 \\ +3 & -6 & -3 & +2 & \\ \hline & & & & -4 \\ & & & & \div 5 \\ & & & & = -0.8 \end{matrix}$$

Simply जिसकी constant मानने है उसकी value में जोड़ दे।।

② $12 - 0.8 = 11.2$ Ans

कई नए एक constant मान लो और उसके respect में other का difference find कर लो। और फिर जो final result आए उसमें उस constant का घटा या जोड़ दो।।

Age concept: Age वाले case में प्रश्न ध्यान रहे कि किस प्रकार से avg. को balance करना है। और फिर उसे सोल्व कर निकालने का प्रयास करें।

- ② If all no. are
- multiples - $f(n)$
 - added - $f+x$
 - subtracted - $f-x$
 - divided - $\frac{f}{x}$

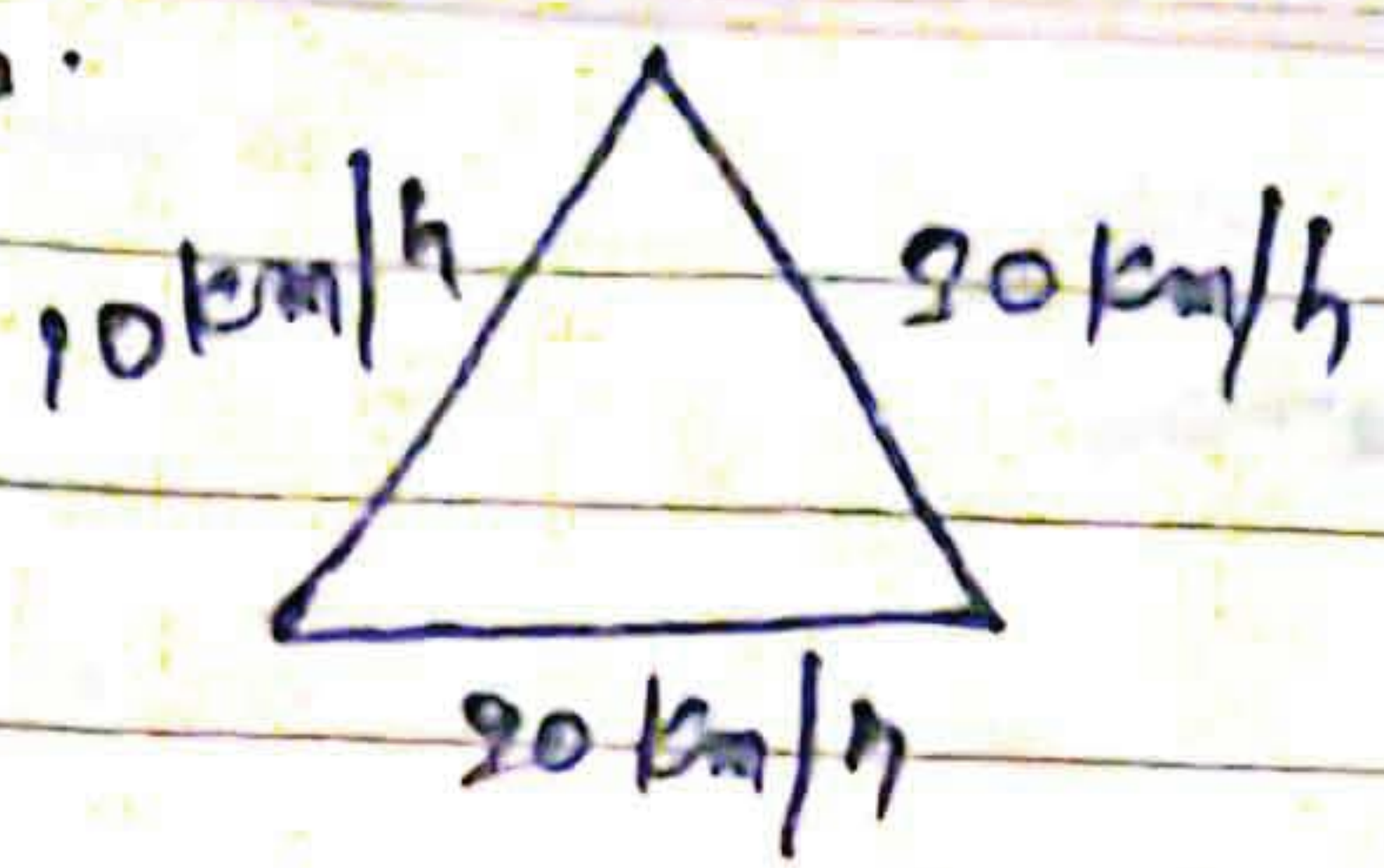
(3) A.P. : $a, a+d, a+2d, \dots, a+(n-1)d$
 $T_n = a + (n-1)d$
 $S_n = \frac{n}{2} [2a + (n-1)d]$

(4) Avg. speed = $\frac{\text{total distance travelled}}{\text{total time taken}}$

Avg. speed = $\frac{2ab}{a+b}$



$\frac{10 \text{ km/h}}{1}$
 $\frac{20 \text{ km/h}}{2}$
 $\frac{30 \text{ km/h}}{3}$



\therefore equilateral triangle

$$\text{Avg speed} = \frac{3abc}{ab+bc+ca}$$

⑤ Concept of weighted average

$$\text{Avg} = \frac{A_1w_1 + A_2w_2}{w_1 + w_2}$$

⑥ Age वाला Problem: - इसमें मैं तभी से ध्यान देना है कि, जो वजु आने की वजु, सबमें से बराबर कर देना है, और इस प्रकार से इसका वजु भी निकाल देना है।

Note: ① $1 + 2 + 3 + \dots + n = \frac{n(n+1)}{2}$ Avg $\frac{n+1}{2}$

← Avg निकालने के लिए simply $\frac{n}{2}$ से divide करें

② $1^2 + 2^2 + 3^2 + \dots + n^2 = \frac{n(n+1)(2n+1)}{6}$ Avg $\frac{(n+1)(2n+1)}{6}$

③ $1^3 + 2^3 + 3^3 + \dots + n^3 = \left(\frac{n(n+1)}{2}\right)^2$ Avg $\frac{n(n+1)^2}{4}$

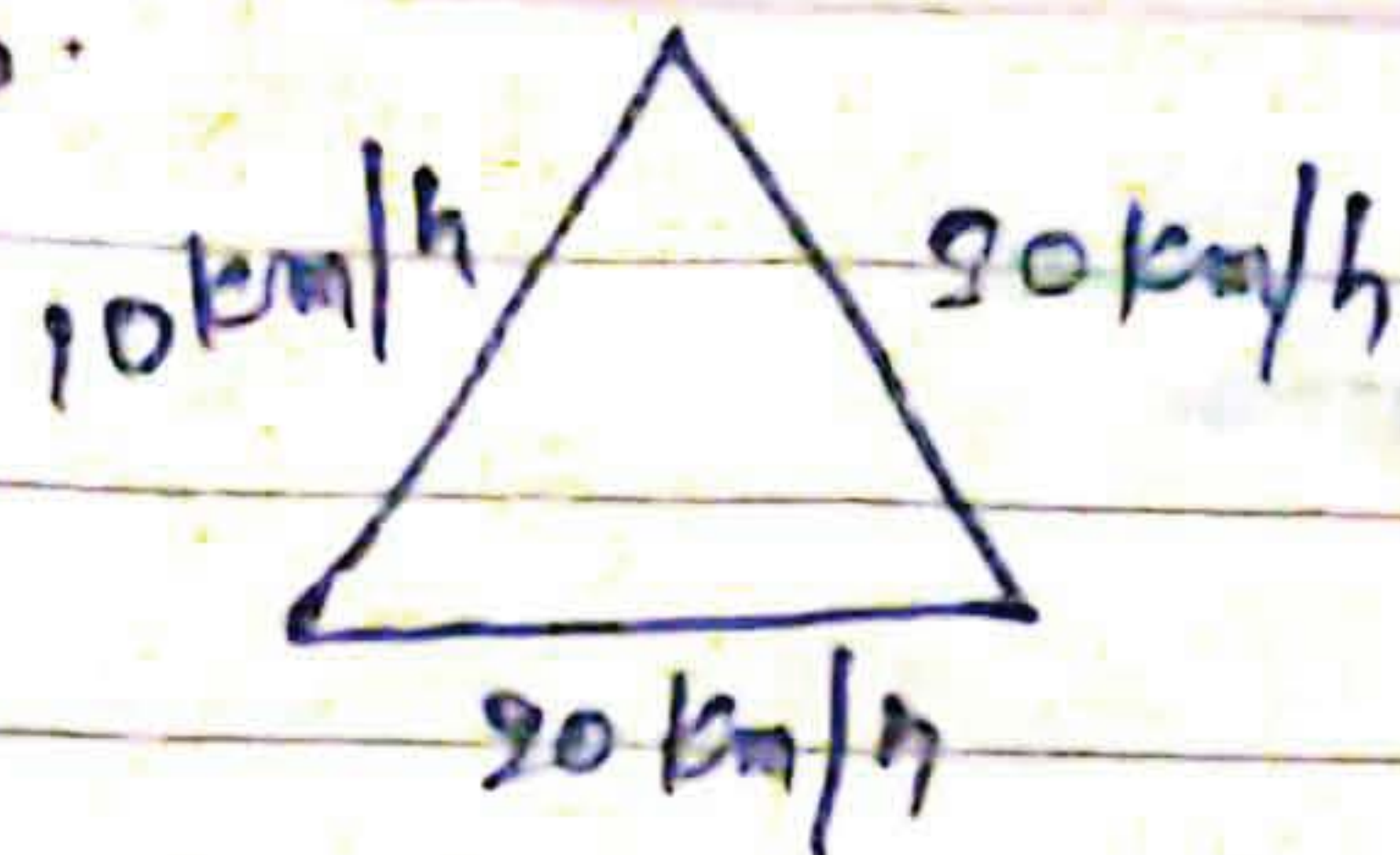
④ first n-odd numbers = n^2 Avg n

⑤ first n-even numbers = $n(n+1)$ Avg $n+1$

⑥ Average of odd no. from 1 upto n
Avg = $\frac{\text{last odd no} + 1}{2}$

⑦ Average of even no. from 2 upto n
Avg = $\frac{\text{last even no} + 2}{2}$

$\frac{a \times b \times c}{3 \text{ km/h}}$
 $\frac{a \times b \times c}{3 \text{ km/h}}$
 $\frac{a \times b \times c}{3 \text{ km/h}}$



\therefore equilateral triangle

$$\text{Avg. speed} = \frac{3abc}{ab+bc+ca}$$

⑤ Concept of weighted average

$$\text{Avg} = \frac{A_1w_1 + A_2w_2}{w_1 + w_2}$$

⑥ Age वाला Problem: - इसमें मैतभी मै छात केना है कि, जो वगु आते वी वगु. सबमें मै बराबर कर केना है, और इस प्रकार से इसका वगु, मै निकाल केना है।

Note: ① $1 + 2 + 3 + \dots + n = \frac{n(n+1)}{2}$ Avg $\frac{n+1}{2}$

② $1^2 + 2^2 + 3^2 + \dots + n^2 = \frac{n(n+1)(2n+1)}{6}$

③ $1^3 + 2^3 + 3^3 + \dots + n^3 = \left(\frac{n(n+1)}{2}\right)^2$ $\frac{n(n+1)^2}{4}$

④ first n -odd numbers = n^2 n

⑤ first n -even numbers = $n(n+1)$ $n+1$

⑥ Average of odd no. from 1 upto n
 Avg = $\frac{\text{last odd no} + 1}{2}$

⑦ Average of even no from 2 upto n
 Avg = $\frac{\text{last even no} + 2}{2}$

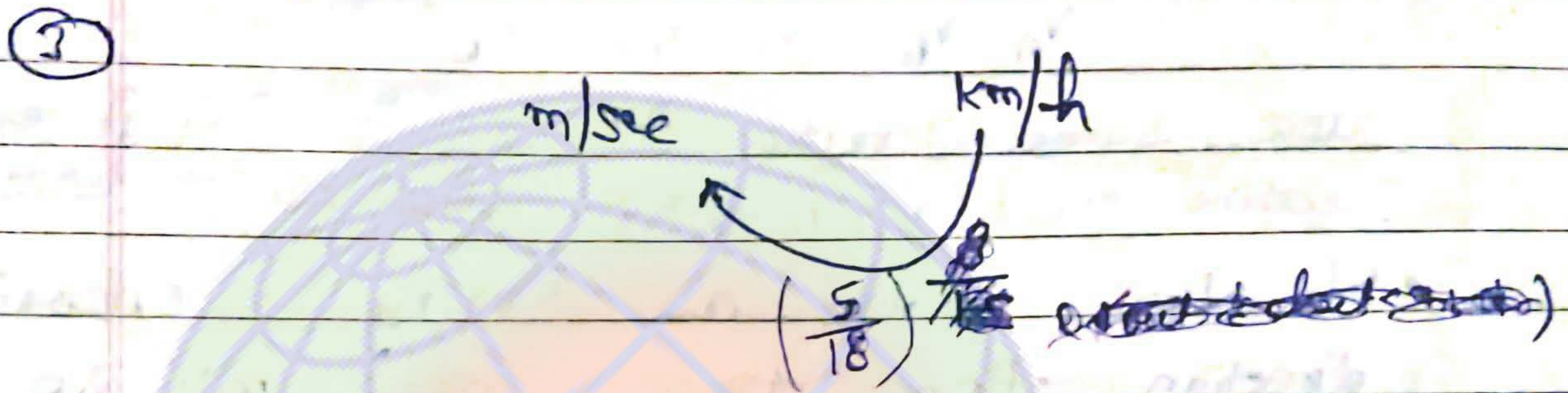
अव. निकालने के लिए simply n से divide करें

4. Speed - time Distance



① $Speed = \frac{Distance}{time}$

② $Speed = 1 \text{ km/h}$
 Shows: Distance is in km and time is in hour.

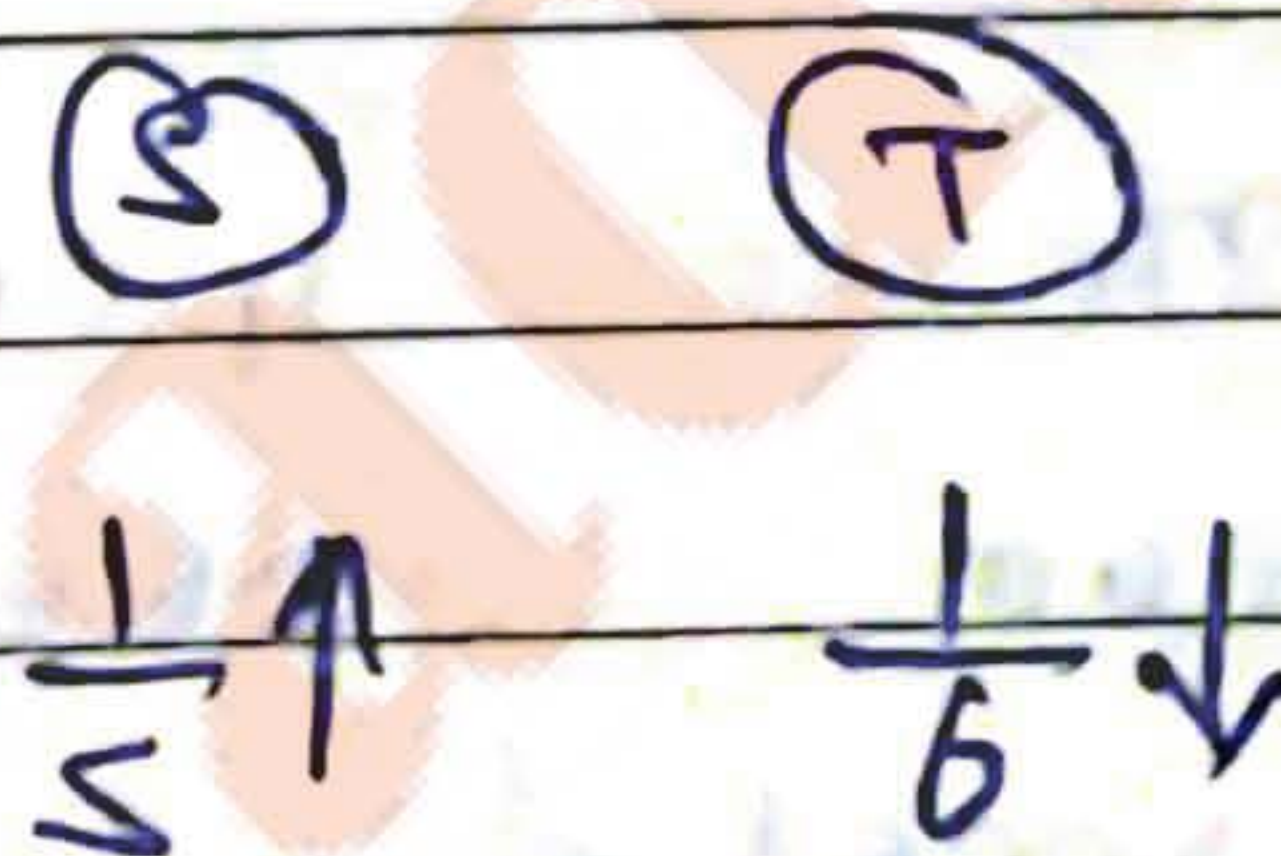


- ④ Way to solve the problems-
- Unit conversion must take in mind.
 - Represent on the line diagram

⑤ • If Distance is constant

then $S \propto \frac{1}{T}$ & $\boxed{\frac{S_1}{S_2} = \frac{T_2}{T_1}}$

Note: Distance = Speed \times time



} Concept of inverse proportion applies here.

• If Time is constant

$S \propto T$ $\boxed{\frac{S_1}{S_2} = \frac{D_1}{D_2}}$

⑥

Relative Speed Problem:-

- If two bodies are moving in same direction with speed V_A and V_B then their relative speed will be

$$V_A - V_B \Rightarrow V_A \sim V_B$$

(अगर same direction में जा रही होंगी तो इनका relative speed minus होगा अर्थात् कम हो जायगा।)

- If two bodies are moving in opposite direction then their speed will be

$$V_A + V_B$$

⑦

River Boat Problem:-

Speed of Boat:-

in still water = x

Rate of current = y

Speed: Down stream = $x + y$

upstream = $x - y$

Downstream speed = a km/h

upstream speed = b km/h

speed of boat in still water = $\frac{a+b}{2}$

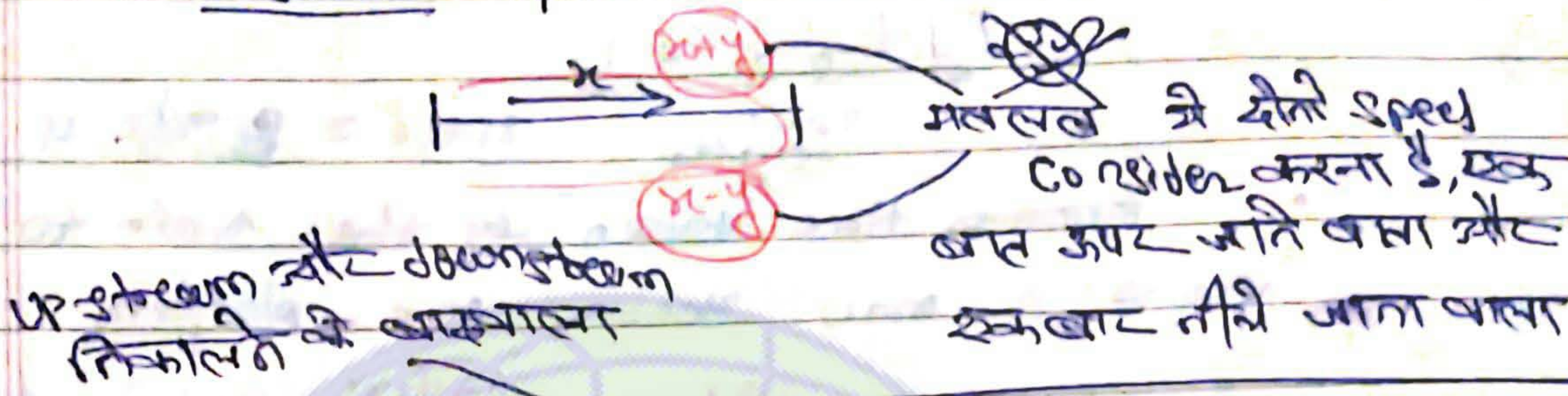
Rate of current = $\frac{a-b}{2}$

Formula mainly train case formula से लिखा जाना है

Formula	Early Late	Late Early	Early Late	Late Early
Diff. of time:	$\frac{\text{Early}}{\text{Early}}$	$\frac{\text{Late}}{\text{Late}}$	$\frac{\text{Early}}{\text{Late}}$	$\frac{\text{Late}}{\text{Early}}$

Distance = Product of speed \times Diff. of time / Diff. of speed

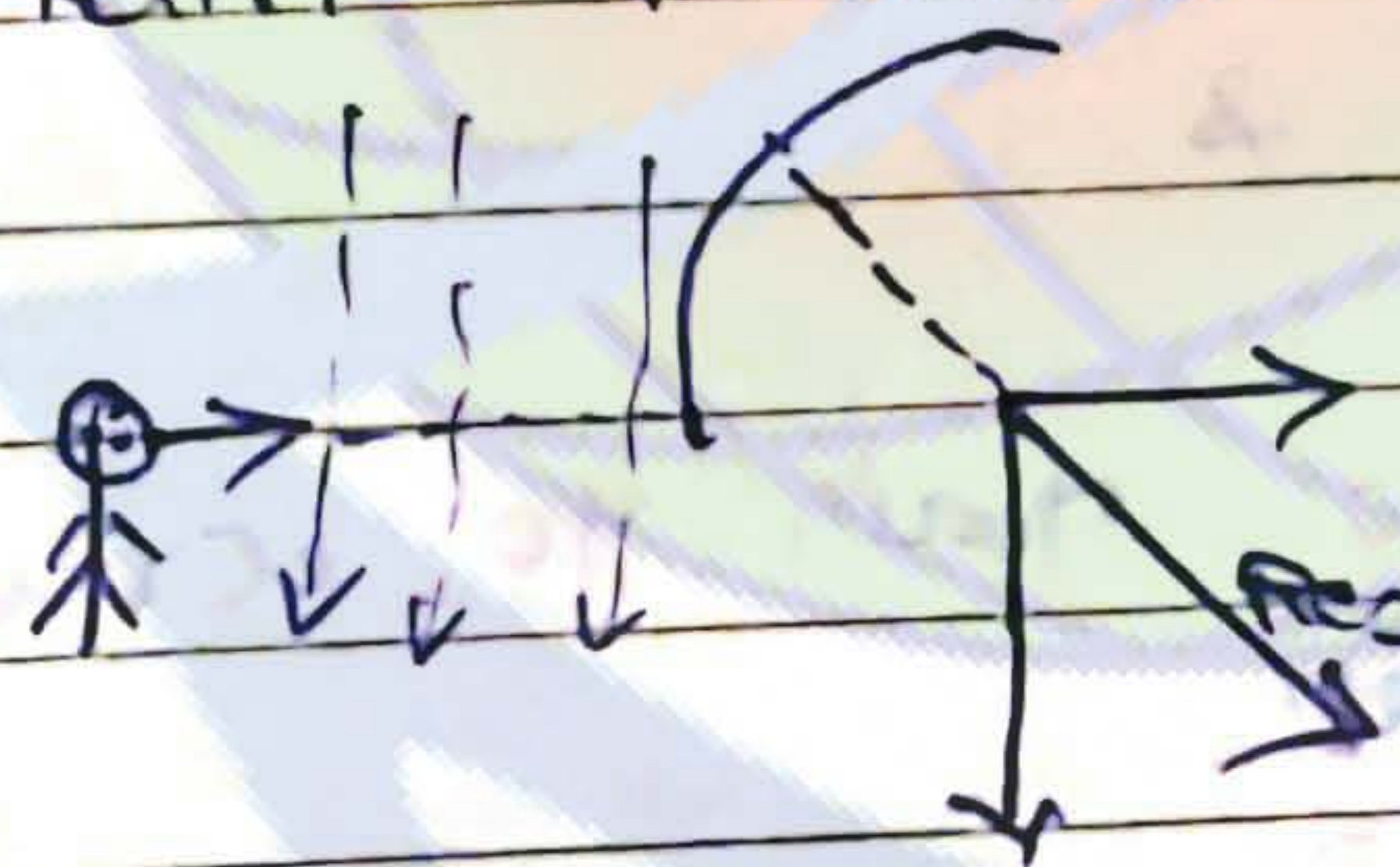
Distance b/w two points:-



$$\text{Distance} = \frac{\text{Product of speed} \times \text{addition of time}}{\text{Addition of speed}}$$

$$\text{Distance} = \frac{\text{Product of speed} \times \text{Diff. of time}}{\text{Diff. of speed}}$$

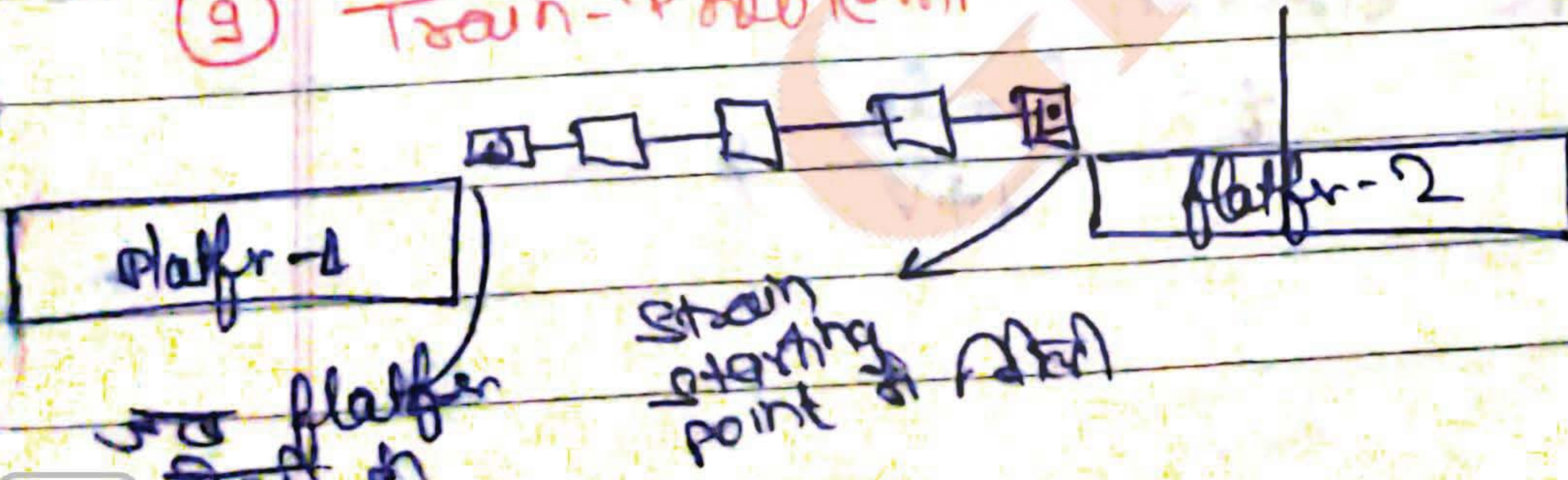
8 Rain Problem:



इसमें mainly resultant पे ध्यान देना है कि वारीबा का direction दिशा में जाती हुई दिखेगी

जै- इसके opposite दिशा में धारा की वजह है। अर्थात इसके उल्टे बचना है।

9 Train-Problem



इसमें mainly आगे बसा पीछे वाले point के

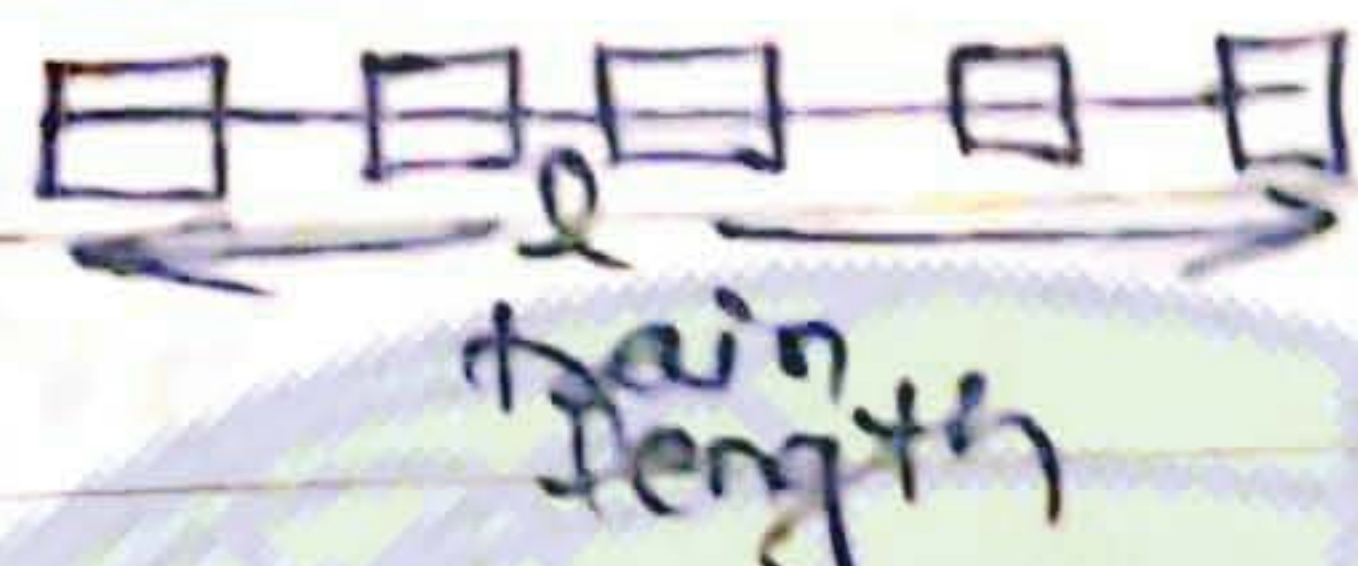
$\frac{x \text{ m/s}}{y \text{ m/s}}$

$$A.S = \frac{2xy}{x+y}$$

$\frac{x \text{ m/s}}{y \text{ m/s}}$

$$A.S = \frac{2xy}{x+y}$$

① ~~Relative motion~~ Train of length l , is traveling at u m/s



speed = ~~3~~ u m/s

- Time taken by the train to cross a man standing on a platform

time = $\frac{\text{length of train}}{\text{speed of train}}$, $t = \frac{l}{u}$ s

- Time taken by the train to cross a man moving in the same direction at v m/s.

$t = \frac{l}{u-v}$ s

- Time taken by the train to cross a man moving in the opposite direction at v m/s.

$t = \frac{l}{u+v}$ s

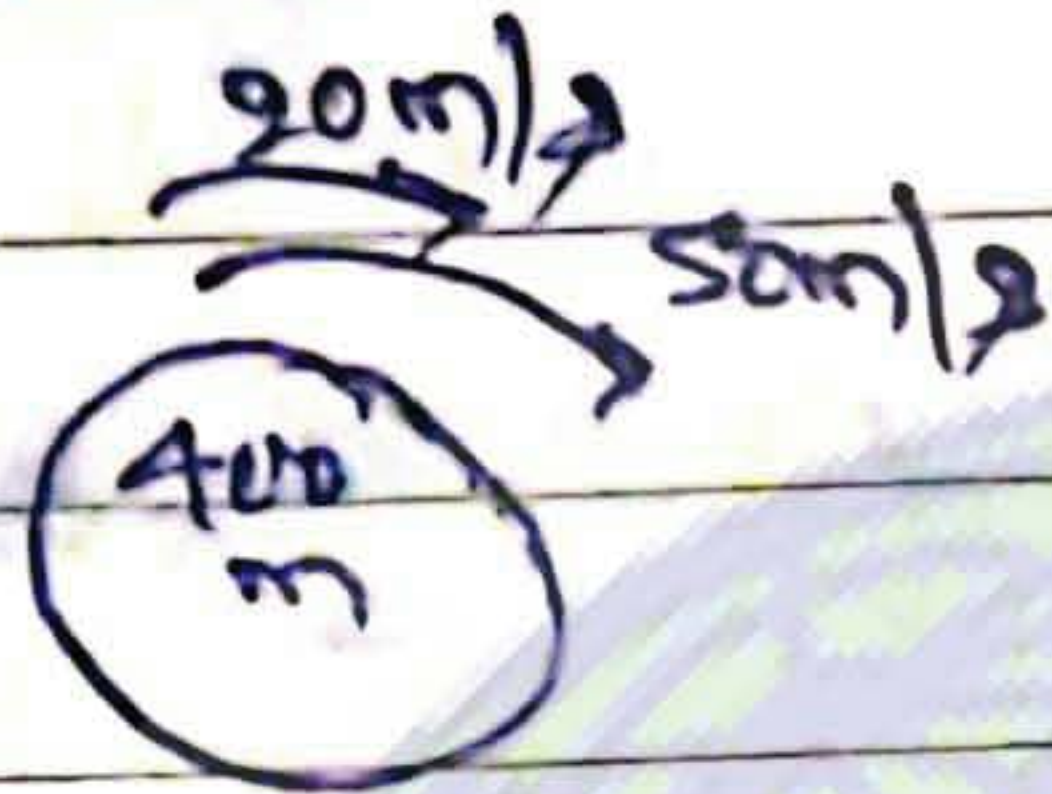
- Time taken by the train to cross a platform of length P .

$t = \frac{l+P}{u}$ s

- Time taken by two trains of length l_1 and l_2 and speeds u and v m/s to cross each other while traveling in the opposite direction

$t = \frac{l_1+l_2}{u+v}$ s

10 circular motion



• First time meet = $\frac{400}{50-20} = \frac{40}{3}$ s
 And also they will continue to meet after every $\frac{40}{3}$ s.

distance or relative speed or time

Notes:
 applicable on both • meet at starting point = L.C.M of
 either on same direction or opposite direction
 time taken by each to complete one round.

11 दो कारों का आपस में मिलने का वक़्त

40 km/h → distance travel in 2 hours

60 km/h

2 hours later

time = $\frac{\text{distance}}{\text{relative speed}}$

So, Dis: speed $\times t = 60 \times 4 = 240$ km में दोनों कार मिलेंगी

Note: इसका main concept है कि विमान की difference है दोनों का जरा थोड़ा पता करते हैं

20/3

5. Ratio and Proportion

① Ratio \rightarrow fraction \rightarrow Percentage

$m:w = 4:1$ } ratio

frac of $m = \frac{4}{5}$

frac of $w = \frac{1}{5}$

} fraction

% of $m = \frac{4}{5} \times 100$

% of $w = \frac{1}{5} \times 100$

} Percent

② $a:b = 2:3$

$a = 2x, b = 3x$

$\Rightarrow \frac{a}{b} = \frac{2x}{3x}$

$\Rightarrow \boxed{a = \frac{2}{3} b}$

Unit of measurement should be same. //

→ ratio ke problem ko x-jan kar hi jaisani se solve kiya jata hai iska batana janna hai.

③ $\boxed{a:b = c:d}$
 $\boxed{3:2 = 15:10}$

"A proportion shows equality of two ratios"

$3:2 :: 15:10$

means

Extremes

• Product of mean = Product of extremes

- Find 4th proportion

$6:8 :: 36:x$

$6x = 8 \times 36$

$x = 48$

* Properties:

$a:b = c:d$

$a:b :: c:d$

a) $\frac{a}{b} = \frac{c}{d}$

b) $\frac{a+b}{b} = \frac{c+d}{d}$ (componendo)

d) $\frac{a+b}{a-b} = \frac{c+d}{c-d}$

c) $\frac{a-b}{b} = \frac{c-d}{d}$ (dividendo)

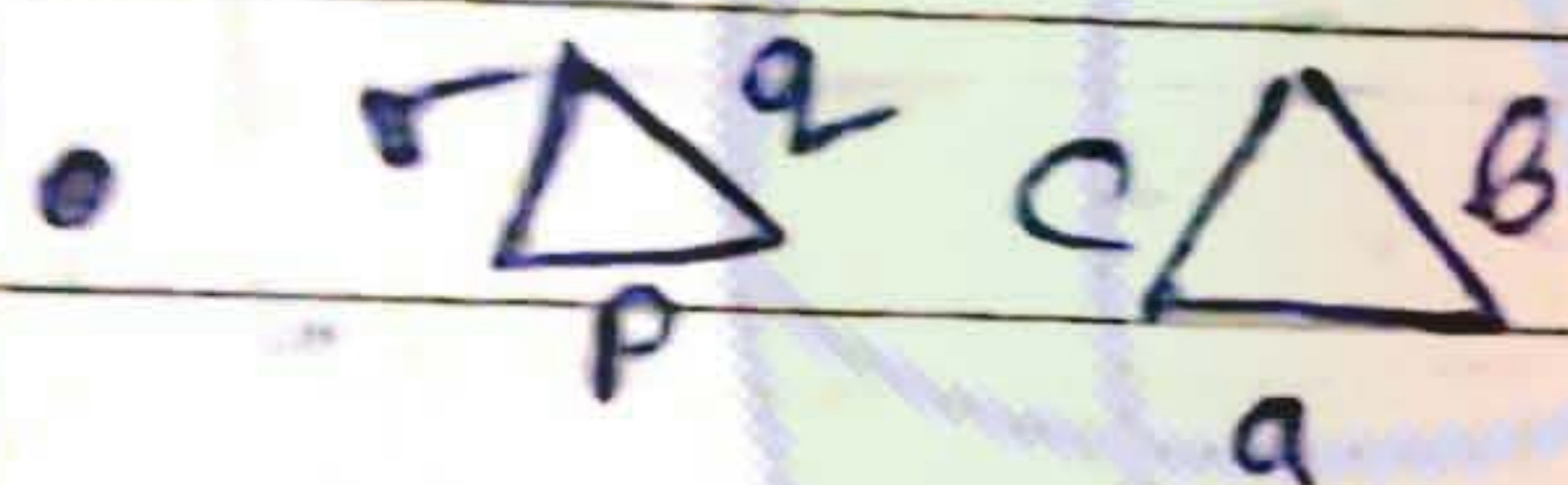
(componendo and dividendo)

④ Continued Proportion: -

• If a, b, c, d, e are in continued proportion then

$$\frac{a}{b} = \frac{b}{c} = \frac{c}{d} = \frac{d}{e} = k = \frac{a+b+c+d}{b+c+d+e}$$

$$\frac{a^2}{b^2} = \frac{b^2}{c^2} = \frac{c^2}{d^2} = \frac{d^2}{e^2} = k^2 = \frac{(a+b+c+d)^2}{(b+c+d+e)^2} = \frac{a^2+b^2+c^2+d^2}{b^2+c^2+d^2+e^2}$$



$$\angle P = \angle Q;$$

$$\angle Q = \angle R;$$

$$\angle R = \angle S;$$

$$\Rightarrow \frac{P}{b} = \frac{Q}{a} = \frac{R}{c} = \frac{P+Q+R}{b+a+c}$$

6. Alligation and mixture

①

$$S \times T = D$$

Alligation gives the ratio of the next.

②

weight
ratio

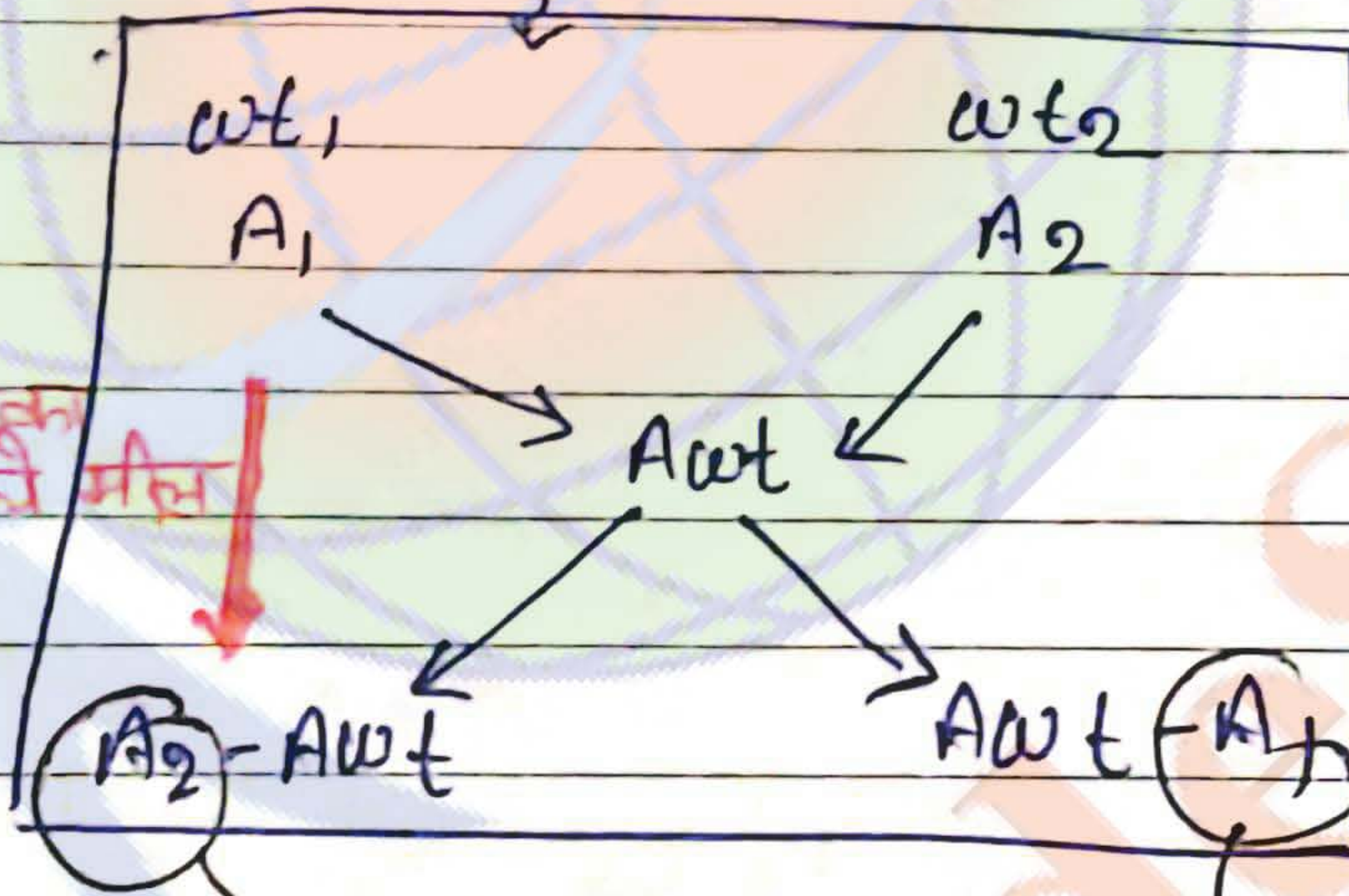
$$\text{weighted Avg} = \frac{A_1 \times wt_1 + A_2 \times wt_2}{wt_1 + wt_2}$$

side of ratio

$$\frac{wt_1}{wt_2} = \frac{A_2 - Awt}{Awt - A_1}$$

ratio

जपरानेक
सकतो नीचे मिल
होए है ॥



Alligation

Note:

When ever weighted Avg. is given and ratio is asked apply the alligation.

When ever weighted Avg. is asked and ratio is given apply weighted avg. formula.

Note: mixed Proportions:

$$\frac{m_1 D_1 H_1}{w_1} = \frac{m_2 D_2 H_2}{w_2}$$

w₁ = work under 1st condition
m₁ = mean under 1st condition
D₁ = days " " "
H₁ = hours " " "

⑩ Mixture Analysis:

Note: Such type of question should be solved by applying successive % change on decreasing component of a mixture

• fractional left = $\frac{\text{volume after removal}}{\text{volume after replacement}}$

$$\frac{m_f}{w_f} = \frac{m_i}{T - m_f} \Rightarrow \frac{w_f}{w_i} = \frac{T - m_f}{m_f}$$

• Final quantity of decreasing part = Initial quantity of decreasing part \times (fractional left)ⁿ

Final ratio of decreasing part to total = Initial ratio of decreasing part to total \times (fractional left)ⁿ

Note: The concept is applicable to the constituent which is continuously getting reduced in the solution.

$$\left(\frac{x-y}{x}\right)^n$$

* Note:

A container has x litres of a solution A. out of this container, y litres are drawn out and replaced by solution B, and this operation is done n-times then

$$\frac{\text{Amount or quantity of A left after } n^{\text{th}} \text{ operation}}{\text{Original amount of quantity of A}} = \left(\frac{x-y}{x}\right)^n$$

$$\frac{\text{Final Fraction of A}}{\text{Initial fraction of A}} = \left(\frac{x-y}{x}\right)^n$$

→ should be volume of A
at volume drawn out

Vessels problem:

$$\begin{array}{|l} m:w \\ 3:2 \end{array}$$

$$\begin{array}{|l} m:w \\ 4:3 \end{array}$$

m → milk
w → water

equal quantity is taken out to make new

vessels are mixed in the ratio of 8:21"

vessel A

$$\begin{array}{|l} 3:2 \\ 4:3 \end{array}$$

vessel C

$$\begin{array}{|l} m:w \\ 3+4 : 2+3 \\ 7 : 5 \end{array}$$

$$\begin{array}{|l} \frac{3}{5} : \frac{4}{7} : \frac{2}{5} : \frac{3}{7} \\ \frac{3}{5} + \frac{4}{7} : \frac{2}{5} + \frac{3}{7} \\ 41 : 29 \end{array}$$

$$m = x \times \frac{3}{5} + 21 \times \frac{4}{7} = x$$

$$w = x \times \frac{2}{5} + 21 \times \frac{3}{7} = y$$

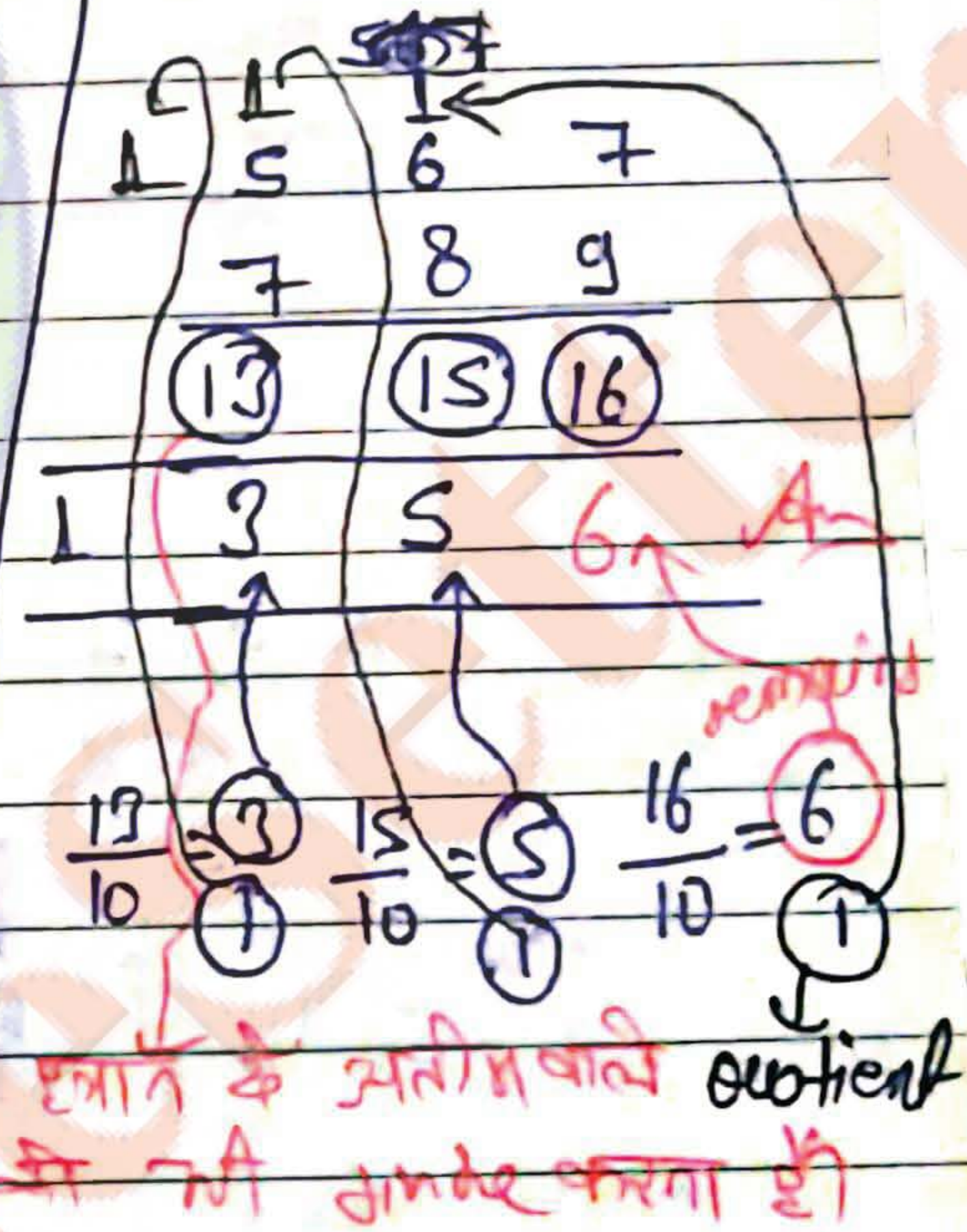
x:y

7.) Base System & Alpha-numerical based Problems.

①

Base system का सबसे बड़ी शक्ति यह है कि :- अगर final value base value से अधिक आ जाता है तो, उसे उसी base से divide करके रिमैन्डर "Remainder" लिखना होता है और quotient को carry में लेना होता है।

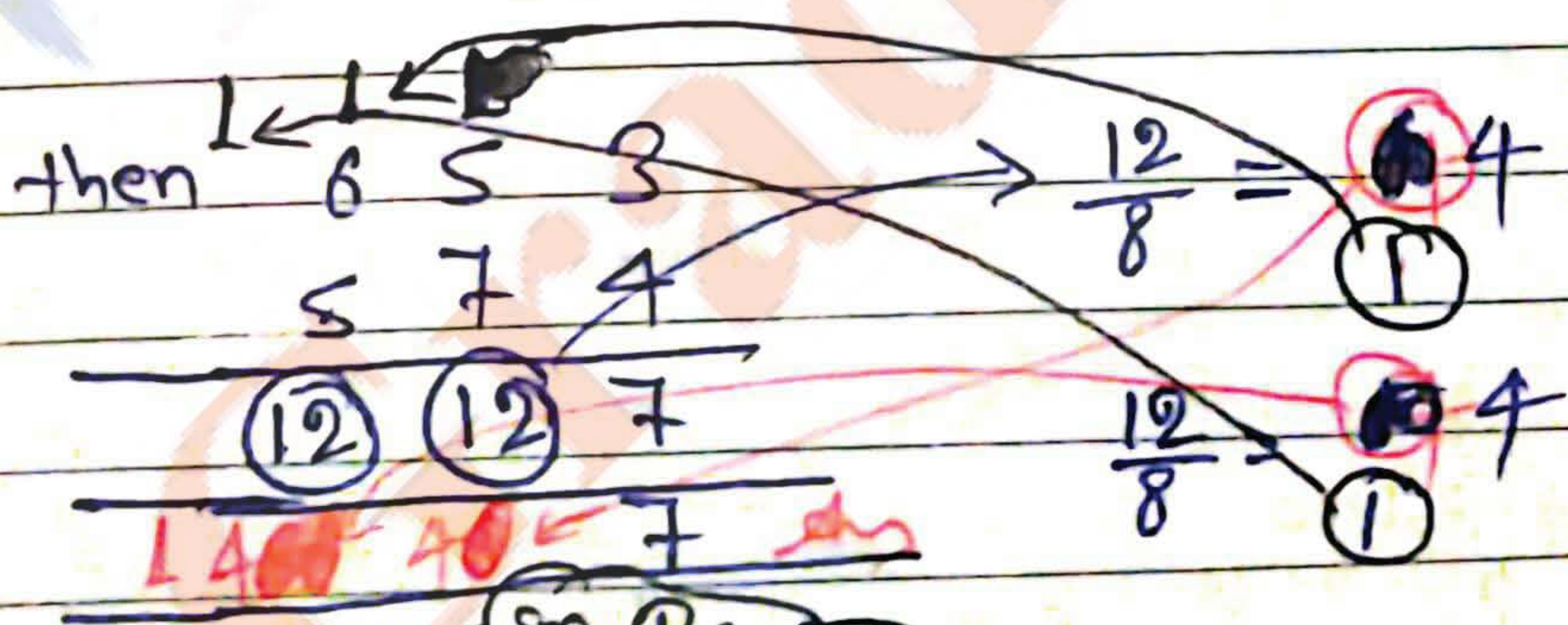
Decimal (10)	Octal (8)	Binary	Hexadecimal
0	0	0	0
1	1	1	1
2	2	10	2
3	3	11	3
4	4	100	4
5	5	101	5
6	6	110	6
7	7	111	7
8	10		8
9	11		9
			A
			B
			C
			D
			E
			F



eg.)

If

5	6	7
6	4	3
1	4	3
2	3	2



What base are choose, so that we get remainder 2 $\frac{10}{8} = 2$

सबसे पहले base पता करना, अगर base पता चल गया तो इसे easily solve कर ले।

Date: _____
Page: _____

② Alpha-numerical based Problem :-

Q. If all the alphabets are in decimal system, and have distinct value then find values, ~~then find~~ of all the alphabets and these values are single digit "no.?"

Step 2 further easy
A. 2000

① ②
F O R T Y

Not possible

+ T E N
+ T E N

S I X T Y

$0 = 0$
 $N = 0, S$
 $E = 0, S$
 $S \rightarrow 10$

2 9 7 8 6

+ 8 5 0

+ 8 5 0

3 1 4 8 6

8) Profit, loss & discount:-

① ^{marked up amount}
 $Profit = SP - CP$
 $Profit \% = \frac{SP - CP}{CP} \times 100$
 or $markup \% = \frac{Profit}{C.P} \times 100$
 $P \% = \left(\frac{SP}{CP} - 1 \right) \times 100$

$Loss = CP - SP$
 $Loss \% = \frac{CP - SP}{C.P} \times 100 = \frac{Loss}{C.P} \times 100$
 $L \% = \left(1 - \frac{SP}{CP} \right) \times 100$

$m \% = \frac{Profit}{S.P} \times 100$
 $m \% = \frac{S.P - C.P}{S.P} \times 100$

margin is always calculated on selling price

②

P %	m %	m %	P %
20% ↑		25% ↓	
$\frac{1}{5}$ ↑	$\frac{1}{6}$ ↓	$\frac{1}{4}$ ↓	$\frac{1}{3}$ ↑

Percentage concept

③

(C.P) $\xrightarrow[\substack{markup \\ m \% \uparrow}]{}$ $\left(1 + \frac{m}{100} \right) C.P$ $\xrightarrow[\substack{discount \\ d \% \downarrow}]{}$ $\left(1 - \frac{d}{100} \right) \left(1 + \frac{m}{100} \right) C.P$

mark price (M.P)
 Tag Price (T.P)
 list price (L.P)
 M.R.P

selling price of consumer of item

$discount \% = \frac{discount}{m.p} \times 100$

$Profit \% \text{ or } loss \% = m - d - \frac{md}{100}$

Successive change applied here!

markup discount

$\frac{m.p}{C.P} = \frac{100 + m}{100 - d}$

$\frac{m.p}{C.P} = \frac{120}{90} = \frac{4}{3} = 1 + \frac{1}{3}$ (markup price)

C.P ↑ marked price (M.P)

$S.P = m.p \times \frac{100 - d_1}{100} \times \frac{100 - d_2}{100}$

$m.p = S.P \times \frac{100}{100 - d_1} \times \frac{100}{100 - d_2}$

This is increment in the C.P. so that is markup price.

(4)

$$S.P = C.P \times \left(\frac{100 + \text{Profit}\%}{100} \right)$$

$$C.P \times \left(\frac{100 - \text{Loss}\%}{100} \right)$$

$$C.P = S.P \times \left(\frac{100}{100 + \text{Profit}\%} \right)$$

$$= S.P \times \left(\frac{100}{100 - \text{Loss}\%} \right)$$

(5) Faulty weight

$$\text{gain}\% = \frac{\text{Error}}{\text{true value}} \times 100$$

→ जी actual में दिया जयमें ही ती profit बनाया।

(6) If CP of two articles is same & 1 at profit % and other at loss of % \Rightarrow 0%.

If S.P is same. Then empirical formula:

$$\text{Loss}\% = \frac{a^2}{100}\%$$

→ जी profit में loss होगा।

(7) Weighted average based problem:-

$$\text{Avg} = \frac{A_1 w_1 + A_2 w_2}{w_1 + w_2}$$

or

$$A_1 w_1 + A_2 w_2 = \text{Avg} (w_1 + w_2)$$

eg. Mohan has 60 pens, some of them he sold at a profit of 12% and remaining at a loss of 8%. So that overall profit is 10%. Then find no.

(4)

$$S.P = C.P \times \left(\frac{100 + \text{Profit}\%}{100} \right)$$

or

$$C.P \times \left(\frac{100 - \text{Loss}\%}{100} \right)$$

$$C.P = S.P \times \left(\frac{100}{100 + \text{Profit}\%} \right)$$

or

$$= S.P \times \left(\frac{100}{100 - \text{Loss}\%} \right)$$

(5) Faulty weight

$$\text{gain \%} = \frac{\text{Error}}{\text{true value}} \times 100$$

→ जो actual में दिया जयमें ही ती profit बनाया।

(6) If C.P of two articles is same & 1 at profit % and other at loss of % \Rightarrow 0%.

If S.P is same. Then empirical formula:

$$\text{Loss \%} = \frac{a^2}{100} \%$$

→ जो profit में loss होगा।

(7) Weighted average based problem:-

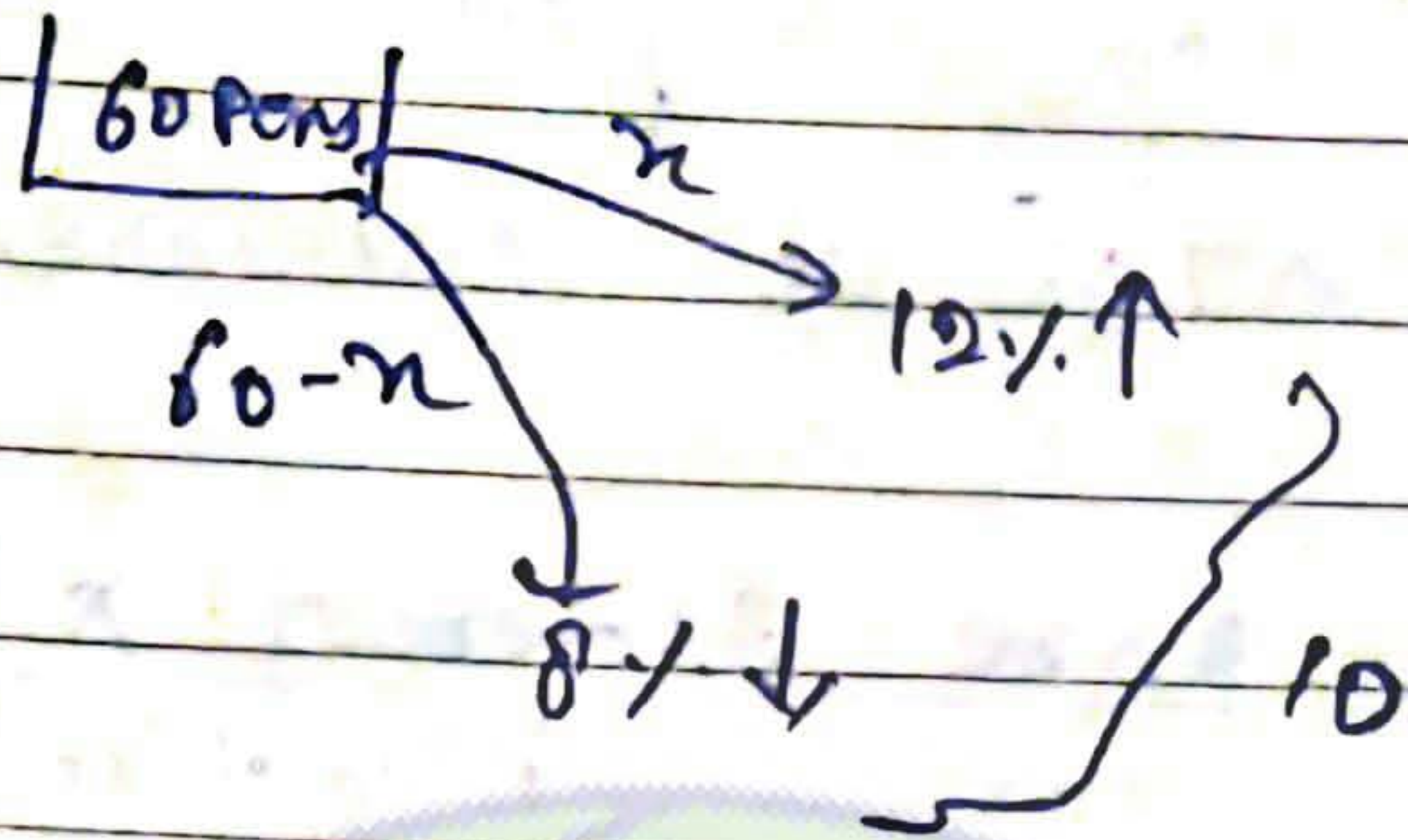
$$\text{Avg} = \frac{A_1 w_1 + A_2 w_2}{w_1 + w_2}$$

or

$$A_1 w_1 + A_2 w_2 = \text{Avg} (w_1 + w_2)$$

eg. Mohan has 60 pens, some of them he sold at a profit of 12% and remaining at a loss of 8%. So that overall profit is 10%. Then find no.

6/7 of pens he sold at a profit of 12%.



$$(x \times 12) + (60-x)(-8) = 60 \times 10$$

$$x = 40$$

⑧ Unequal Quantity buying-selling

"इसमें हम S.P का ratio निकालते हैं, और इसके help से हम C.P खजाने का प्रयास करते हैं, कि कितना profit या loss हुआ, जो $1 + (\quad)$ में आता है".

Note: "जब भी हम ratio लेते हैं, तो ① के स्थान में आता है वह नीचे वाले को ~~खरीदने~~ के respect में ऊपर वाले को ~~खरीदा~~ है". "कि ऊपर वाला आया है या क्या".

C.P of 12 pencil = S.P of 9 pencil

$$C.P \times 12 = S.P \times 9$$

$$\frac{S.P}{C.P} = \frac{12}{9} = \frac{4}{3} = 1 + \frac{1}{3} \rightarrow \text{profit}$$

9.) Simple Interest

① $S.I = \frac{P \times R \times T}{100}$; Amount = Principal + S.I

Note:- S.I is RT% of principle. $S.I = A - P$

② Principle = $\frac{\text{more Interest} \times 100}{\text{more rate} \times \text{time}}$; $P = \frac{S.I \times 100}{R \times T}$

10.) Compound Interest:-

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

Annually
(R% Per annum)

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

∴ here r becomes $\frac{r}{2}$ and n becomes 2n } half yearly

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

Compounded Quarterly

$C.I = A - P$

③ Relation b/w S.I and C.I:-
for 2-year:

$(C.I)_2 + (S.I)_2 = \text{sum} = \frac{\text{diff} \times 100 \times 100}{2 \times 100}$

$(C.I)_2 - (S.I)_2 = \text{diff} = \frac{\text{sum} \times 100 \times 100}{100 \times 100} = \frac{P \times r^2}{(100)^2} = \frac{I \times r}{100}$

∴ $I = \frac{P \times r}{100}$

⊙ For 3-years! -

$$(100)_3 + (S.I.)_3 \text{ Sum} = \frac{\text{diff} \times 100 \times 100 \times 100}{100 \times 100 \times (100 + r)}$$

$$(C.I.)_3 - (S.I.)_3 = \text{diff} = \frac{\text{sum} \times r \times r \times r \times (100 + r)}{100 \times 100 \times 100} = \frac{P r^3 (100 + r)}{(100)^3}$$

Ⓐ Installment -

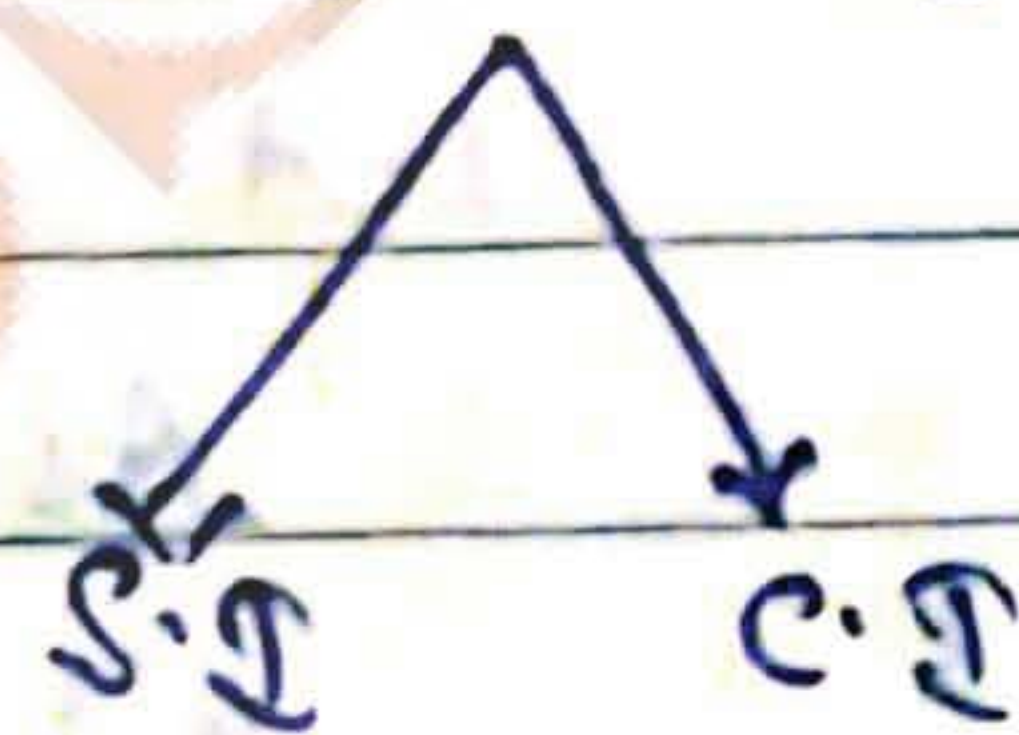
- a) Cash Purchase Price
- b) Hire Purchase Price

↓
Down Payment + Installments

↓
जो पहले payment करना पड़ना है।

Cash Purchase Price

Interest



10. Time & work

① $\text{Rate of work} = \frac{\text{Total work}}{\text{total time}}$

Best method

② L.C.M method - Total work L.C.M के बराबर मान ले।

③ A can do a work in 10 days, B can do work in 12 days, while C can do work in 15 days. Then how many days job completed by all.

a) Percentage method

100 job

100 job मान करके 100 को इस number से divide करके % find कर लो, कि एक दिन में कितना % complete करके दे।

A - 10 y.

B - $\frac{100}{12} = 8.33\%$

C - $\frac{100}{15} = 6.66\%$

100% in four days

b) Rate method

Let total work = 1 Unit

A's per day work = $\frac{1}{10}$

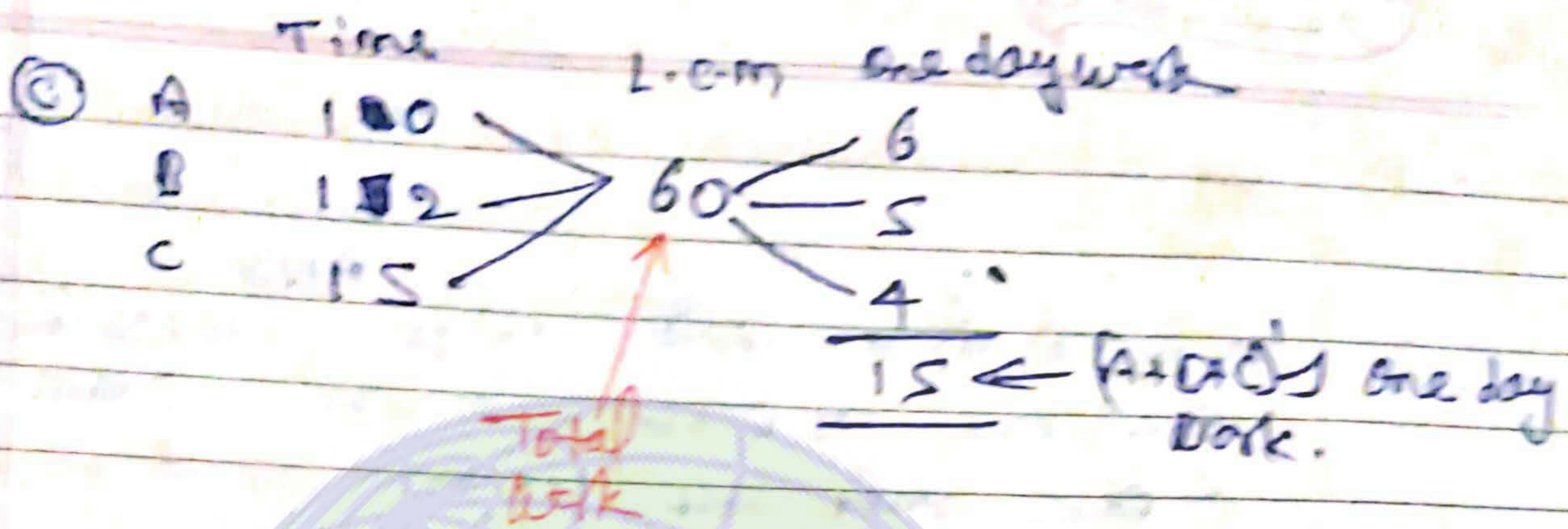
B's per day work = $\frac{1}{12}$

C's per day work = $\frac{1}{15}$

(A+B+C)'s per day work = $\frac{1}{10} + \frac{1}{12} + \frac{1}{15} = \frac{1}{4}$

एक दिन के total time के लिए इस case में reciprocal करना है।

total time = $\frac{1}{\frac{1}{4}} = 4 \text{ days}$



Time = $\frac{60}{15} = 4 \text{ days}$
 Note: L.C.M की work सब बिचे हें।

④ -ve work - -

Logic - last में builder से जना चाहीए so complete the work.
 → last में favourable बंधा जा जाई, so तुम्हे बिच में दिन का काम बचा ले।
 → संकीर्ण में बताने वाले की लम्बा हें, ताबि वी बना कर चला जाई। इम्बलिये पृथ्वी ही बताने वाले का काम संकीर्ण बिच में बिच मान्य करके म्बाने करके रस ले।

⑤ Problems based on efficiency and wedges

Efficiency & work

efficiency & $\frac{1}{\text{time}}$

“अगर efficiency ज्यादा हीगी तो work भी ज्यादा हीगी”

“अगर efficiency ज्यादा हीगी तो time कम लगीगी”

$$\frac{E_A}{E_B} = \frac{W_A}{W_B} = \frac{T_B}{T_A}$$

6) Man, women, children based problems:-

OR
 ee अबकी बराबर करके
 किसी एक का विकास
 ले फिर इसके help
 से इसके ती विकास
 ले ११

AND
 ee अलग-अलग को variable
 मान कर Eqn बना ली ॥
 ee फिर जो ती फाइनल है
 work इसके L.C.M ले ली
 और उसे total work मानवी,

let माना कि total को उस L.C.M
 से गुणा करके final value
 निकालें ॥

ee जो निकालता है उसमें समय
 के form में value put कर के

ee finally total time में sumवाला
 तब L.C.M को गुणा करके
 value फिर से ११

eg: 2m and 2 boy can do a work in 10 days,
 while 3m and 2 boy can do the same
 work in 8 days. then in how many days the
 job get completed by 1 man and 1 boy.

soln

$$2x + 2y = 4$$

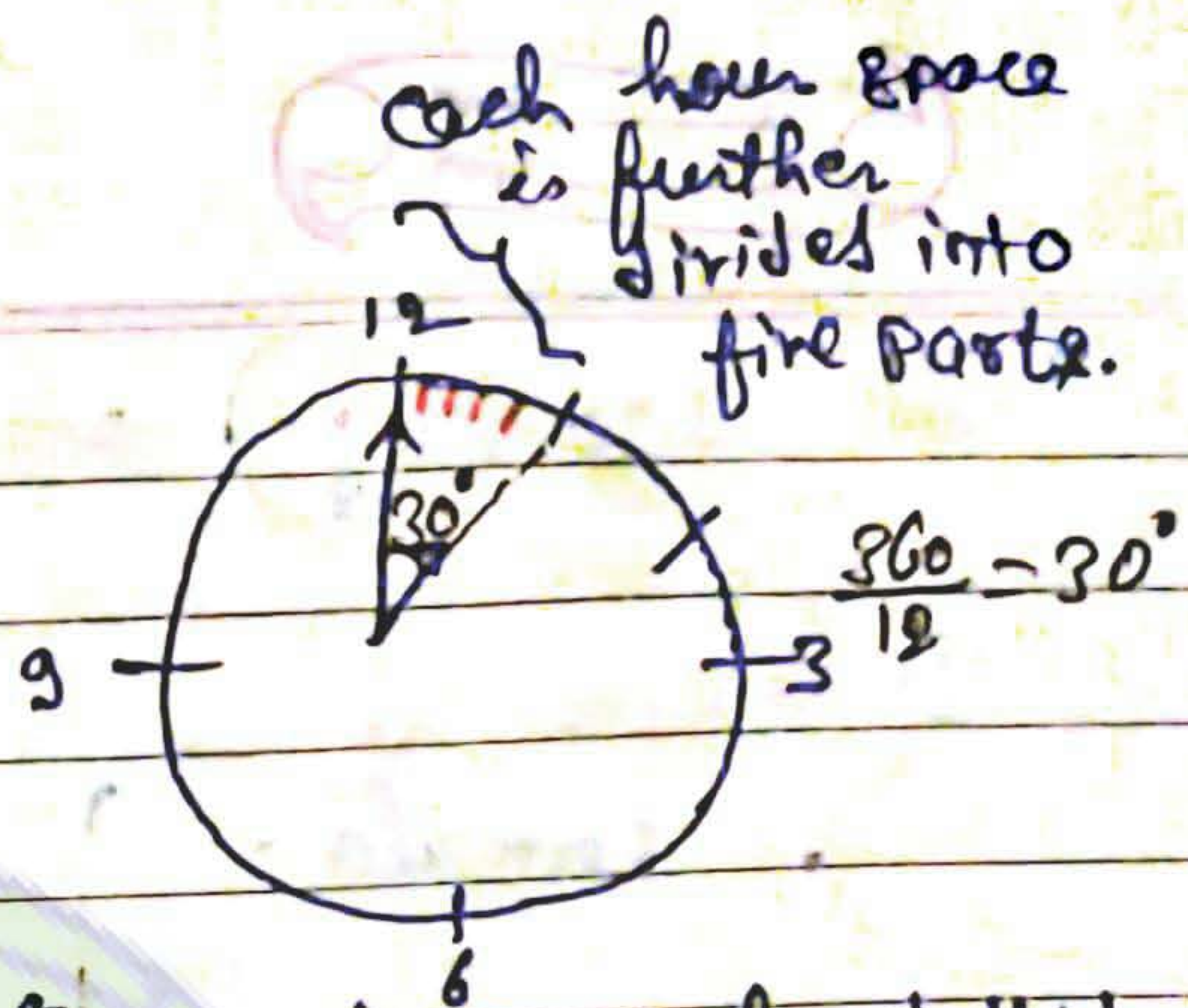
$$3x + 2y = 5$$

$$x = \frac{7}{5}, y = \frac{2}{5}$$

Total work (LCM) = 40

so, 1m + 1b = $2 \times \frac{7}{5} + 1 \times \frac{2}{5}$
 $= \frac{16}{5}$
 total time = $\frac{40}{16/5} = \frac{40 \times 5}{16} = 12.5 \text{ days}$

11.) clock



① In 60' minute hand turns by $= 360^\circ$
 In 1', minute hand turns by $= \frac{360}{60}$
 $= 6^\circ/\text{min}$

② In 60', hour hand turns by $= 30^\circ$
 In 1', hour hand turns by $= \frac{1^\circ}{2}/\text{min}$

③ In 60 min, the minute hand gains 55 min, on the hour hand.


④ In 1 minute, the minute hand leads the hour hand by $5\frac{1}{2}^\circ$ or $\frac{11}{2}^\circ$.

Note: The angle b/w the minute hand and the hour hand will change by $\frac{11^\circ}{2}$ per minute increase or decrease

⑤ In every hour, both the hands co-incide once, but 11-times in 12 hours.

⑥ In every hour, both are opposite - direction once but 11-times in 12 hours.


⑦ In every hour both hands are at right angle for 2-times but 22-times in 12 hours.

⑧ 3:30 →  ⇒ $3 + \frac{1}{2} = \frac{7}{2} \times 30^\circ = 105^\circ$ (hour hand) = $105 - 105 = 0^\circ$
 $30 \times 6 = 180^\circ$ (min hand) = $180 - 180 = 0^\circ$

⑨ Rules of co-incide:

Formula:

$$5x \times \frac{12}{11}$$

→  हमारे ये प्रश्न initial वाला value है;

General formula:-

$$(5x - y) \times \frac{12}{11}$$

$$(5x - \text{min}) \times \frac{12}{11}$$

→ Zero min degree के लिए
 Zero degree min के लिए

प्रश्न min में है

→ degree के अनुसार min भरके

min वाला value चाहिए जहाँ से time लेनी है

Rules of right angle

$15 \text{ min} = 15 \times 6 = 90^\circ$

$\frac{90}{6} = 15$

$$(5x - 15) \times \frac{12}{11}$$

$$(5x + 15) \times \frac{12}{11}$$

→ हमेशा कोल वाला value लेना

$$(5x + 15) \times \frac{12}{11} = 5 \frac{8}{11}$$

$$(5x + 15) \times \frac{12}{11} = 38 \frac{2}{11}$$

Rules of minutes apart:-

2 min apart

$$(5x - 2) \times \frac{12}{11} = 14.18$$

$$(5x + 2) \times \frac{12}{11} = 18.54$$

12.) Calendar :-

1.) Earth complete one full round around sun
 $= 365 \cdot 24 \cdot 24 \text{ --- day}$
 $\approx 365 \text{ day}$

2.) In four year calendar get slow by
 $= 0.2424 \text{ ---}$
 $= 0.9696 \text{ ---}$
 $\approx 1 \text{ day}$

3.)
$$\begin{array}{r} 100000000 \text{ ---} \\ 0.96969696 \text{ ---} \\ \hline 0.03030303 \text{ ---} \end{array}$$

4.) In four hundred year's calendar get fast by
 $= (0.030303 \text{ ---}) \times 100$
 $= 3.030303 \text{ ---}$

5.) 1, 2, 3, ---, 100, 101, 102, ---, 200, 201, ---, 300,
301, ---, 399, 400, 401, 402, ---



ee Those year's which are non-century year's, If are divisible by 4, then they are said to be leap year.

But for century year, If they are divisible by 400 only then they are said to be leap year."

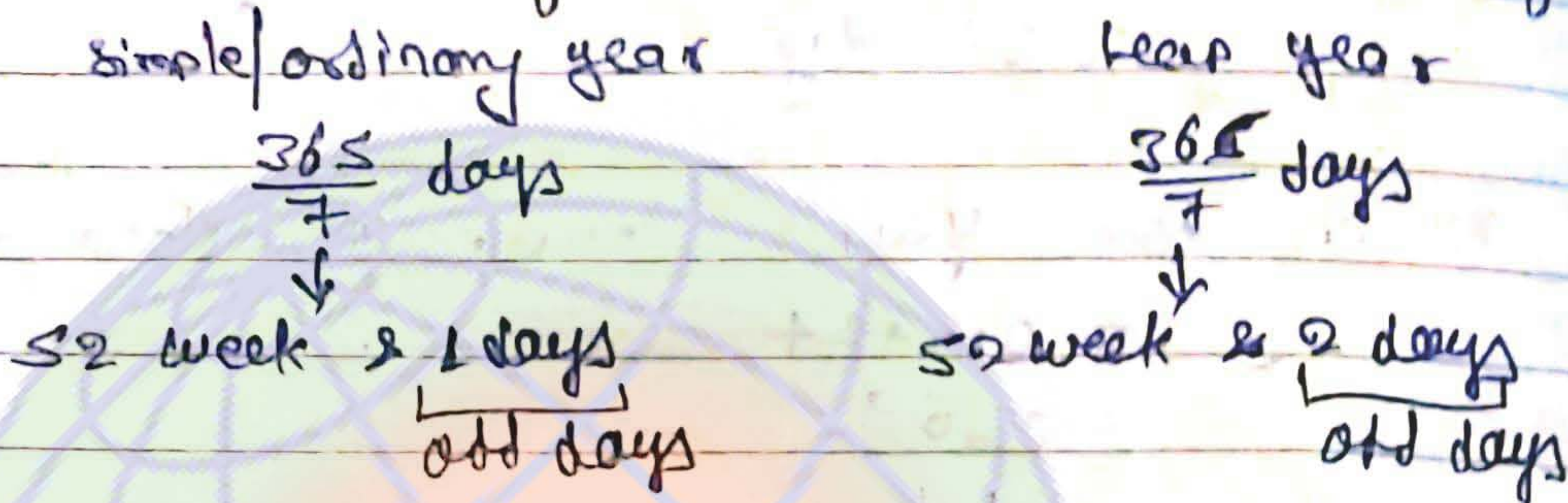
मनु ही Concept
 Mainly जसतीका
 कारण बनना
 वृ, इसलिये
 इस पर
 क्यारि से
 लागू है।।

8) 3 Feb 1996

काली मा कालुत जी जी से ना ले, हर शायद
Complete year की 1995 तक ही consider होगा

9) अगर बुक से दिन मान रहा हो तो उस दिन को ही '1' मानके
और फिर year concept से solve कर ले।

6.) odd days: - No. of days which can not complete week.
No. of possible remainder on division of 7.



7.) In 1st 100 year's No. of odd days -
1, 2, 3, 4, - - - - - 99, 100

$$\frac{100}{4} = 25 - 1 = 24$$

↑
leap year

because 100 is not leap year

76 Simple year

24 leap year

$$\frac{76}{7} = 6$$

odd days

$$24 \times 2 = 48 \Rightarrow \frac{48}{7} = 6$$

odd days

$$\frac{12}{7} = 5$$

odd days

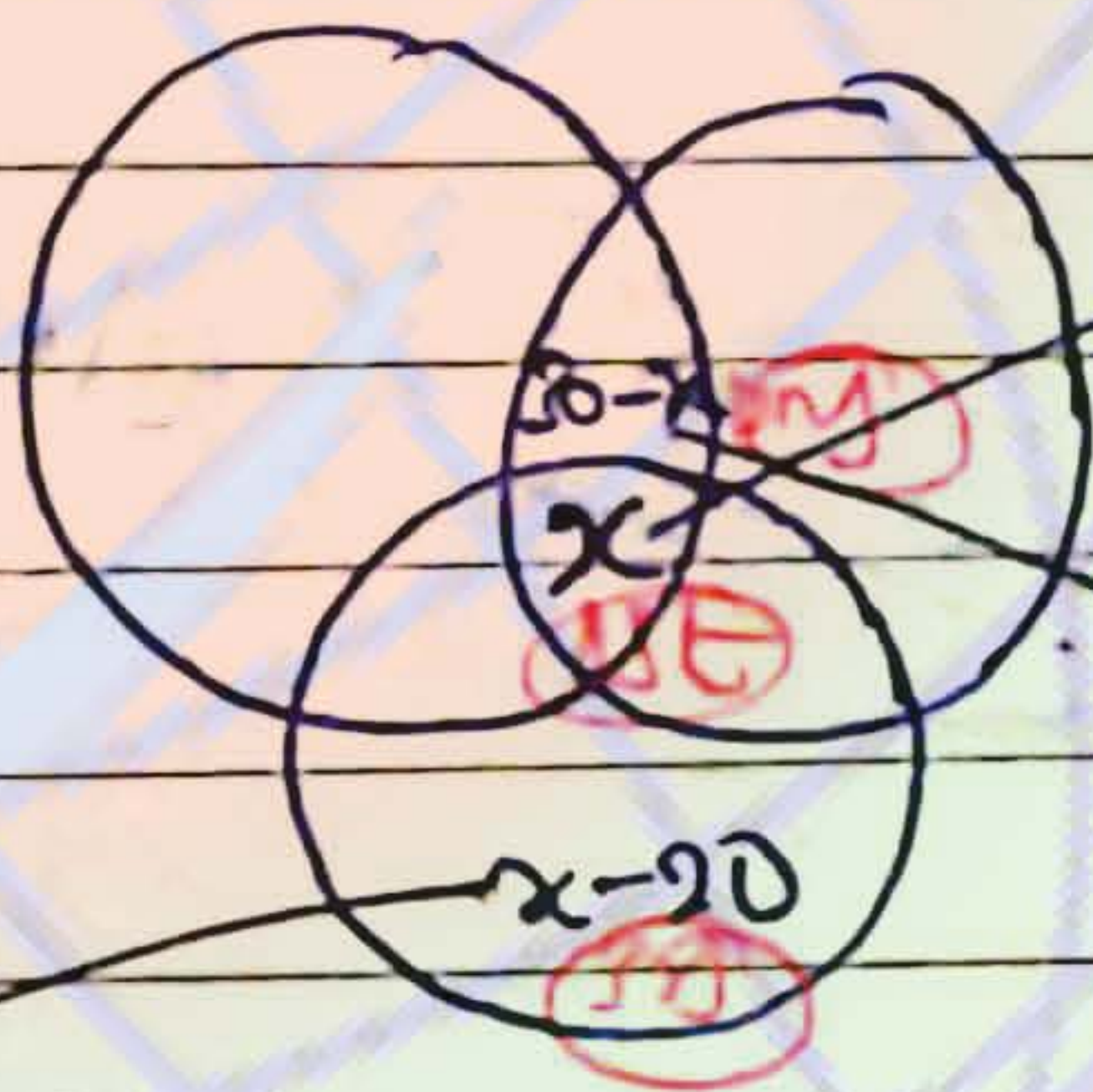
- In first 100 year's no. of odd days = 5
- " " 200 " " " = 3
- " " 300 " " " = 1
- " " 400 " " " = 0

Note

Calendar start

1 AD → Monday.

13.) Set theory (maximum and minimum case) :-



[Imp: Common को x -साथ कर solve करें]

mins: not go to the
 $20 \leq x$

max: only the
 $x \leq 30$

(जिसमें x -पक्ष ही सबसे minimum value निकालेंगे | max. value के respect में।)

$\begin{matrix} \text{min} & & \text{max} \\ \uparrow & & \uparrow \\ \boxed{20 \leq x \leq 30} \end{matrix}$

(जिसमें x -बाद में ही सबसे max. value निकालेंगे, min value के respect में)

$30 - x$
 should be \downarrow min value \downarrow max