Arithmetic reasoning

(Q) Jitender says "if rajender gives me Rs 40, he will have half as much as Raja, but if Raja gives me Rs 40, then 3 of us will all have the same amount. What is the total amount of money that Jitender, rajender, and raja will have b/w them

Sol^n

Jitender = x
Rajender = y
Raja = z

$y - 40 = \frac{z}{2}$

$x + 40 = y = z - 40$

80 120

$y - 40 = \frac{z}{2}$

$z - 40 - 40 = \frac{z}{2}$

$-80 = \frac{z}{2} - z$

$160 = z$

80, 120

(Q) Anjuman was counting down from 42, and Neha " " up to upward the number starting from 1.

ans she was calling out the odd no. only, what common no. will they call out at the same time, if they are calling out at the same speed.

Sol'n They will say same no. at 5th count.

$$42 + (n-1)\times -1 = 1 + (n-1)\times 2$$

$$42 - n + 1 = 1 + 2n - 2$$

$$42 + 2 = 2n + n$$

$$44 = 3n$$

$$\frac{44}{3} = n$$

But this count is not possible so it means 2 को कभी भी same no. नहीं बोलेगी।

Q7.) A airline has a certain free luggage alounce and charges for excess luggage at a fixed rate per kg. two passengers Digvijay and Sankalp have

Sol'n

Date____
Page____

60kg of lugge b/w them and are charges Rs 1200 and Rs 2400. resp. for excess lugge.
At the entire lugge belong to one of them, the excess lugge charge would have been Rs 5400 what is the weight of parkals lugge.

Sol^n

~~Diny - x - 1200 x+y = 60~~
~~Sank - y - 2400~~ → charge ∝ 1200, 2400

free lugge = y kg

$(x+y) + (2x+y) = 60$ kg

$3x + 2y = 60$ kg

charge = 3600

if 3600 is paid for = $3x$

" 1 " " " = $\frac{3x}{3600}$

" 5400 " " " = $\frac{3x}{3600} \times 5400$

$= \frac{9x}{2}$

$\frac{3x}{2} + y = 3x + 2y$

$\frac{3x}{2} - 3x = 2y - y$

$\frac{3x - 6x}{2} = y$

$\boxed{\frac{3x}{2} = y}$

$3x + 2y = 60$

$3x + 2 \times \frac{3x}{2} = 60$

$3x + 3x = 60$

$6x = 60$

$\boxed{x = 10}$

$\boxed{y = 15}$

Q4) How many odd numbered pages are there in a book of 1089 page

Sol: $\frac{1089 + 1}{2} =$

Q5) A man has 2016 candles after burning all of them, he can

make a new candles from 9 stubs left behind,
find the max. no. of candles that can be made

sol^n

1st level

$$9\overline{)2016}(224$$
18
21
18
36

2nd level:-

$$9\overline{)224}(24$$
18
44
36
8

24 + 8 = 32

$$9\overline{)32}(3$$
27
5

अब 9 पूरे नहीं हो पाए

Total candles = 224
24
3
251

Date
Page

Q) A certain street has 1000 building, a signmaker is contracted to number the houses from 1 to 1000. How many zeros will be needed there.

Sol

10
20
30
40
50
60
70
80
90
100

101

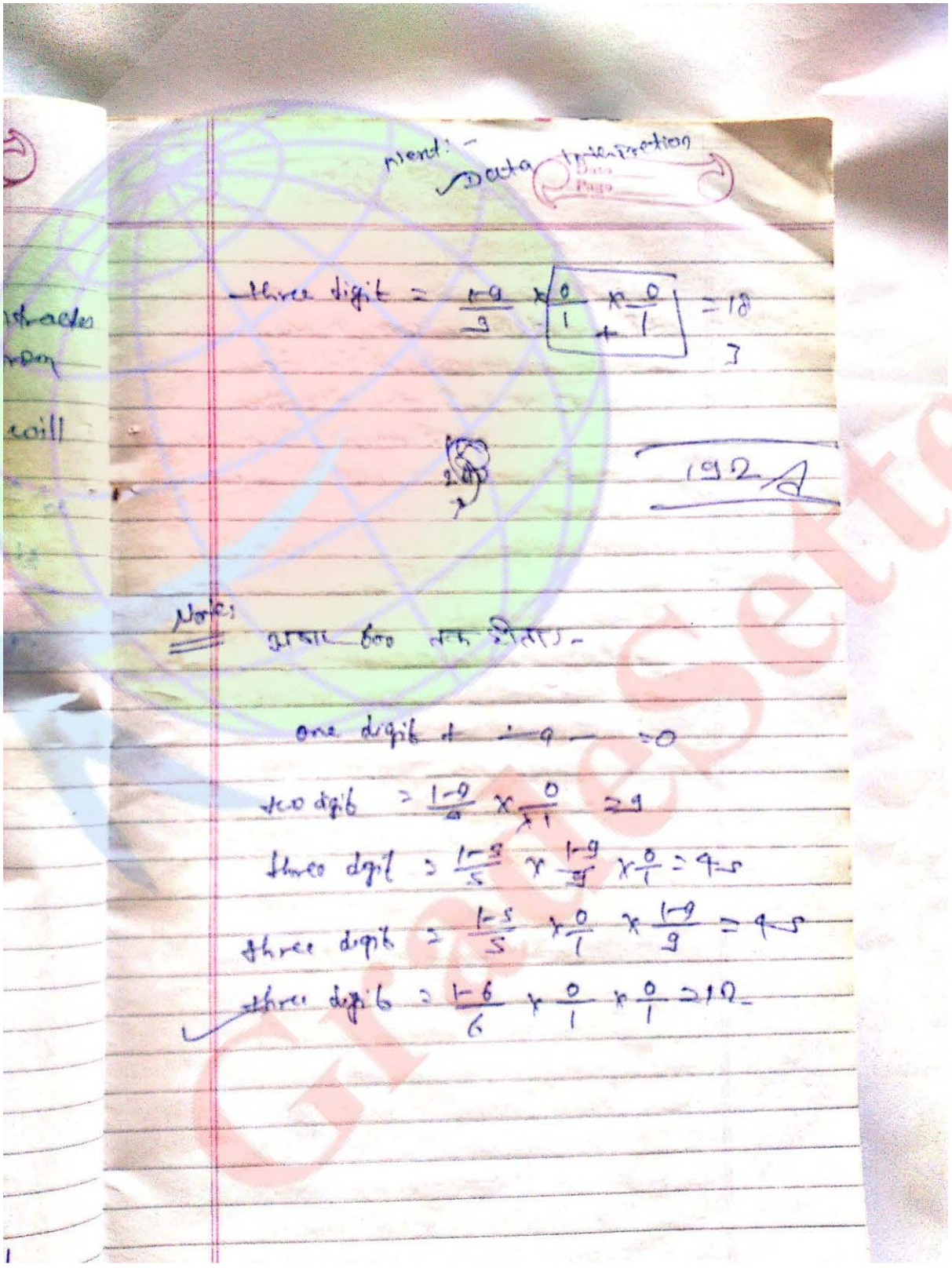
Tech

One digit $1-9 = 0$

two digit $\frac{1-9}{9} \times \frac{0}{1} = 9$

three digit $= \frac{1-9}{9} \times \frac{1-9}{9} \times \frac{0}{1} = 81$

three digit $= \frac{1-9}{9} \times \frac{0}{1} \times \frac{1-9}{9} = 81$



Trend:- Data Interpretation

three digit = $\frac{1-9}{3} \times \left[\frac{0}{1} \times \frac{0}{1}\right] = 18$

192

Note:

one digit = $\frac{1-9}{9} = 0$

two digit = $\frac{1-9}{9} \times \frac{0}{1} = 9$

three digit = $\frac{1-5}{5} \times \frac{1-9}{9} \times \frac{0}{1} = 45$

three digit = $\frac{1-5}{5} \times \frac{0}{1} \times \frac{1-9}{9} = 45$

three digit = $\frac{1-6}{6} \times \frac{0}{1} \times \frac{0}{1} = 10$

2-5-15

Percentage

A : B

200 250

50

B is how 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 % quantity should be reduces. so that we have same total expenditure

Sol

Price x quantity = Total expenditure

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

20%

eg.) Price of an article is ↑ by 30%, and Con. is ↑ by 10%, find the eff. on total exp.

Sol^n

Date
Page

Price x quantity => total expanditure

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

$$\left(30+10+\frac{30\times10}{100}\right)\% = 43\%$$

Note:- If case of decrease, then:-

$$\left(x-y-\frac{xy}{100}\right)$$

$$\left(30-10-\frac{30\times10}{100}\right)\%$$

eg4) Price of tea ↑ by 50% and total expanditure ↑ by 20%, find the effect on consumption of tea.

Sol^n

Price x quantity = total expanditure

100 x 100 = 10000

150 x 80 → 20% decrease, 20% → 12000

सूत्र से निकालेंगे
20% decrease होगी।

Date
Page

eg5) Price of tea is reduced by 15%. a man purchases 8 kg tea more for Rs 6000, find the new price and initial price of tea.

Soln own $\frac{15}{100-15} \times 100 = \frac{15}{85} \times 100 = 20\%$

$\frac{1200}{6000} = 1200$

120
60
180

1200
180
1022

Teacher -

Reduced Price $= 6000 \times \frac{15}{100} \times \frac{1}{5}$

formula apply हुआ है

$= 180$

Original price $= 6000 \times \frac{15}{100-15} \times \frac{1}{5}$

eg6) Population in 2009 = 14400
rate of increase = 20%.
find population in 2011 and 2007

Soln Population in 2011 $= 14400 \times \frac{120}{100} \times \frac{120}{100}$ — पूर्व ज्यादा

Population in 2007 $= 14400 \times \frac{100}{120} \times \frac{100}{120}$ — पूर्व कम होगा,

eg7) Car ...
... in

eg8) A his ...

Sol own

Depreciation

eg:) Car value in 2014 : 81000
rate of dep = 10%.
find value in 2016

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

$= 8$

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.

Sol:

100	120
spend → 60	
rest → 40	
↓	
36	

Date ______
Page ______

Income	expenditure	saving
100	60	40
20% 20	6	14

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

$= 35\%$

Q9.) Present population of a town is 8000, male ↑ by 6%, female ↑ by 10%.
The total population becomes 86..
find the initial population of male and female.

Sol^n (own) 8000

(4000) x, (4000) 8000−x

6% 10%

$\frac{x}{4000} \times 100 = 6$

$x = 240$

240 400

Teacher:

8000

males females

6% 10%

female:
if all
Ac
le
male:
$\frac{200}{4}$

eg 10) In a
marks
same
and
passing
find
passing

Sol^n own

Teacher
(M-1)

Date
Page

female:-
if all increase at 10% then total
increase = 800

Actual increase = 600

less increase = 200

male:-

$\frac{200}{4} \times 100 = 5000$ ✓ male

So, rest 3000 are female,

eg 10) In an examination student got 45% marks and failed by 30 marks, in the same exam. other get 50% marks and got 10 more marks than than the passing.
find out the passing % of marks and passing marks.

Sol/n own 45% ↓ (fails) 30 marks   50% ↓ 10% more than

Teache
(M-1) 45% marks and failed by 30 marks] 40
50% marks and passed by 10 marks.

$$\frac{\begin{matrix} P \\ P \end{matrix}}{\text{minus}(-)} \quad \frac{\begin{matrix} F \\ F \end{matrix}}{(-)} \quad \frac{\begin{matrix} P \\ F \end{matrix}}{+} \quad \frac{\begin{matrix} F \\ P \end{matrix}}{+}$$

5% of total marks = 40

$$\text{Total marks} = \frac{40}{5} \times 100$$
$$= 800$$

$$\text{Passing marks} = 800 \times \frac{50}{100} - 10$$
$$= 390$$

$$\text{Passing } \% = \frac{390}{800} \times 100$$
$$= 48.75\%$$

method 2nd!

5% of total marks = 40

40 marks — 5%

$$1 \;\; " = \frac{5}{40}$$

$$10 \;\; " = \frac{5}{40} \times 10$$

$$= 1.25\%$$

(Q11) Two electi... winnin... and ... total ...

sol

(Q12) Two ... 10% ... 20% ... winning ... note ...

So, = 50% − 1.25%
= 48.75%

Q11) Two candidate participate in election, winning candidate got 52% votes, and won by 6400 vote, find the total no. of votes.

Sol)

Total Votes

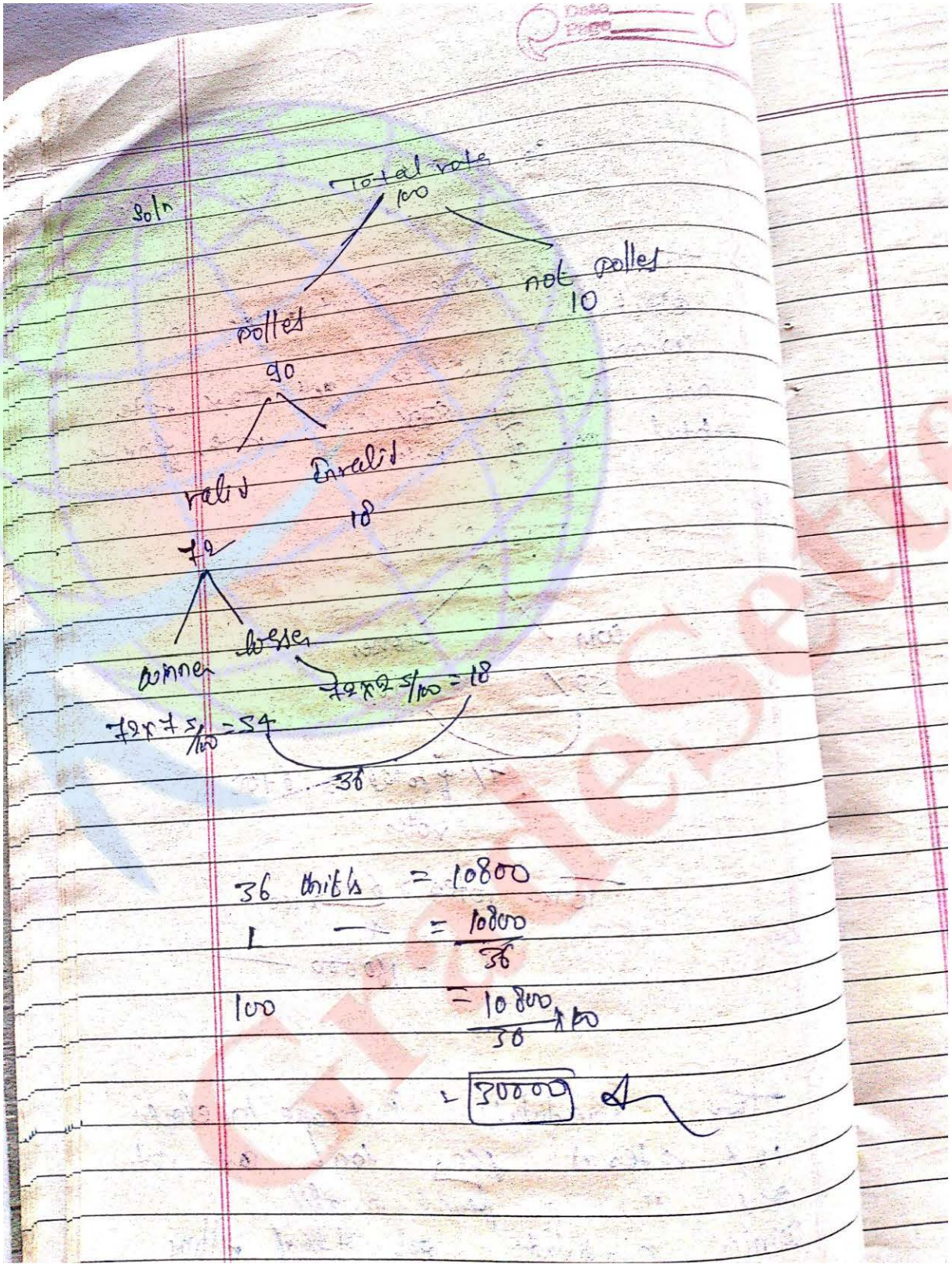
Win 52% | Loses 48%

4% of total = 6400 votes

Total votes = $\frac{6400 \times 100}{4}$

= 160000

Q12) Two candidate participate in election 10% votes is they don't cast vote, 20% " found invalid winning candidate got 75% of willing vote and won by 1080 votes, find total no. of votes.



Ratio and Proportion

(i)

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

A proportion shows equality of two ratios.

3 : 2 :: 15 : 10

means

extremes.

(ii) Product of means = Product of extremes.

(iii) find 4th Proportion

6 : 8 :: 36 : x

$6 \times x = 8 \times 36$

$x = 48$

(iv) Find 3rd Proportional

3 : 6 :: 6 : x

$3 \times x = 6 \times 6$

$x = 12$

/demo

(4) The ratio of the total amount is distributes in all male and females is 6:5, the ratio of salary of male and female is 2:3, find the ratio of the no. of the male and female.

Sol^n Given: 2:3

	male	female
Total salary –	6 :	5
No of persons –	2 :	3

$\frac{6}{2}$ ⟷ $\frac{5}{3}$

9 : 5

Q2) The initial no of employees at relicees are in the ratio 3:2, salary of each employ earlier and now is in the ratio of 4:5, by doing show, company saves 12,000, find initial expenditure initial relicees.

Sol^n No of employees – 3 : 2

Salary each person – 4 : 5

Total expenditure – 12 : 10

2 units = 12000 so, 1 unit = 6000

(right page, partially visible:) Q3) The ... is 3:4 ... of bot... Rs 900 ... B. Sol^n income ... expend... saving ... Q4) ... is 4 ... and ... Sol^n ... inco... Gofi...

/demo

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

Sol'n 6/5 : 2/3

male female

Total salary — 6 : 5

No of persons — 2 : 3

6/2 : 5/3

9 : 5

Q2) The initial no of employees are in the ratio 3:2, salary of each employee earlier and now is in the ratio of 4:5, by doubling them, company saves 12,000, find initial expenditure.

initial reduced

Sol'n No of employees — 3 : 2

Salary each person — 4 : 5

Total expenditure 12 : 10

2 units = 12000

so. 1 unit = 6000

Date
Page

Arbitrary expenditure
12 × 6000 = 72000

Q7) The ratio of income of A and B is 3:4 and the ratio of expenditure of both is 2:3, each person saves Rs 200, find the income of A and B.

Sol^n

A : B (600, 800)
income 3 : 4
expend. 2 : 3
saving 1 : 1
1 unit = 200

Q4) " "
" 3:2 and " "
is 4:3, their saving is are 2000 and 1000, find income of A and B.

Sol^n
A : B
(3 : 2) × 2
inco 6 : 4
exp 4 : 3
2 : 1

income of A = 6 × 1000 = 6000

Eg:) The ratio of expenses of A, B and C are 6 : 12 : 9, and their saving are 20% : 25% : 40% of their incomes. If the sum of their income is Rs 1530, find salaries of B.

Soln A : B : C

exp. ratio - 16 : 12 : 9

Saving - 20% 25% 40%

income - $\frac{16}{20} \times 100 : \frac{12}{75} \times 100 : \frac{9}{60} \times 100$

$\frac{1}{5} : \frac{4}{25} : \frac{3}{20}$

20 : 16 : 15

LCM

20 : 16 : 15

Eg:) A, B, C along complete a piece of work in 30, 50 and 40 days, The ratio of salaries of each day is 4 : 3 : 2 resp. If the total income of A is 144 find total income of B.

Sol^n

	A	B	C
No of days	30	50	40
salary per day	4	3	2

30 × 4 = 120

Total income 12ϕ : 15ϕ : 8ϕ

12 : 15 : 8

12 unit = 144

1 unit = $\frac{144}{12}$ = 12

so,

15 unit = $\frac{144}{12}$ × 15

= 180

eg:- A person cover certain distance by tram, bus and car, in the ratio of 4:3:2.

The ratio of fair is 1:2:4, per km.

If the total expenditure as a fair is Rs 720.

find total expenditure as fair on bus.

Sol:-

	Tram	Bus	Car
Distance Cover	4	3	2
fair per km	1	2	4
Total exp.	4	6	8

2 : 3 : 4

9 units = 720

fair on bus = $\frac{720}{9} \times 7$

$= 240$

eg Two no. are in the ratio of 4:5, each no. is reduced by 2 & 5, ratio become 3:4, find the difference

Sol

4 : 5

3 : 4

4 : 4

1 unit = 2

eg. The Price of gold is directly proportional to square of it's weight. A Person broke down the gold in the ratio of 3:2:1, and faces a loss of 4620, find initial price of gold

Sol

$P = w^2$

7 : 2 : 1

9 : 4 : 1

Date
Page

Yeah

Let amount of gold $3 : 2 : 1$

$3x : 2x : x$

Total amount $= 3x + 2x + x = 6x$

$$(6x)^2 - [(3x)^2 + (2x)^2 + (x)^2] = 4620$$

$$36x^2 - 9x^2 - 4x^2 - x^2 = 4620$$

$$22x^2 = 4620$$

$$x^2 = \frac{4620}{22} = 210$$

eg) A is inversly proportional to the cube of B. If A is 3, then B is 2, if A is 8/9 find value of B.

Sol) our $A = \frac{1}{B^3}$

$3 = 2$

$8 : 9$

Yeah $A = \frac{k}{(B)^3}$

$3 = \frac{k}{(2)^3}$

$3 = \frac{k}{8}$

$24 = k$

Now

$$A = \frac{24}{B}$$

$$\frac{8}{3} = \frac{24}{B}$$

$$B = 9$$

$B = 3$

(Eg 8.) A bag contains Rs 410 in form of Rs 5, Rs 2 and Rs 1 coins. The no. of coins are in the ratio of 4:6:9, find the no. of Rs 2 coins.

Soln face vale per coin 5 : 2 : 1

(Eg 9.)

Vessels Problem

C-1

m : w
3 : 2

m : w
4 : 1

m→milk
w→water

equal quantity is taken out to make new.

vessel C

m : w
3+4 : 2+1
7 : 3

C

C-2

m : w
3 : 2

m : w
4 : 3

equal quantity is taken out

vessel C

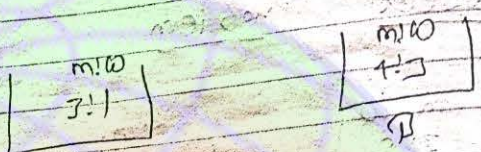
m : w
$\frac{3}{5} : \frac{4}{7} :: \frac{2}{5} + \frac{3}{7}$

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

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

41 : 29

G3



These vessels are mixed in the ratio of 8:21

$$\text{milk} = 8 \times \frac{7}{4} + 21 \times \frac{4}{7}$$

$$= 6 + 12 = 18$$

$$\text{water} = 8 \times \frac{1}{4} + 12 \times \frac{3}{7}$$

$$= 2 + 9 = 11$$

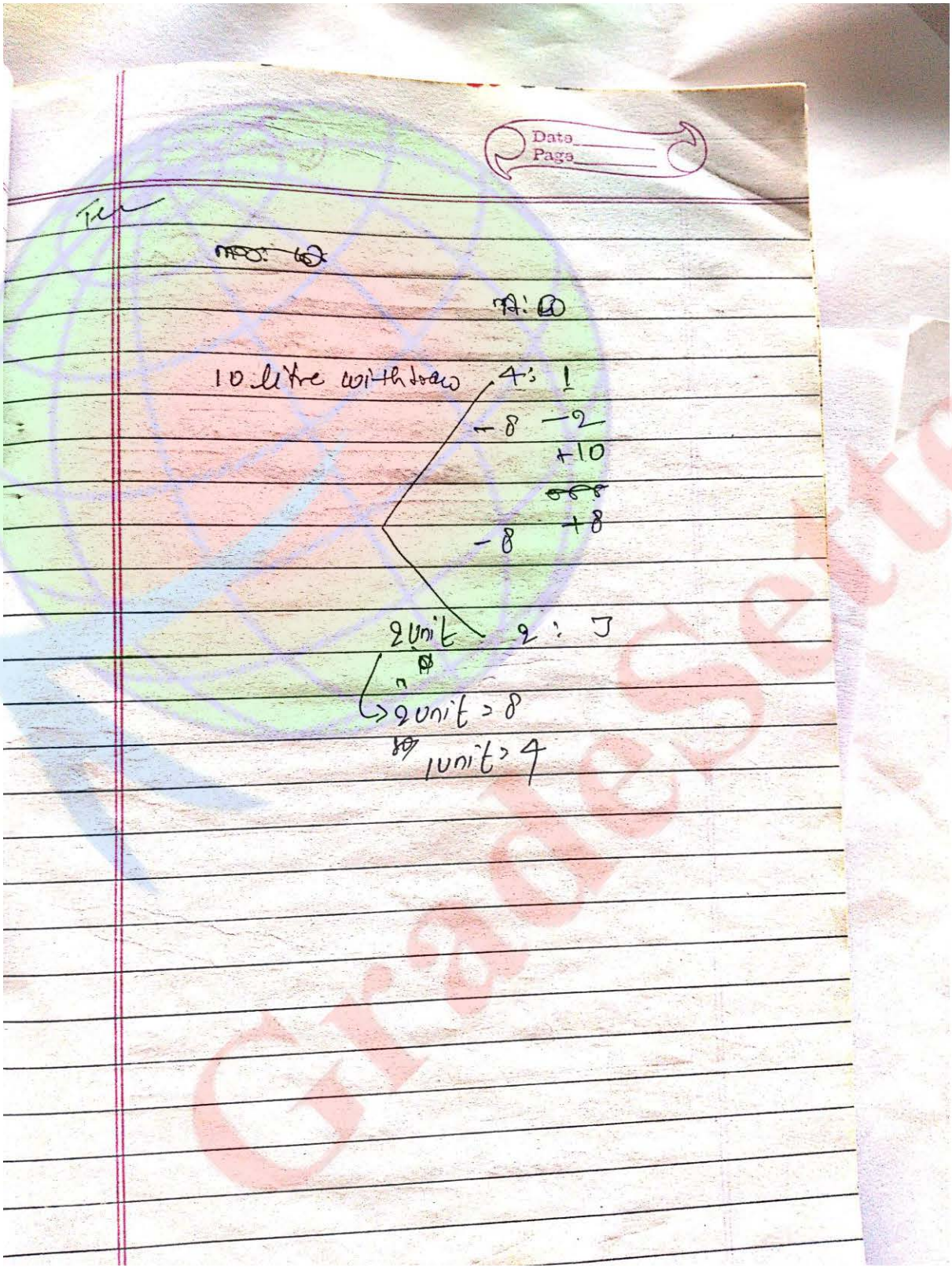
18:11

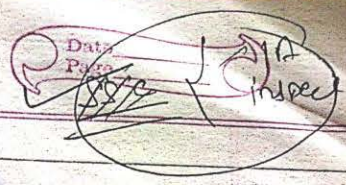
Eg:) A container contains a mixture of two liquid A and B in the ratio of 4:1, 10 litre of mixture is taken out and replaced by liquid B, and ratio become 2:3, find initial amount of A and B.

Solution

	A	B
	4	1
	2	3

$4n + 1 = 10$





Time and Distance

Distance = Speed x time

(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

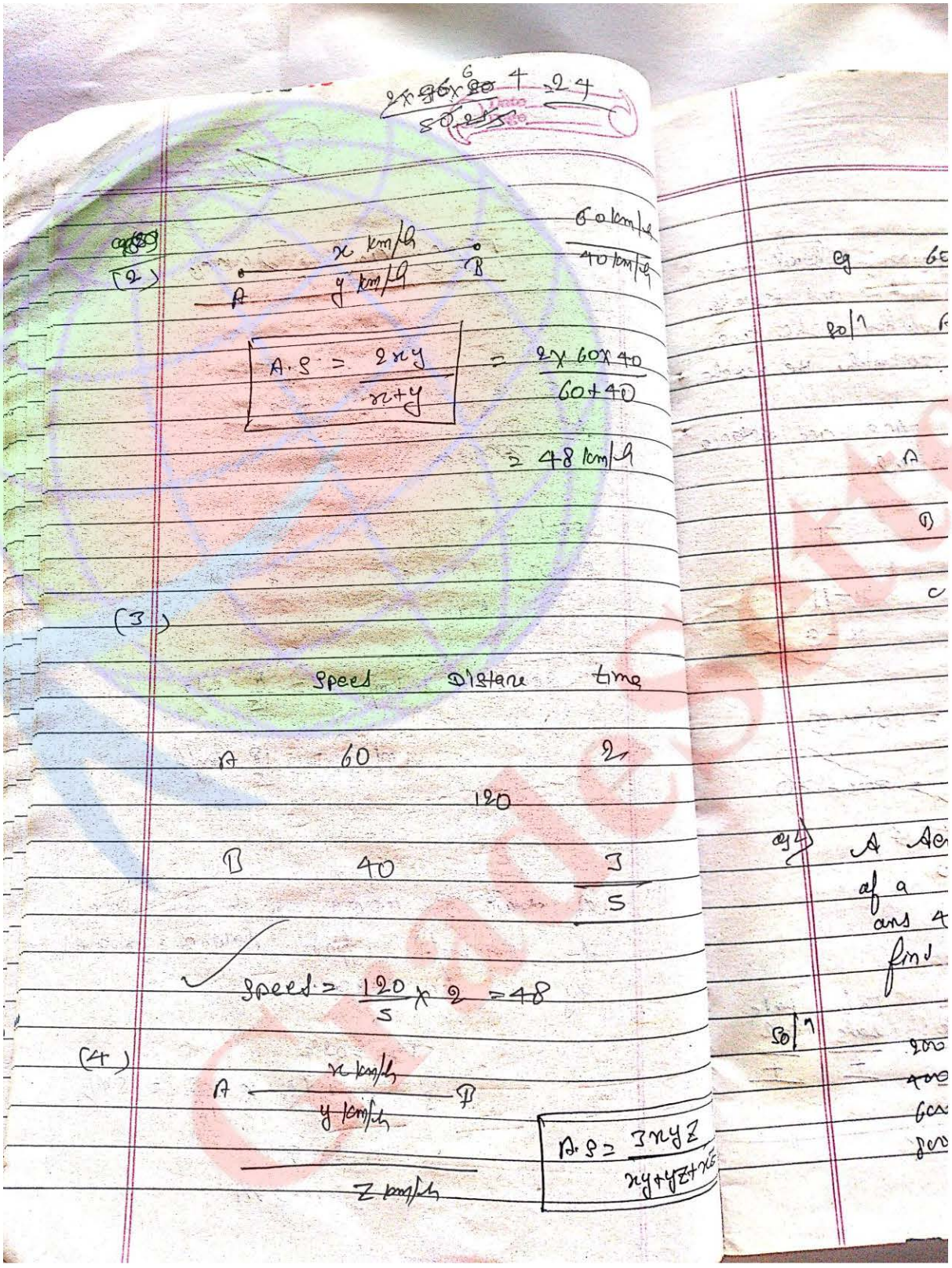
(iii) A train is moving with the speed of 54 km/h, find distance covered by it in 20 sec.

T = 20 sec

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

D = S x T

= 300 m



(2)

A —— x km/h —— B —— 60 km/h —— 40 km/h

$$A.S = \frac{2xy}{x+y} = \frac{2 \times 60 \times 40}{60+40}$$

$$= 48 \text{ km/h}$$

(3)

	Speed	Distance	time
A	60	120	2
B	40		3
			5

$$\text{Speed} = \frac{120}{5} \times 2 = 48$$

(4)

A —— x km/h —— B —— y km/h —— Z km/h

$$A.S = \frac{3xyz}{xy+yz+xz}$$

Eg 60, 40, 40

Sol

	SP	Dist	Time
A	60		2
B	40	120	3
C	40		3/8

Ans $\frac{120}{8} \times 3 = 45$ km/hr

Eg 4) A Aeroplane is along the 4 side of a square at speed of 200 and 400 and 600 km/h, 800 km/h find the average speed.

Sol

200		12
400	2400	6
600		4
800		3

Ans $\frac{2400}{25}$ kmph

Q) A boy going to school at speed of 20 km/h and reaches 11 min late, when he goes at speed of 30 km/h. He reaches 9 min early. Find the right time and distance b/w home and school.

Sol) own S D T

20 — $x-11$

30 — $x-9$

$\Rightarrow 20(x-11) = 30(x-9)$

$\Rightarrow 20x - 220 = 30x - 270$

$\Rightarrow 10x = 50$

$x = 50$

Teach

Formula! —

Diff. of time	Early Early	Late Late	Early Late	Late Early
	−	−	+	+

If speed is 20 km/h late 11 min → 220
" " " 30 km/h " 9 min → 270
10 → 490

Distance = Product of speed × (diff of time / diff of speed)

$= 20 \times 30 \times \frac{\frac{1}{3}}{10}$

= 20 km

Correct time = $\frac{490}{10}$ = 49 min

eg.) A Person cover's a certain distance with 5/6 of it's usual speed and he is 10 min to late, find time taken by him with his usual speed.

sol. $\frac{5}{6}$

Time with normal speed = $10 \times \frac{5}{1}$ ← diff of both N and D.

= 50 min

eg A person walking $\frac{3}{2}$ of it's usual speed and he is 15 min to early find time taken with his usual speed.

sol

$\frac{3}{2}$

Time taken usual speed $= 15 \times \frac{3}{1} = 45$ min

eg A person is walking with $\frac{7}{11}$ of it's usual speed and he takes 22 hours to cover the journey find time with his normal speed.

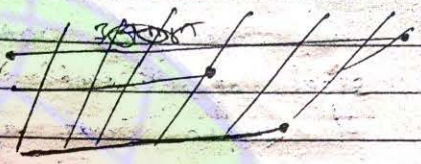
sol

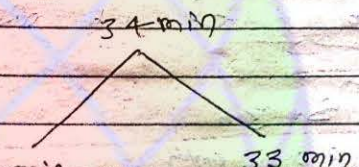
Time with $= 22 \times \frac{7}{11} = 14$ hour

eg Two bullets fire at the interval of 34 min.
A person moving towards firing point in his car and he hears the sound of two bullets in the interval of 33 min.
The speed of sound is 330 m/s find speed of the car.

Date
Page

Sol^n



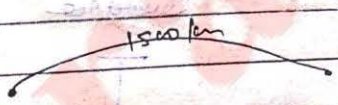


$1 \times 60 \times 330 = 33 \times 60 \times x$

$10\ m/s = x$

eg) An aeroplane starts 30 min late from it's sedules time to a place 1500 km apart. To reach the distination in time the pilot has increased the speed by 250 km/h. find the original speed of the aeroplane.

Sol^n



250

$\frac{1}{2}$ hr

500

new time 1

original time 2

$\frac{1}{2}$

750 original speed

1000 new speed

Q1) A man is moving with the speed of 12 km/h after every 1 h it takes rest of 1 min, how much time he will take to travel a distance of 36 km

Sol/n

D = 36

S = 12 km/h

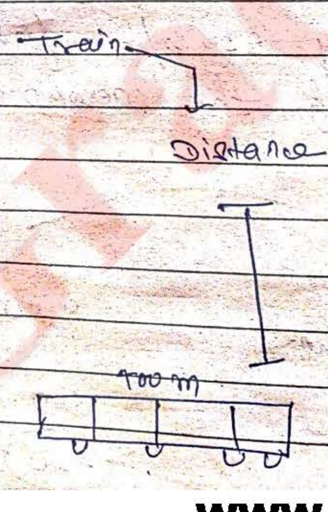
New

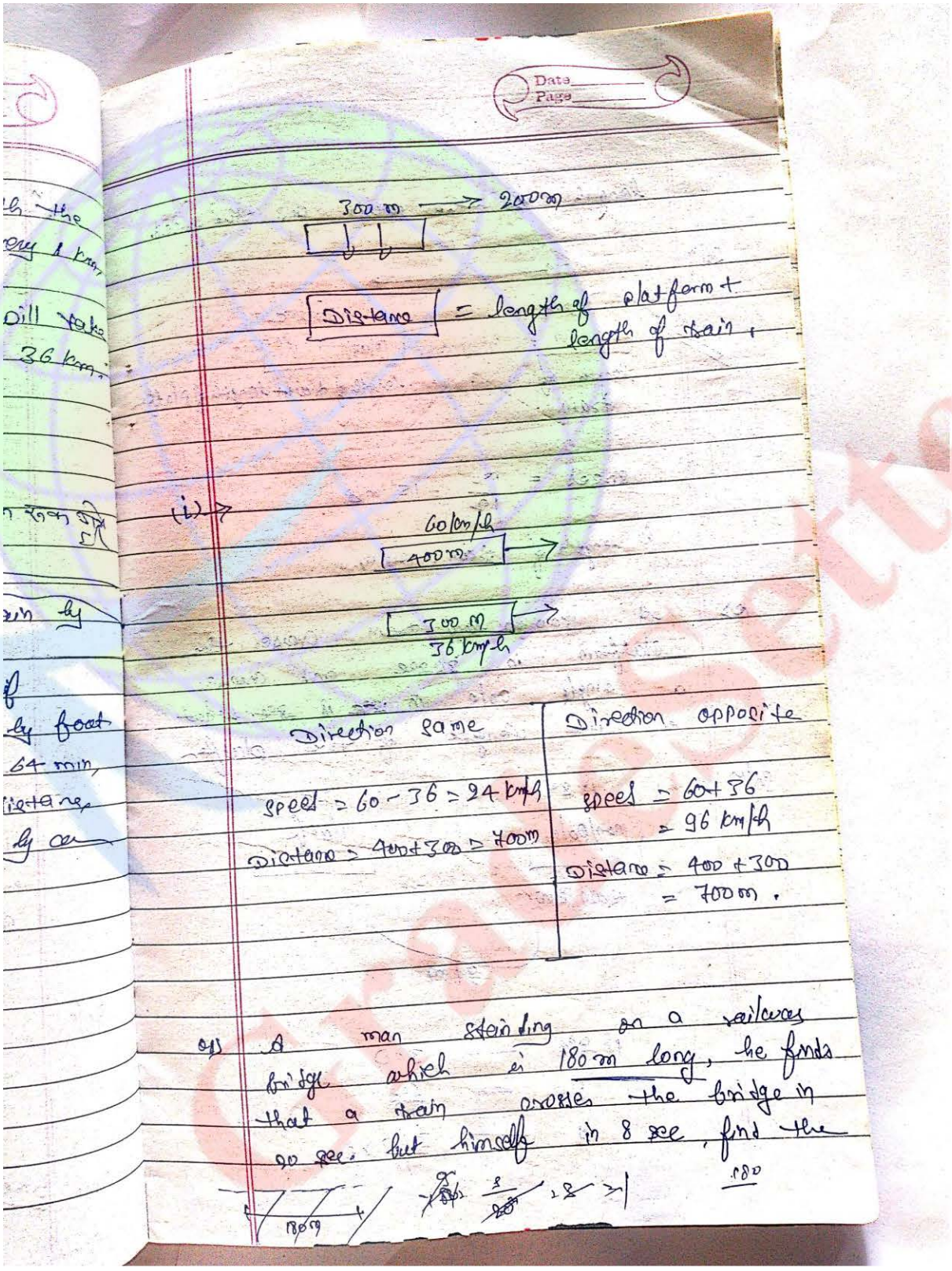
T = $\frac{36}{12}$ = 3 hr (बिना रुके) + 3 min (रुकना)

Train Problem

A person covers a certain by train and return back by car, he takes 54 min in all, if he covers the distance by foot on both side total time is 64 min, find time to cover the distance if he both side he is going by car

Sol/n





300 m → 200 m

Distance = length of platform + length of train.

(i)

60 km/h
400 m →

300 m
36 km/h →

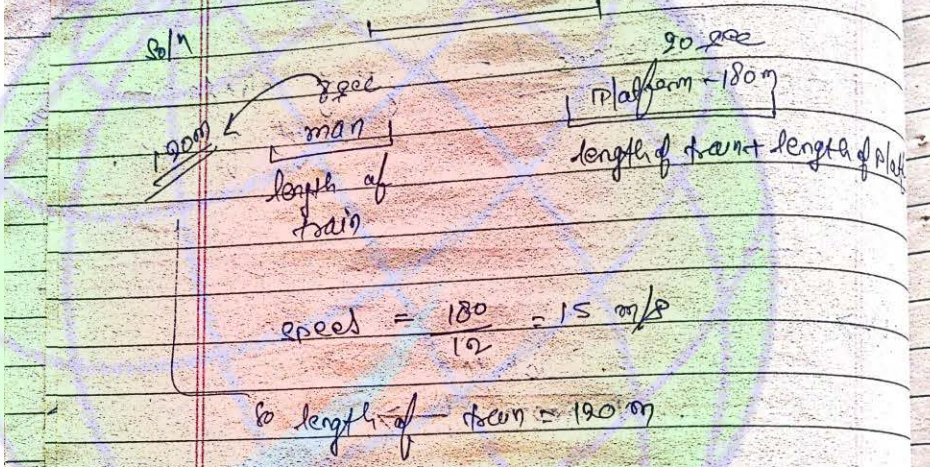
Direction same	Direction opposite
speed = 60 − 36 = 24 km/h	speed = 60 + 36 = 96 km/h
Distance = 400 + 300 = 700 m	Distance = 400 + 300 = 700 m.

Q5 A man standing on a railways bridge which is 180 m long, he finds that a train crosses the bridge in 20 sec. but himself in 8 sec, find the

180

length of the train and the speed

Sol^n

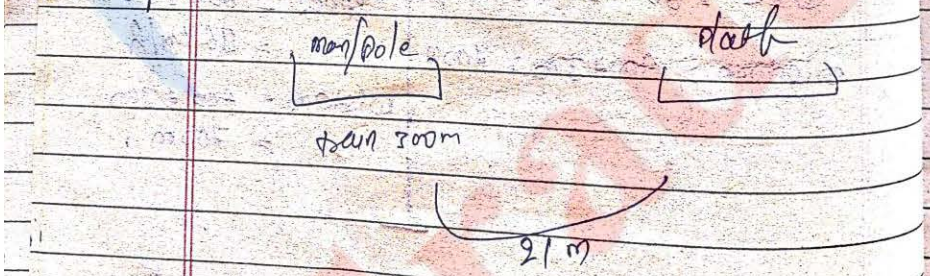


$$\text{speed} = \frac{180}{12} = 15 \text{ m/s}$$

So length of train = 120 m

Q) A 300 m long train crosses the platform in 39 sec and crosses a single pole in 18 sec. What is the length of the platform

Sol^n



18 sec — 300

1 — $\frac{300}{18}$

21 — $\frac{300}{18} \times 21$

Date
Page

Q8 A train moving from new delhi at 4 pm and reach at chandig at 6pm another train moving from chandi at 4pm and reache at new delhi at 7pm at what time both train will meet each other.

Sol^n given

4pm — 2h — 6pm

4 — 3h — 7

$\frac{5}{2}$ (2.20)

D = S × t

$S = \frac{D}{2}$ | $S = \frac{D}{3}$

$\frac{D}{2} = \frac{D}{3}$

Train	Time	Distance	speed
(I)	2	L.C.M = 6	3
(II)	3		2

sol A + B speed = 5 km

Date
Page

time = $\frac{D}{S}$ = $\frac{6}{5}$ = 1.2 hr

= 1 h + 0.2 × 60

= 1 h + 12 min

Q4) A train moving from new delhi at 2 am and meet aligarh at 5 am. another train moving from aligarh at 4 am and reach to new delhi at 9 am when both train will cross each other

sol^n New ... Al

2 am ... 5 am

Train	Time	Distance	Speed
2 am - 5 am	I	3 hr → 15	5 × 2 = 10
4 am - 9 am	II	5 hr	$\frac{3}{8}$ 10 mph

Remaining distance = 15 - 10 = 5

Time = $\frac{5}{8}$ h = $\frac{5}{8}$ × 60 = $\frac{75}{2}$

= $37\frac{1}{2}$ m

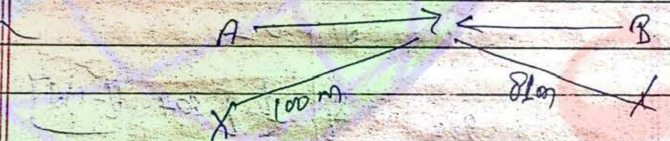
Date
Page

8G

4:37 min To see

Q5.) Two trains A and B moving from diff points x and y towards each other at same time after crossing each other train A takes 81 min to reach y while and train B takes 100 min to reach x, find the ratio of their speed.

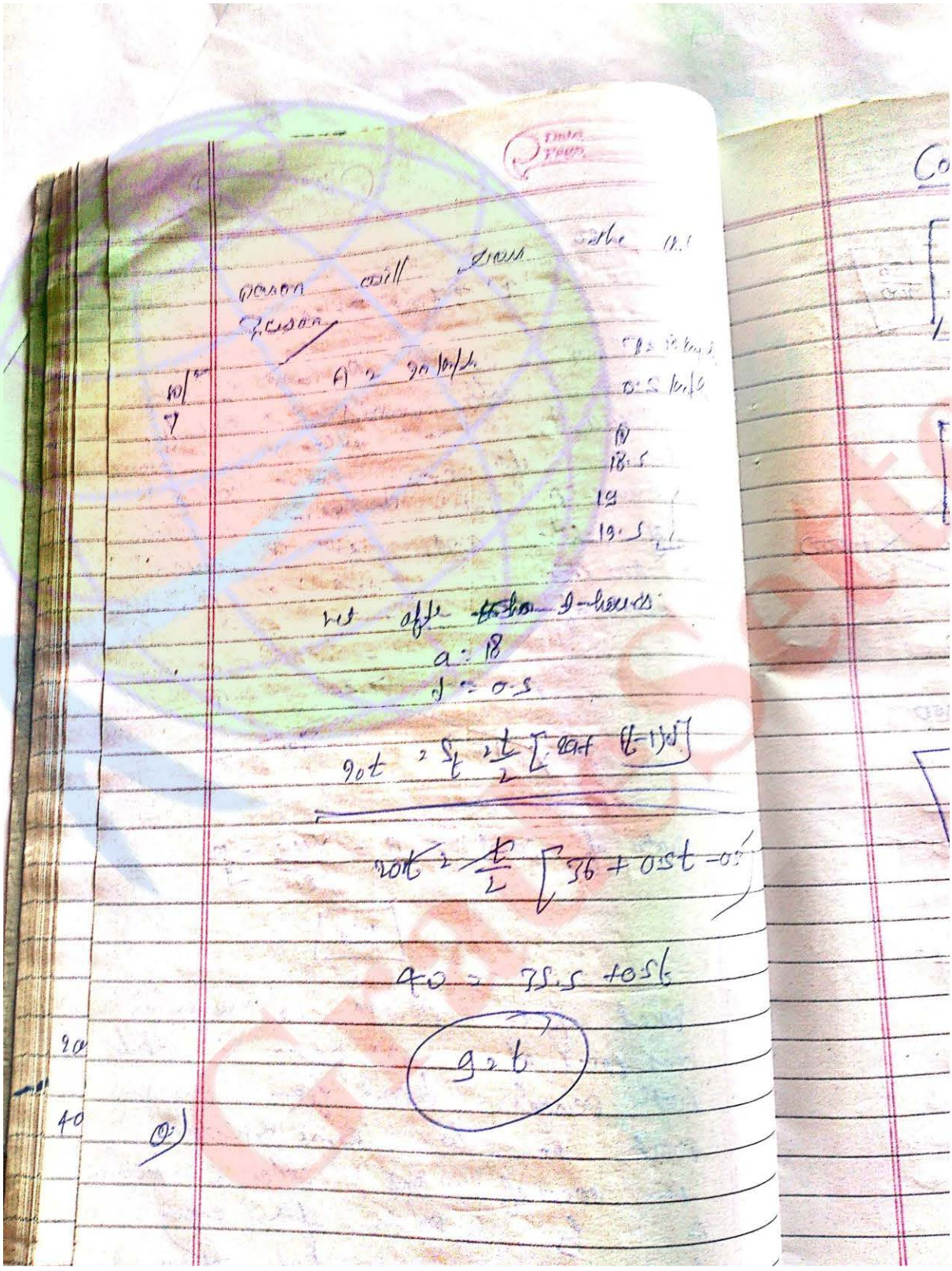
Sol/-



ratio of speed = $\frac{A}{B} = \frac{\sqrt{100}}{\sqrt{81}} = \frac{10}{9}$

10:9

Q6) Speed of a person is 20 km/h and speed of 2nd person is 18 km/h both persons depart from the same point in the same direction the speed of 2nd person is increasing by 1/2 km/h after every hour, at what time 2nd



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 compounded half yearly.

R = rate per annum
t = no. of year.

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

↳ quaterly

$$C.I = A - P$$

$R_1 = 10\%$.
$R_2 = 20\%$.
$R_3 = 30\%$.

$P = 10000$
$R = 10\%$ → $A = 12100$
$t = 2$

$$A = P\left(1+\frac{r_1}{100}\right)\left(1+\frac{r_2}{100}\right)\left(1+\frac{r_3}{100}\right)$$

S.I

$P = 10000$

$r = 10\%$

1 year interest $= 1000$

2nd year interest $= 1000$

C.I

10000

10% → 11000

1000

1100

1000 100

3 year rate $= 10\%$

10 10 10

1 2.1

10 11 12.1

21 33.1%

Date
Page

* Relation b/w S.I and C.I :-

for 2 years :-

$$\text{Sum} = \frac{\text{diff} \times 100 \times 100}{r \times r} \quad \text{for 2 years}$$

$$\text{diff} = \frac{\text{Sum} \times r \times r}{100 \times 100} = \frac{Pr^2}{(100)^2}$$

Q) The diff b/w the C.I and S.I on a sum of money for 2 years is Rs 631, find the sum. whe rate 10%.

Sol:

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

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

Sol:

diff : 405

P : 18000

t : 2 years

r : ?

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

Q) The C.I on a certain sum for 2 years is Rs 40.80 and S.I is Rs 40. find the rate of int per annum.

Soln $r = \frac{2 \times diff \times 100}{S.I}$

$= \frac{2 \times 0.80 \times 100}{40}$

$= 4\%$

for 3 years :-

$$Sum = \frac{diff \times 100 \times 100 \times 100}{r \times r \times (300 + r)}$$

for 3 yrs

$$diff = \frac{Sum \times r \times r \times (300 + r)}{100 \times 100 \times 100}$$

$= \frac{Pr^2(300+r)}{(100)^3}$

Q) The diff b/w C.I and S.I on a certain sum of money for 3 years at 5% per annum is Rs 122, find the sum.

Date
Page

Sol^n Sum = diff × 100 × 100 × 100 / r × r × r (300 + r)

= 122 × 100 × 100 × 100 / r × ...

Q The C.I on a certain sum for 2 years at 10% per annum is Rs 420, find S.I

Sol^n 2 years

S.I = 200 / (200 + r) × C.I

= 200 / (200 + 10) × 420

= 400

(Q3) A sum of money doubles itself at C.I in 15 years, in how many years it will become 8 fold.

Sol^n times

2 — 15

8 — 15 × 3

2³ = 8 — 45 साल

Q. A sum of money invested at C.I becomes Rs 800 in 3 years and 840 in 4 years. find the rate of interest.

Sol^n Amount — 3 — 800
A — 4 — 840

$r = \frac{40}{800} \times 100$

Note I
(1 year is one year)

Q) A certain sum amounts to Rs 7350 in 2 years and to Rs 8575 in 3 years, find the sum.

Sol^n (7350) — 2 years
(8575) — 3 years

Sum = $\frac{(7350)^3}{(8575)^2}$, 5400

Alligation

Date Page

(1) In what ratio tea 40/kg with tea 60/kg to form mixture at Rs. 48/kg

Sol

tea tea

Cost ⟵ 40 60

cost ⟵ 48

12 8

12.8

3.2

(2) In what ratio ~~rice~~ tea of 60 mixed with coffee 90, so that 10% Profit is earn by selling the mixture, at Rs 88, per kg.

Sol

C.P = S.P × 100 / (100 + Profit %)

= 88 × 100/110

60 90

80

10 20

1:2

Q) In what ratio water must be mixed with milk so that 20% after earning by selling the mixture at cost price of milk.

Sol)

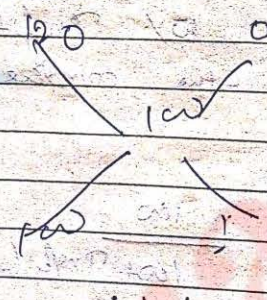
milk cost = 120

cost = 0

S.P of mixture = 120

Profit = 20%.

S.P of mixture $= 120 \times \frac{100}{120} = 100$



5 : 1

Q) A vessel has 80 litre of milk 8 litre milk is withdrawn and 8 litre water is put into the vessel, this

process is further repeated for 2 times, find quality of milk left in the vessel.

Ans:

80l milk left $= 80 \times \frac{90}{100} \times \frac{90}{100} \times \frac{90}{100}$

80
9
72
8
64.8

58.32l

Installment

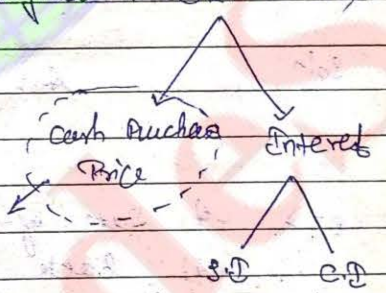
Date
Page

Q) What annual inst. will discharge a debt of Rs 770 due in 5 years, the rate of interest being 5% per annum?

Sol

Theory :-

Cash Purchase Price
Hire Purchase Price
↓
Down Payment + Installments



Year's
$5 \times 1000 = 500$
~~(4+3+2+1) = 10~~
$(4+3+2+1) \times R$
$(4+3+2+1) \times 5$
$10 \times 5 = 50$ (Interest)

550 (H.P.P)
↓
hire purchase price.

Payment/ Installment = $770 \times \frac{100}{550}$

Of page is 550 the ter = 100

" " " 1 " " = $\frac{100}{550}$

" " 770 " " = $\frac{100}{550} \times 770$

<Q2.> what annual installment will discharge a date of 5400, due in 5 year's, at 4% interest per annum

Sol^n

Ans: 1000

$= 5400 \times 5$

$= \frac{1500}{5}$

<Q3.> A sum of Rs 3310, is to be paid back in 3 equal annual installment's, how much is each installment, the interest is compounded annually at 10% per annum.

Sol^n

$\left(1+\frac{R}{100}\right) = \left(1+\frac{10}{100}\right) = \left(\frac{110}{100}\right)$ 3310

Installment = $\frac{3310}{\left(\frac{10}{11}\right) + \left(\frac{10}{11}\right)^2 + \left(\frac{10}{11}\right)^2}$

पहला साल Interest | दूसरी साल के साल का interest | तीसरी साल

$$= \frac{3310}{1210 + 1100 + 1000}$$

$$= \frac{3310}{3310}$$

$$= \frac{3310}{1331}$$

$$= 3310 \times \frac{1331}{3310}$$

$$= 1331$$

Interest

$1331 - 1210 = 121$

$1331 - 1100 = 231$

$1331 - 1100 = 331$

(04) Sudhash purchase a refrigerator on the terms basis, he is required to take 1500, cash down payment, follows by Rs 1020, at the end of 1st year, Rs 1005 at the end of 2nd year, and Rs 990 at the end of 3rd year.

Interest is charged at 10% Per annum, calculate the cash price and total interest charge.

Soln

C.P = 1500 + 1020 × (10/110) + 1005 × (10/110)^2 +

Date
Page

$C.P.P = 1500 + 1020 \times \frac{10}{11} + 1003 \times \left(\frac{10}{11}\right) + 990 \times \left(\frac{10}{11}\right)^2$

$= 1500 + 2500 = 4000$

08 A man borrows sum of money and paid in 3 equal installments of Rs 2160, what sum did he borrow, if the rate of interest charged was 20% per annum, Compound annually.
also find total interest charges and principle and interest in each installment.

$\left(\frac{20}{1+0}\right) = \frac{20}{1}$

Sol/n own
$C.P.P = \frac{2160 \times (20)}{11} + 2160 \times \left(\frac{20}{11}\right)^2 + 2160 ...$

$=$

Teacher

C.P.P
cash purchase price
$= 2160 \left[\left(\frac{5}{6}\right)^1 + \left(\frac{5}{6}\right)^2 + \left(\frac{5}{6}\right)^3\right]$

$= 2160 \left[\frac{455}{216}\right]$

$= 4550$

1st installment C.P.P $= 2160 \times \frac{5}{6} = 1800$

2nd " C.P.P $= 2160 \times \frac{25}{36} = 1500$

" " " $= 2160 \times \frac{125}{216} = 1250$

Install
360
660
910

(09) A sum ... back in ... is each ... is compo... at 4% ... in each ...

Sol/n One ...

(09) A sum of Rs 7500 is to be paid back in 3 annual installment, how much is each installment if the interest is compound annuly on the balance at 4% ans is to be inclues in each installment?

Sol:- Ans Purchase Price = 7500

1st installm = $2500 + 7500 \times \frac{4}{100}$
= 2800 ✓

2nd " = $2500 + 5000 \times \frac{4}{100}$
= 2700 ✓

3rd " = $2500 + 2500 \times \frac{4}{100}$
= 2600 ✓

"Probability"

$P(E) = \frac{\text{No. of favorable cases}}{\text{total no. of cases}}$

* Dice - Prob = 2

$P(2) = \frac{1}{6}$

$P(E) = 3/6$

Experiment

$P(A \text{ or } B) = P(A) + P(B) - P(A \cap B)$

Q) A card is drawn, find the prob of (a) king or queen, (b) king or black card (c) king or honour card (d)

Sol^n (a) $P(A \text{ or } B) = P(A) + P(B) - P(A \cap B)$

$= \frac{4}{52} + \frac{4}{52} = \frac{2}{13}$

(b) $P(A \text{ or } B) = \frac{4}{52} + \frac{26}{52} - \frac{2}{52}$

$= \frac{28}{52} = \frac{7}{13}$

(c) $= \frac{4}{52} + \frac{16}{52} - \frac{4}{52}$

Q.) from

are

Sol^n

P(

Q.) from a pack of card (2 cards) are drawn, find the prob. that both kings are of same colour?

Soln

P(B and B)

$P(BB) = \frac{4}{52} \times \frac{3}{51}$

or

$P(RR) = \frac{4}{52} \times \frac{3}{51}$

$P(A \text{ or } B) = P(A) + P(B) - P(A \cap B)$

$= \frac{1}{13 \times 17} + \frac{1}{13 \times 17} - 0$

$= \frac{2}{221}$

BOATS and STREAM

formula (1)

Speed of Boat in still water = x

Rate of current = y

Speed : Down stream = x+y

upstream = x-y

formula (2)

Down stream speed = a kmph

upstream speed = b kmph

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

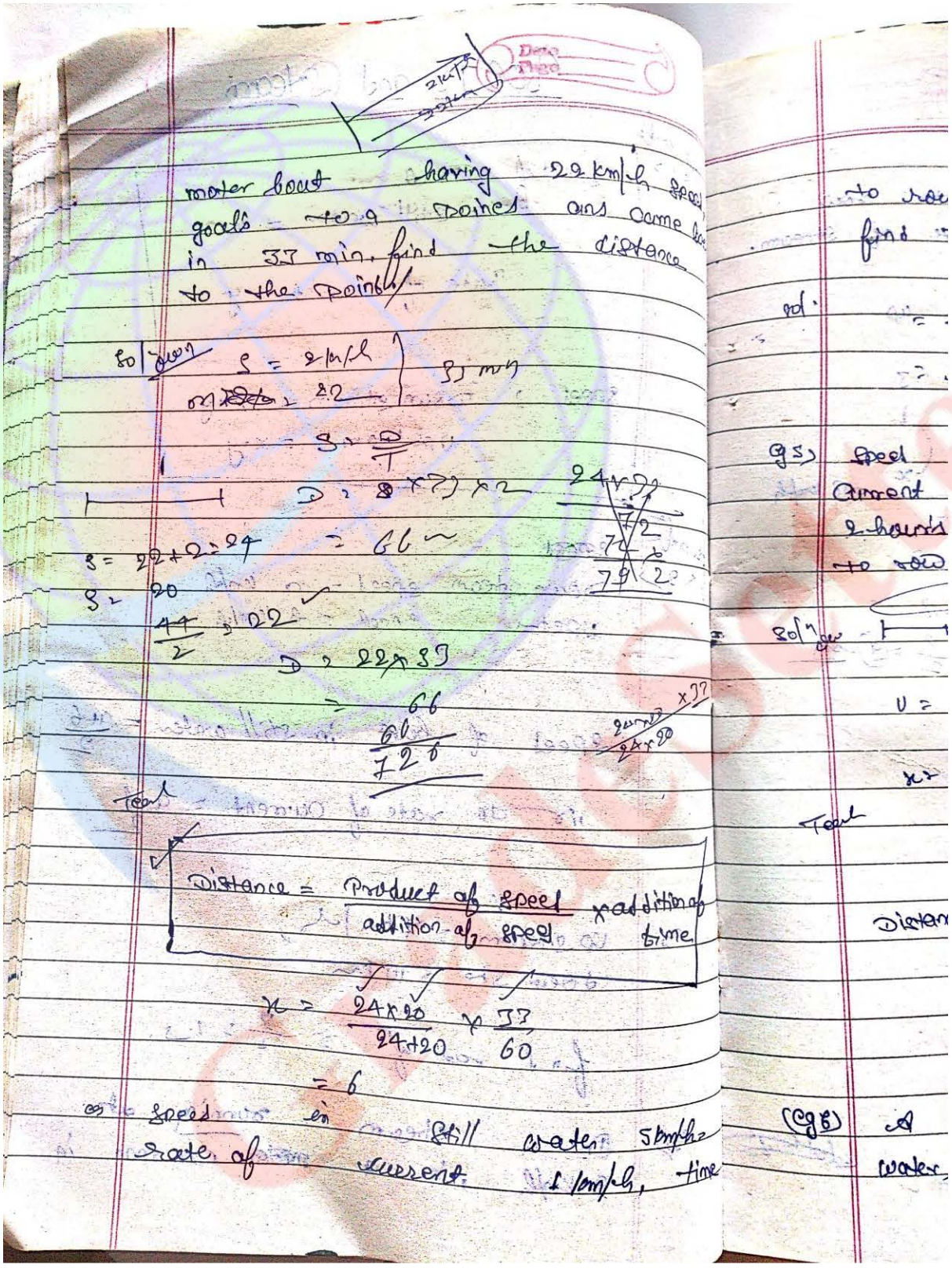
or rate of current = $\frac{a-b}{2}$

eg: up stream = 4 km/h,

down str = 10 km

find rate of = $\frac{7}{2} = 1.5$

eg) In a stream running at 2 kmph, in a motor man in



motor boat having 22 km/h speed goes to a point and come back in 37 min. find the distance to the point.

Sol: Given $s = 2$ km/h, $m = 22$, 37 min

$s = \frac{D}{T}$

$D = s \times T \times 2$

$s = 22 + 2 = 24$

$s = 20$

$\frac{44}{2} = 22$

$D = 22 \times 37$

$= 66$

$\frac{66}{720}$

Time

Distance = Product of speed / addition of speed × addition of time

$x = \frac{24 \times 20}{24 + 20} \times \frac{37}{60}$

$= 6$

∴ speed in still water 5 km/h, rate of current 1 km/h, time

(Q6) A water

to row a place and come back find the distance.

sol: $= \frac{6 \times 4}{10} \times \frac{1}{60}$

Q5) speed in still water 50 km/h, rate of current 10 km/h, it takes a man 2 hours more to row up then to row down, find the distance.

sol: 50 km/h, 10 km/h

$v = 40,\ d = 60$

$x = \frac{40 \times 60}{40+60} \times \frac{120}{60}$

Trick

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

$= \frac{60 \times 40}{20} \times 2 = 240\ km$

(Q6) A man can row 18 km/h in still water, it takes in thrice, as long

to row up as to row down, find the rate of stream.

Sol^n

	down		up
time ratio	1	:	3
speed	3	:	1
	$3x$		x

$$\frac{3x + x}{2} = 18 \text{ kmph}$$

$$\frac{4x}{2} = 18$$

$$2x = 18$$

$$x = \frac{18}{2} = 9 \text{ kmph}$$

रिजर्व बैंक ऑफ इण्डिया

(1) goods = 1000 note

= 1000

= 1000

= 1000

(2) monitery Policy

- Quantative measure
- qualitative measure

I. Bank rate

RBI → Bank

(No collelateral)

(RBI बैंक को बिना security के ही लोन देता है)

II. CRR - cash reserve ratio → Cash form

III. SLR - statitery liquid ratio → (cash + Gold + securits)

Bank

- Depositers
  - Demand deposit → current account, saving account (CASA)
  - time deposit → FDRD → fixed deposit, recurring deposit
- Borrower's

Date
Page

NDTL ⇒ Demand deposit time deposit

(3) ~~Repo rate~~
Repo rate
Reverse repo rate } LAT

* Repo rate

RBI —short term→ Clints
- Banks
- Central gov,
- State gov
- NBFC - non-banking financial companies,

Collateral - Security
Undertaking - Rs 100 crore
Rs 107 crore
7% repo rate

श्री कुल
दिन के बाद
वापस लेगा।

Note: (1) Repo rate — base rate or, policy rate
Reverse repo rate } 8

(ii) SLR
repo
<4> MSF -
SLR ←
<4> Repo rate
minimum -
RBI -
No
<5> MO

deposit

(11) SLR can not use SLR for repo rate or reverse repo rate.

<A> MSF - marginal standing feeilities.

0.75%

SLR ⟷ NDTL

<4>	Repo rate	MSF
	minimum - 5 crore	minimum - 1 crore
	RBI - Customer	Banks
	No SLR	Sys. SLR

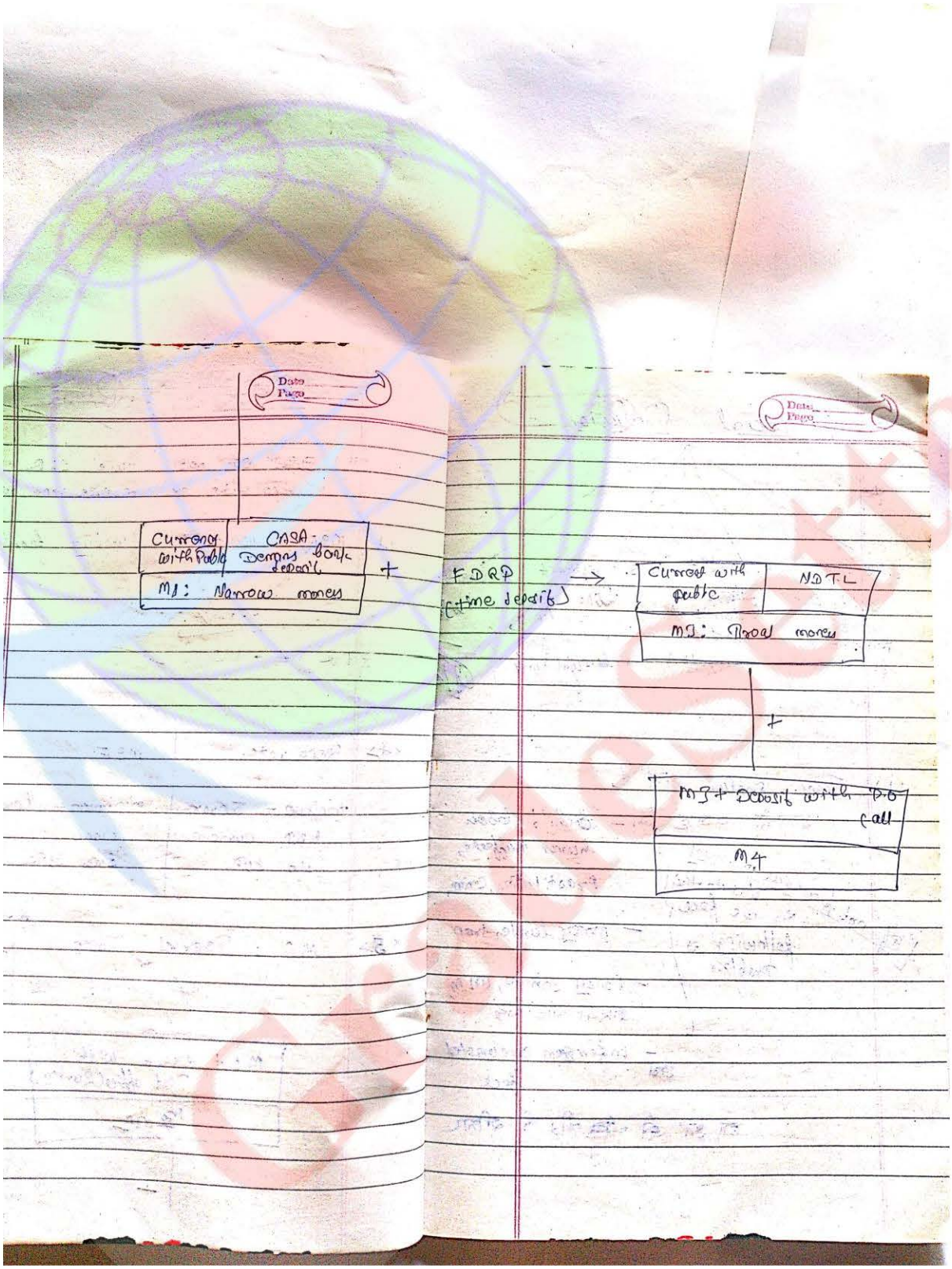
<5> MO : Reserved money
or
High powered money

- Currency in circulation
- Banks deposit with RBI
- other deposit with RBI.

M1 + deposit with Post office (Saving)

M2

+



* Financial Inclusion

1. Banking (facility हो आमदी, पैसा निकाल या जमा करवाने)
2. Credit (loan's at affordable rate)
3. Investment — like pension funds, mutual fund, other inves. firm
4. Insurance — life, general insurance

(1) Financ. Inclus. नहीं है,

इसकी वजह से — child labour, human traffick., Prostitution, crime

[If not financial inclusion] due to this we face following problem ⇒

- money lender trap
- Ponzy scheme, MLM, शारदा चीट फंड
- unforeseen circumstances force

इन इन सभी चीजों के शिकार हैं

* Financial Inclusion

1. Banking (facility हो, आम हो, पैसा निकाल या जमा कर पाये)
2. Credit (loan at affordable rate)
3. Investment – like pension fund, mutual fund, & other Inves fin.
4. Insurance – life, general insurance

(1) Financ. Inclus नहीं है,

इसकी वजह से – child labour, human trafficking, Prostitution, crime

[If not financial inclusion] due to this we face following problem ⇒

- money lender trap
- Ponzy scheme, MLM, शारदा चीट फंड
- unforeseen circumstance face

हम इन सभी चीज़ों के शिकार हैं