1. Time and work
2. Squaring
3. multiplication
4. mixed Fraction
5. Number System
6. No of divisor's
7. Unit Plce Problems
8. divisibility rules
9. Find Zero's
10. HCF and LCM

11) Logical reasoning
12) Average
13) Profit and loss
14) Discount
15) Simple interest
16) Calender
17) clock

36

CSAT :→

[redacted]

		math(marks)	Question (No. of Questions)
G.S	–	200	100
C-SAT	–	200	80
		400	180

- English Comprehension (30%)
- Maths (18%)
- Reasoning (52%)

1) (*) Time and work:→

Q.) If 10 days A can do a piece of work & 10 days, B can do in 15 days first time taken when both A and B work together.

Ans 6 days

Sol) Own (Time) and (work)

A can do a Piece of work in 10 days

A's 1 day work = $\frac{1}{10}$ —

B's 1 day work = $\frac{1}{15}$ —

(A+B)'s 1 " " = $\frac{1}{10} + \frac{1}{15}$ —

$= \frac{1}{6}$ —

Time cor = $\frac{1}{\frac{1}{6}}$

= 6 days

Teeche

Trick! -

	Time	work	One day work
A	10		3
B	15	L.C.M → 30	2

(A + B)'s one day work = 5

Time by (A+B) = 30/5 = 6

Note! - L.C.M की work मान लिजिये।

Q.) A -12, B-15, C-20 . first time taken by them working together

Sol^n

5
4
9

12 — 60/12 = 5 days

Teeche

	Time	work	
A	12	60	5 4
B	15		9
C	20		12

3.) A-10, B=15 days, both togeth stal the work, afte 4 days A left the work and rest work is done by B find time by B, to comple the remaining work.

So/n

own

10   30   3

15    $\frac{2}{5}$

$\frac{30}{5} = 6$

Teache

	time	work	
A	10	30	3
B	15		2

$\frac{}{5}$

A+B one day work

So, 4 दिन मे 20 work comple

Work remaining = 30 - 20 = 10

B's one day work = 2

B' complet rem. work $\frac{10}{2}$ = 5 days

(4) A-10, B-15, C-30 all start work together, after 3 days A left, next after 3 days B left the rem. work work is comp. by C in how many days

Sol^n

10
15 30
70

3
2
1
6
6's days

3 × 3 = 9 work

3 × 6 = 18 work

3 work

one days wor

10 3 × 3 = 9
15 30 2 × 6 = 12
30 1 × 9 = 9

9

9 days

Teache

<5.> A-10, B-20, C-10, all together started work after some days A left, next after 2 days B left, Rem. work is completed by C, in 3 days. Find after how many days A has left?

10
20
30

60

6
3
2
11

60
- 5
3

Teache

	time	work	one days work
A	10		6
B	20	60	3 x 2 = 6
C	30		2 x 5 = 10
	(A+B+C) days = 11		16

work done by A+B+C = 60 - 16 = 44

website | Hitias.com

No of days A bfl = $\frac{14}{11}$ = 1 days,

Q [6] A-10, B-15, Start working alternatively beginning with A. find no. of days taken by them to complete the work.

Sol:

	time	work	2 days' work
A	10	30	3
B	15		2
	e's days work		5

No of days to complete the work = $\frac{30}{5} \times 2$

= 12 days

Q [8] A-15, B-20, Start working alt. beginning with A, find no. of days to complete the work

Sol

15	60	4
20		3
2 days work		7

$\frac{60}{7} \times 2 = \frac{120}{7}$

$\frac{60}{7} = 8\frac{4}{7}$

	time		
A	15	60	$\frac{4}{7}$
B	20		

$8\left[3 \text{ days} = \frac{4}{7}\right]$

$= \frac{60}{16 \text{ days work}} + \frac{4}{\text{rest one day}}$

$= 15 \text{ days} + 1 = 16 \text{ days}$

[8] A-12, B-15, and rest one as 8.

Sol^n

12	60	5
15		4

$6\left[2 \text{ days} = 9\right]$

$\frac{60}{9} = 6.$

$= \frac{54}{12} + \frac{6 \text{ days}}{\text{one day}} + \frac{1}{\text{rest one day}}$

$= 12 + 1 + \frac{1}{4}$

$= 13\frac{1}{4} \text{ days}$

[9] A and B together can do a work in 18 days. B and C ~~has~~ do ~~together~~ do together the work in 24 days, A and B work just 4 and 6 days resp.
C ~~start~~ join the work after A left and C work 24 days to complete the work.
~~A~~ C alone can complete the whole work in how many days.

Sol/

A – 4
] – 18
B – 6
] 24
C – after A left
alone!

	time	work	one day work
A+B	18	72	4 × 4 = 16
B+C	24		3 × 2 = 6

or

A — 4 days
B – 6 day
C – 25▪ day

(10)

Sol/

$$\frac{16}{(A+B)\ 4\text{ days}} + \frac{6}{(B+C)\ 2\text{ days}} + \frac{₹\ 50}{C\ (25\text{ days})}$$

Time taken by C to complete the work $= \frac{72}{2} = 36$ days

(10) A and B can do a work A working alone takes 8 hour more to complete the job than if both working together. B takes $4\frac{1}{2}$ hour more to complete the job than both working together. find time by both to complete the work?

Sol:

$A + B = x$ days

A alone $= x + 8$

B alone $= x + 4\frac{1}{2}$

$x = ?$

Short cut :-

$x = \sqrt{8 \times 4\frac{1}{2}}$ ← जितना जितना ज्यादा लेते है उसका root ले लेते है

$= \sqrt{36}$

$= 6$ days

Q.) A, B, and C can do a work in 10, 15, 20 days, A work for whole time, B and C work in all days with A in how many days work is completed

Sol^n

A 10
B 15 60
C 20

6 × 2 = 12
4 × 1 = 4
3 × 1 = 3

1's days work 13 ; 17 — 2 days work

3 × [2 days work]

$\frac{17 \times 3 = 51}{2 \times 3 = 6 \text{ days}} + \frac{9}{1 \text{ days}}$ — 7 days

Q2. A and B can do a work in 20 and 30 days, Both together start the work After 4 days A left the work and C join the work, the rest work is done in 10 days. C alone can complete the work in how many days.

Sol^n

A 20 3
B 30 60 2

1's day = 5 × 4 = 20

work remaining = 60 − 20 = 40

<Q3.>

Sol^n

Alt sol^n

done by A+C in 10 days
(A+C)'s one day work = $\frac{40}{10} = 4$

B's one day work = 2
C's one day work = 2

∴ C alone = $\frac{60}{2}$ = 30 days Ans. /

Q.7. A and B can do a work in 18 days. B and C together do that work in 24 days. A and B work just 4 and 6 days resp. before A left. and C work for 24 days and complete the work. C alone can complete in how many days.

Sol^n

A

B

Next Sol^n 2^nd

(4) A complete $\frac{2}{5}$th work in 6 days,
B " $\frac{1}{3}$rd work in 10 days.
Both gether complete the work
in how many days.

Sol:-

Given

$\frac{2}{5}$ of 1 → 6 days

6 days → $\frac{2}{5}$

1 → $\frac{2}{5} \times \frac{1}{6}$

10 days → $\frac{1}{3} \times \frac{1}{10}$

(A+B) $\frac{2}{30} + \frac{1}{10} = \frac{3}{10} = 3$

Teacher:-

$6 \times 5/2 = \frac{2}{5} \div 6$
$\frac{2}{5} \times \frac{1}{6}$

A $\frac{2}{5}$th work = 6 days

A 1th " $= 6 \times \frac{5}{2} = 15$ days.

B $\frac{1}{3} = 10$

B 1 $= 10 \times \frac{3}{1} = 30$ day

(5) A co
Comp.

abone
days.

Sol:

Teache

H

A

A

(3) A comp. the work in certain days. B comp. $\frac{1}{2}$ work in $\frac{7}{4}$th of the time of A. Both comp. the work in 36 days find A alone will comp. the work in how many days.

Sol:

A = x days

$\frac{1}{2}$ work = $\frac{7}{4}x \times \frac{1}{2}$

Sol

~~$x + \frac{7}{4}x = 36$~~ $\quad x + \frac{7}{8}x = 36$

~~B $\frac{1}{4}x = \frac{36}{\frac{7}{4}}$~~ $\quad 15x = \left(\frac{36 \times 8}{11}\right)$

Trick

Hint = [time की आवश्यकता है]

	F_1 Time	F_2 work
A	1	1
— A	7/4	7/4
B	$\frac{7}{4}$	$\frac{1}{2}$

So

A = B

$\frac{7}{4_2} = \frac{1}{2}$

→ Relation b/w efficiency and work

Efficiency & work

→ Rel. b/w eff. and time

$$\text{Eff} \propto \frac{1}{\text{time}}$$

So,

अगर efficiency	work / eff	5	— time	36 days
हो तो कम	"	1	— "	$= 36 \times 5$
बढ़ेगी	"	3	— "	$= \frac{36 \times 5}{3} = 60$ days

[Q6] A and B, together com. the work of $\frac{14}{23}$, B and C " " " " " $\frac{14}{23}$ of total work, what is the ratio of work of A, B and C.

So/ Ans

$$\text{Total}$$

$$(A+B) = \frac{14}{23} x$$

$$(B+C) = \frac{14}{23} x$$

$$\frac{14}{23} x + \frac{14}{23} x = 1$$

$$\frac{31}{23} x = 1 \qquad x = \frac{23}{31}$$

[Q7] of

So/ Ans

$\frac{6}{10}$

Teach

Teacher

A+B = $\frac{14}{23}$

B+C = $\frac{14}{23}$

B's work = $\frac{14}{23} + \frac{14}{23} - 1 = \frac{8}{23}$

A's work = $\frac{14}{23} - \frac{8}{23} = \frac{9}{23}$

C's work = $\frac{14}{23} - \frac{8}{23} = \frac{6}{23}$

A : B : C

9 : 8 : 6

[Q+] Eff of A is 60% more than B. A alone Comp. the work in 18 days. find time taken by B alone.

Sol/ Ques

A B

x x+60%

$\frac{6}{10}$ $2x + \frac{6}{10} = 18$

$2x = 18\frac{6}{10}$

Teacher A : B

60% : 100%

If eff. = 100 then time = 80 days

——— 1 " " = 80 × 160

——— 160 " " = $\frac{80 \times 160}{100}$ = 128 days

[09] A, B & C can do a piece of work in 80 days. If the efficiency of B is thrice of A, A takes 12 days more than B to complete the work. In how many days both will complete the work.

Sol/ Given

A	B	
x	3x	
y+3	y	x(y+3) = 3xy

Table

	A : B	
eff. ratio =	1 : 3	
Time ratio =	3 : 1	(∵ eff ∝ $\frac{1}{\text{time}}$)

Note:

2 ≠ 12

1 = $\frac{12}{2}$ = 6

6 days

18 days

So, $\frac{18}{4} = \frac{9}{2}$ days.

H.W - Do exercise of R.S aggarwal.

ages 3 days

$3x - x = 6$

$2x = 6$

$x = 3$

[09] A, B, C 10, 20, 30 ; they work for a sum of rupees 660 work, find rupees of B.

A	10		6	
B	20	60	3	660
C	30		2	
			11	

B's share $= 660 \times \frac{3}{11}$

$= 180$

Section
98-2-15

Squaring =

(1)

(i) $(98)^2$

Compare with 100

$(98)^2$
(-2)

98-2 = 96 — Square = 9604 Ans.

96 | 04

↳ Always दो digit में होने चाहिए fill कर रहे है इस बात का ध्यान दे, In case of square or other power of two digit no.

(ii) $(97)^2$

(-7)

94 | 09

(iii) $(96)^2$
-4

92 | 16

(2) (i) $(102)^2$
$+2$

104 | 04

(ii) $(105)^2$
$+5$

110 | 25

(3) (a) $(88)^2$

1 common

(1)2

(1)4 4

88-12+1 = 77

77 | 44

(b)

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

1×2

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

2×3

next वाला

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

3×4

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

9×10

फिर next वाला

(5) $(48)^2$

(-2) — comp. with 50

48-

Best su

$48-2 = \frac{46}{2} > 27$ → पूरी base 50 से 80, 2 से divide कीजिये।

→ 2304

(b) $(47)^2$ → पूरी base 50 से

50 से कितना कम है उसका square

$47-3 = 44 \quad 22 \quad 09$

Rest rule of squaring

(a) $(63)^2$

$a^2 \; 2ab \; b^2$ ⇐ formula है।

$39 \mid 6 \mid 9 \Rightarrow 3969$

(b) $(64)^2$

$a^2 \quad 2ab \quad b^2$

$\Sigma 4 \times 2 = 48$

$40 \mid 9 \mid 6 = 4096$ Ans.

(carry ई) (carry ई)

28-2-15

Multiplication :-

R-28-2-15

(b) 102 × 103 — +2 +3 = 6

105 | 06

102+3=105
or
103+2=105

चूंकी 100 तक की संख्या के लिए हमें दो digit को ही consider करना है।

(c) 103 × 101 — +3 +1 = multiply = 3

104 | 03

(c) 104 × 106 — 4 6

110 | 24

(d) 1002 × 1003 — +2 +3

100 5 | 00 6

↳ thousands base में three digit लेंगे।

Steel

Mixed Proportion

R-14-J-15

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

m_1 = men under 1st cond.	m_2 = men under 2nd cond.
D_1 = days " "	D_2
H_1 = hours " "	
W_1 = works " "	

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

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

a) 20 men works 9 hours a day to comp. a piece of work in 12 days. Some work done by 24 men 6 hours a day. then the work is comp. in how many days

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

R. 14-5-17

07.) 7 men work 8 hour a day to comp. 1/3rd piece of work in 36 days, The red work done by 14 men working 6 hour a day in how many day hour.

$$\frac{7\times 8\times 36}{1/3} = \frac{14\times 6\times D_2}{5/6}$$

$$\boxed{D_2 = 28}$$

<01.) 72 carpenter works 6 hour a day to make 400 tables in 25 days, then 30 carpenter, work 5 hour a day for 24 days then how many tables will be make

8) $$\frac{72\times 25\times 6}{400} = \frac{30\times 24\times 5}{w_2}$$

$$\boxed{300 = w_2}$$

02.) 120 workers can do one piece of work in 85 days and each workers works 10 hour a day, all workers start the

work afte 10 days, all goes to Stoke, due to Stoke 2 days works is Stopped. how many more works should be employed to finish the rem. work if each works works 8 hour a day

Sol:

$\frac{120 \times 8 \times 10}{\text{Half - Remaining}} \quad \frac{x \times 2 \times x}{\text{काम कितना pending है, उसके Basic पर निर्भर}}$

total work = $120 \times 8 \times 10$

work done = $120 \times 10 \times 10$

Work remaining = $120 \times 7 \times 10$ = | $m_2 = 2$

$D_2 = 85 - 10 - 25 = 50$

$H_2 = 8$

Sol:

$\frac{120 \times 7 \times 10}{} = m_2 \times D_2 \times H_2$

$120 \times 35 \times 10 = m_2 \times 50 \times 8$

$\boxed{225 = m_2}$

So, Extra employed = 225 - 120

= 105

Q3.> 40 works can. comp. a piece of work in 36 days and each works works @ 8 hour a day, after 20 days all goes to Strike, due to Strike work is Stopped for 6 days. 10 works left the work how many more works should be employed to comp. the

works, if each works 4 hour a day.

Sol^n

40 × 36 × 8 = Total work

work compl = 40 × 20 × 8

work rem = 40 × 16 × 8

Now,

m_2 = ?

D_2 = 36 − 20 − 16

= 10

40 × 16 × 8 = m_2 × 10 × 4

108 = m_2

extra employed = 108 − 40 + 10 ← जो चले गये है उनके स्थान पे भी लाना है।

= 78 A

<Q1> 50 workers can comp. a piece of work in 40 days, after every 10 days 5 workers left the work. the work will be completed in how many days.

Sol^n ~~50 × 40~~ Total work = 50 × 40

~~work~~ m = 50 } 50 × 40 = 2000

D = 40

So day

Ans

Sol^n

65

इसान से ... लेते के ... इन ...

D M

50 days
$10 \times 50 = 500$
$10 \times 45 = 450$
$10 \times 40 = 400$
$10 \times 35 = 350$
$10 \times 30 = 300$
2000

Q2) 60 works can comp a piece of work in 50 days after every 10 day 5 works left the work the work is comp in how many days.

Sol^n m = 60, D = 50 } ← Total work = 60×50 = 3000

65 days
$10 \times 60 = 600$
$10 \times 55 = 550$
$10 \times 50 = 500$
$10 \times 45 = 450$
$10 \times 40 = 400$
$10 \times 35 = 350$
$5 \times 30 = 150$
2850

इसको equal करने के लिए
लेते हैं इन दिन रखुद से
set करलेंगे।

Q.) A contractor employed 30 works to comple. a piece of works in 38 days, after 25 days he employed 5 more works and the work is comp. 1 day

befor than the scheduled time, how many days, he would have taken more to com. the work, if she has not employed extra works.

<03:>

Sol^n

Sol^n m_1 D_1

30x 38 = 1140

5 more after (25 days)

So, worker done by | new team = 12x 35

Days by old team to com. rem. works = $\frac{12 \times 38}{30}$ = (14 days)

39 days

1 days extra than sedul

Q15) In a hostel food mate is available for 200 student, 120 days if each student consume 760g per day after 20 days, 50 more students join the hostal and now each student consume 950g per day, the rest food material is available for how many days.

Sol $200 \times 120 \times 760$ = $250 \times D_2 \times 950$

Q4.)

$200 \times 100 \times 760 = 250 \times D_2 \times 950$

rem. food

$D_2 = 64$ days

<03> 12 male comp a piece of work in 18 days
12 female " the same work in 24 days.
then in how many days work will be comp. by
10 male and 8 female.

Soln.

12 m — 18 days
12 F — 24 days

12 m x 18 = 12 F x 24

3 m = 4 F

$\frac{3}{4} m = F$ —(1)

10 m + 8 F so. frm eq (1)

$10 m + 8 \times \frac{3}{4} m$

$10 m + 6 m$

$16 m$

So,

$12 \times 18 = 16 \times D_2$

$D_2 = \frac{24}{2}$ days

04.) 02 male comp. a piece of work in 16 days
3 female comp. the same work in 04 days
16 m and 16 F together start the work
after 12 days the work is comp. how

Start
14-3-2015

many more males are req. to comp the rest work in 2 days

Sol/n $24m \times 16 = 32F \times 24$

$m = 2F$

$= 16m + 16F$

$= 16m + 16 \times \frac{m}{2}$

$= 16m + 8m$

$= 24m$

$(16m + 16F) \times 12 + (16m + 16F + xm) \times 2 = 24m \times 16$

$24m \times 12 + 24m \times 2 + xm \times 2 = 24m \times 16$

$2m \times 2 = 24m \times 2$

$\boxed{x = 24}$ Ans

Start
14-3-2015

"Number System"

(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 $\frac{p}{q}$
$\sqrt{2}$, $\sqrt{5}$, π, e , 1.7245 - -
non-terminating non-repeat

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

Prob

1.) A no. is continously divided by 6, 2 4 leaves the remainder 3, 1, 2 resp.
the same no. is continously divided by 4, 2, 6. what will be the remainder.

8
80
3:15
19, 89
3

6, 2, 4 - 3, 1, 2

4, 2, 6 - 1, 0, 4

Trick:-

6	81	7
2	12	1
4	6	0

4 + 2 = 6

यहाँ पर शुरू से "1" मान लेना है, यही trick है।

4	81	1
2	20	0
0	6	4

Q2.) A no. is cont. divided by 5, 4, 6, leave the rem 4, 0, 3, 4 resp the same no. is cont. divided by 6, 4, 5 then what will be the reminder.

6	219	3
	36	1

5	219	4
4	43	3
6	10	4
	1	

21544

No. of Divisors

Q) Find the no. of divisors of 36.

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

total 9 divisors.

2	36
2	18
3	9
	3

Trick :-

36

4 x 9

$2^2 \times 3^2$ ⇒ ध्यान से पहले दो Ans 3 का Pow.

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

Q) Find no. of divisors of 144

$2^4 \times 3^2$

2	144
2	72
2	36
2	18
3	9
	3

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

$= 15$ Ans

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

Sol:

225

$(15)^2$

$5^2 \times 3^2$

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

3	225
3	75
5	25
	5

9-2 = 7 Ans

(iii) *

Q1.) Find the sum of divisors of 108.

Sol^n $2^2 \times 3^3$

$(2+1)(3+1) = 3 \times 4$

$= 12$

2	108
2	54
3	27
3	9
	3

Trick :- Power में एक जोड़ एक घटाकर लिख दो।

$\frac{2^{2+1}-1}{2-1} \times \frac{3^{3+1}-1}{3-1}$

$= 7 \times 40$

$= 280$

Q2.) Find the sum of divisors of 36

$2^2 \times 3^2$

$\frac{2^{2+1}-1}{2-1} \times \frac{3^{2+1}-1}{3-1}$

$= 7 \times 13 = 91$

2	36
2	18
3	9
	3

(1

Rule fo

34

4

Rul

(iii) * **Unit Place Problem:-**

↳ इसके लिए हमें सिर्फ Unit digit मालूम करना है कि last में क्या है।

$14 \times 5 = 70$

↳ unit place = 0

Unit place

(1) $(1)^n = 1$

$(5)^n = 5$

$(6)^n = 6$

Note: इसमें हम mainly power को 4 से divide करके check कर देते हैं, और इसके बाद normally हम 1, 2, या 3 को भी check करते हैं।

Rule for 2:-

$2^4 = 16 = 6$ ✓

$2^{4n} = 6$

$2^1 = 2$, $2^2 = 4$, $2^3 = 18$

eg $2^{44} = 6$ (divisible by 4, यहाँ जाना है यह 4n के term में है।), $2^{74} = 2^{2} = 4$ (74 को 4 से divide करने के बाद जो remainder बचेगा।) ✓

$\frac{34}{4}$ 8

Note: ⇒ Power 4 को हम base बनाते हैं।

Rule for 3:-

$3^4 = 81 = 1$

$3^{4n} = 1$

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

eg $3^{27} = 3^3 = 7$

Rule for 4! -

Power odd = 4

Power even = 6

eg

$4^{1+1} = 4$

Rule for 5! -

$(5)^1 = 5$

Rule for 6! -

$(6)^1 = 6$

Rule for 7! -

$7^0 = 1$

$4^{4m} = 1$

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

Note! याद रखने के लिए 4 का multiple ही लिखना है।

Rule for 8! -

$8^4 = 6$

$8^{4+x} = 6$

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

Rule for 9! -

Power odd = 9

Power even = 1

Q(1) $(478)^{387} \times (342)^{37} \times (986)^{40}$

Note! इसमें सिर्फ unit digit देखना है।

5×2^1

10

↳ Unit place = 0

(10 से कुछ भी गुणा होगा last में 0 ही आएगा।)

(2) $(983)^{85} - (234)^{34}$

$3^7 - 4 = 6$

↓ means (आपने तरक से 10 लेंगे।) → ये इसलिए किए क्योंकि हमारा value positive में आए।

$17 - 4 \geq 6$

(IV) Divisibility rules! -

(IV)

• Divisible by 2! -

last 0, 2, 4, 6, 8

• Divisibility rule of 3! -

Sum of digit's are divisible by 3

$472 = 4+7+2 = 9$

• By 4! -

last two digit divisible by 4 ✓

$\frac{11744}{4} = ✓$

• By 5! -

Last digit 0, 5 ✓

• By 6! → 2, 3 , Note! 2 ans 3 are Co-Prime of 6

No. are divisible by 2 ans 3 both

• By 7! -

Co Prime :-

By 8 :- last 3 digit divisible by 8

By 9 :-
sum of digits divisible by 9

By 10 :-
last digit 0

By 11 :-

$$\begin{array}{r} 121 \times 11 \\ \hline 121 \\ 121\times \\ \hline 1331 \end{array}$$

By 12 → Ans 4 → Note → 3 and 4 are Co prime of 12

By 17 →

By 14 → 2 and 7

By 15 → 3 and 5

By 16! - last 4 digits are divisible by 16.

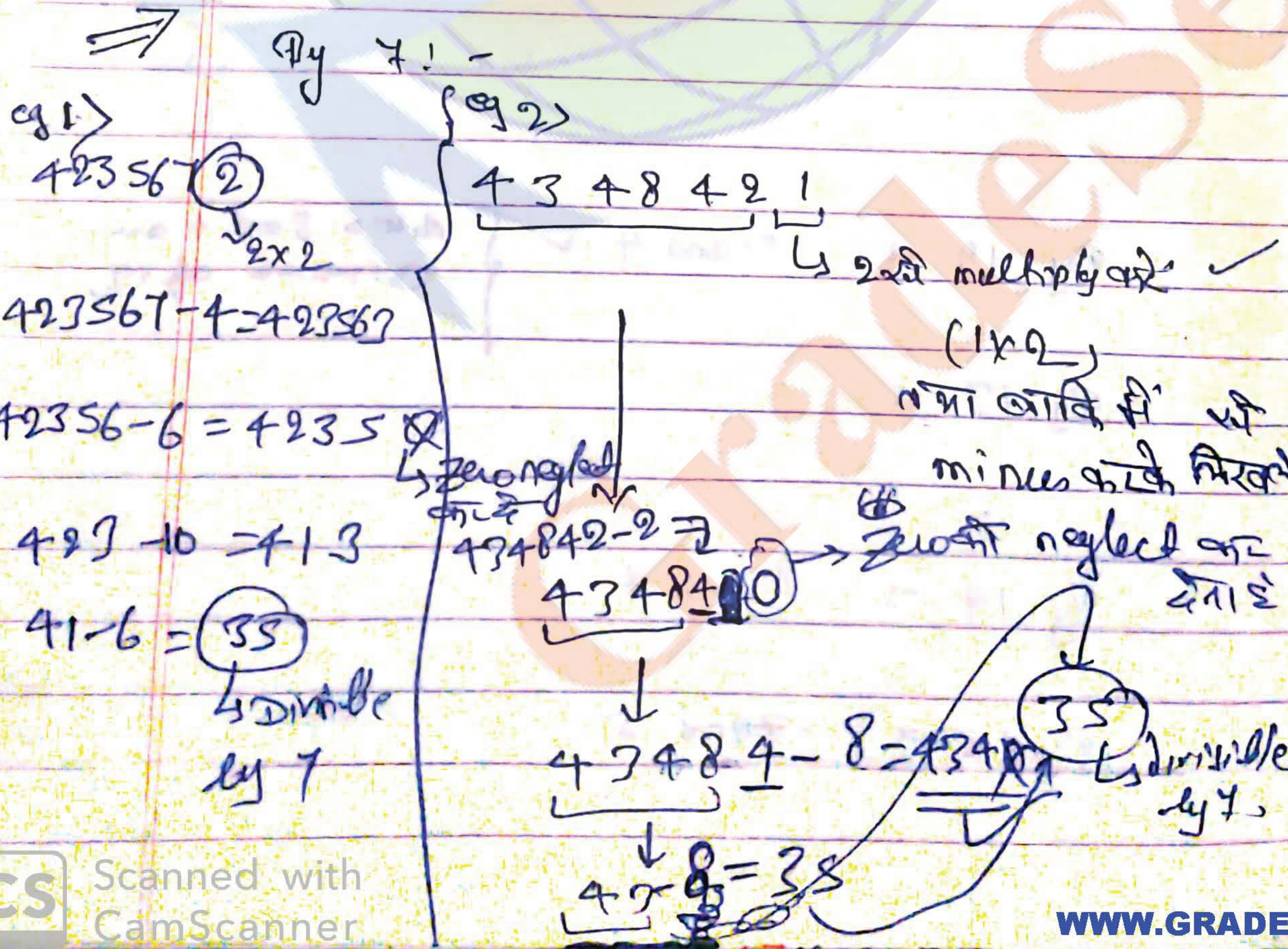
By 17! -

By 18! - Ans 9

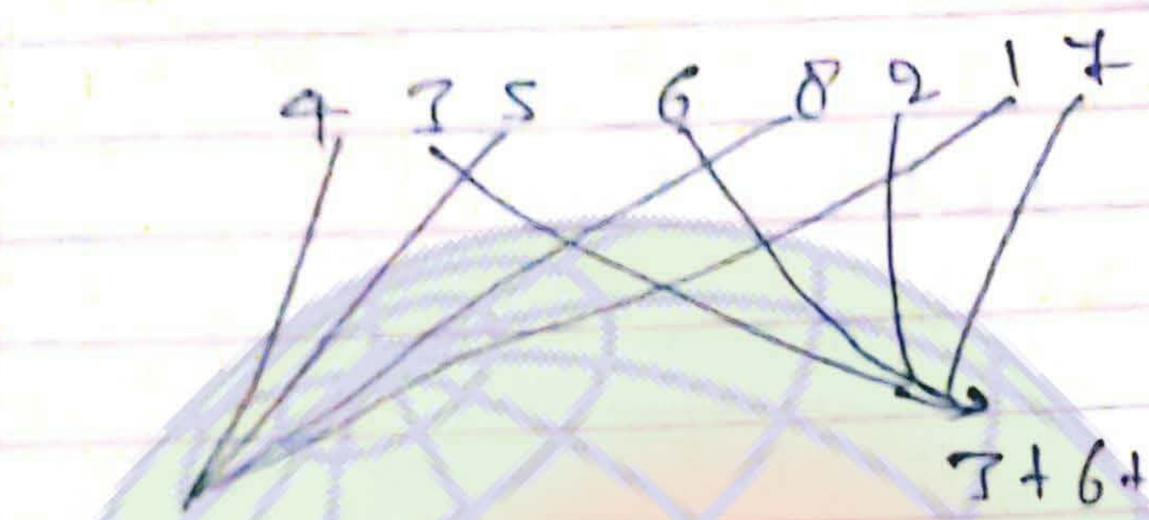
By 19! -

By 20! -

By 7! -



By 11 :-



18-18=0 , 11, 22

Sum can divisible by 11.

(Remark : 1)

1.) If any digit is repeated by 6 times it is divisible by 7, 11, 13, 77 and 1001,

eg. 111111

222222

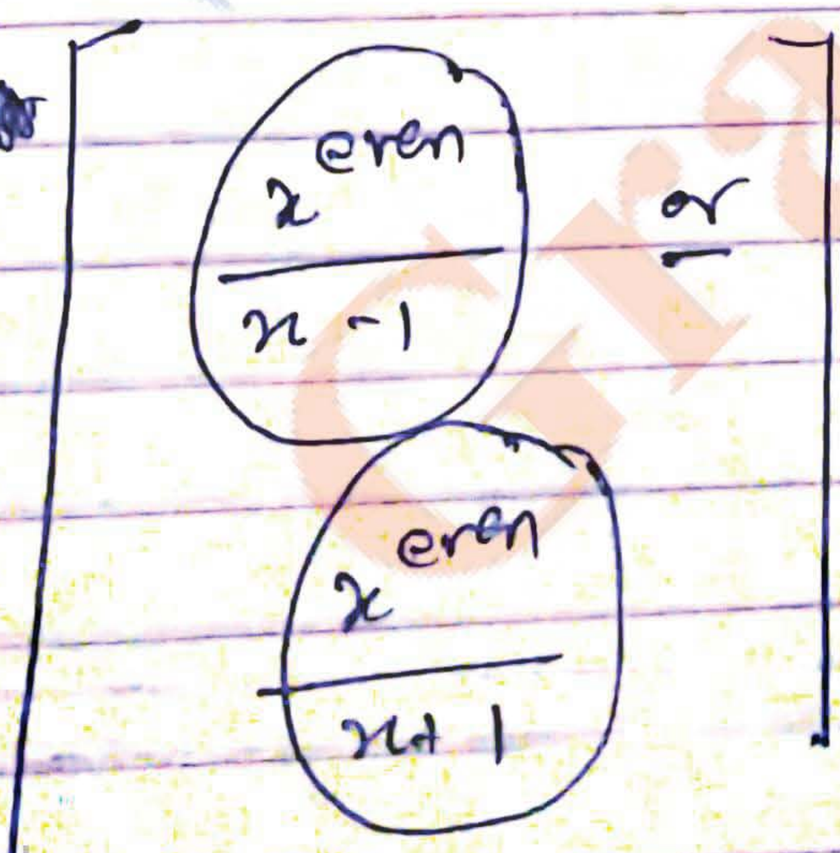
2.) Any 3-digit no. Repeated 2 times in sequence then the no. is divisible by 7, 11, 13, 1001

eg 792 792

742742

3.) Any two digit no. repeated 3 time in seq. then the no. is divisible by 3, 7, 13

eg 25 25 25 ; 13 13 13

4.) 

Remark → Remainder will be 1.

Q:- "Remine"

$$\frac{14^{42}}{16} = 1$$

$$\frac{14^{42}}{18} = 1$$

(5) $\left[\frac{x^{odd}}{x-1}, \frac{x^{odd}}{x+1}\right]$ → Remainder → 1, Remainder → x

(बड़ा वाला भी divide करने पर same no. आएगा इसलिए)

or

Q.

$$\frac{17^{43}}{16} = 1$$

$$\frac{17^{43}}{18} = 17$$

Q1.) $\frac{9^{41}+1}{10}$ ⇒ Remainder = 9

Hint → $9^{41} + 1$ (remainder) → $\frac{9+1}{10} = \frac{10}{10} = 10$

Q2 . $\frac{9^{7}+1}{10}$ $\frac{9+1}{10} = \frac{10}{10} = 0$

रिमाइंडर-

(Q3) $\frac{13^{91}+1}{12} = 2$ (Reminde)

(Q4) $\frac{(18^{97})+5}{17}$ = Reminde = 6

Reminde

$\frac{1+5}{17} = \frac{6}{17}$ = Reminde 6

(6) • $(x^n - a^n)$ is divisible by $(x-a)$ for all values of n

• $(x^n - a^n)$ is divisible by $(x+a)$ ✓ even value of n.

• $(x^n + a^n)$ is divisible by $(x+a)$ ✓ for odd value of n.

Q1- 92

☆ Fin

✓ 1) fin

sol^n

Note Zero के लिए 5 से ही divide करना पड़

5

2.)

3

Q.- 24-7-2018

B - ✓
L → X

Find Zero's:

1) find Zeros from the right hand side
$\lfloor 5 \times \lfloor 24 \times 5$ .... $\times 60$

sol^n 10, 20, 30, 40, 500, 60, 70, 80, 90, 100

$\frac{600}{5} = 120$ ⌉ → quotient है

Note: Zero के लिए 5 से ही dividation करते हैं

$\frac{120}{5} = 24$

$\frac{24}{5} = 4$ ⌋ → जब तक divide करते रहेंगे जब तक कि इसे कम न हो जाए।

148 Zeros

5 | 24 | 4 ← Quotient
20
4

2) Find Zero from right hand side

$1 \times 2 \times 78$ 16

$\frac{16}{5} = \underline{3}$] so, 3 Zeros in answer

of n.

lue of n.

3) Find no of Zeros from R.H.S -

$\lfloor 26 \times \lfloor 24 \times \lfloor 46$

sol^n
$\frac{26}{5} = 5$ ⌉
$\frac{5}{5} = 1$ ⌋ 6

Q_1 –

$\frac{34}{5} > 6$

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

} 7

$\frac{46}{5} = 9$

$\frac{9}{5} > 1$

} 10

$\overline{22}$ Ans

Case 2nd – Addition

(9) Find no. of zeros from R.H.S

$\underline{126} + \underline{34} + \underline{146}$

Sol

No. of zero's = 6 (जो सबसे least होगा।
(eg 6, 7, 10 में से 6 least है)

case 3rd :-

(s) Find no of Zero's from R.H.S

$57 \times 25 \times 125 \times 64 \times 135 \times 45 \times 80 \times 95 + 5$

Sol'n ~~हमें~~ 2 और 5 को in pair करना है बस

R_1 —

$5^{\cancel{4}} \times 25 \times 125 \times 64 \times 135 \times 45 \times 80 \times 95 \times 15$

$5^2 \times 5^3 \times 2^6 \times 5 \times 5 \times 5 \times 2^4 \times 5$

5 जगह 2 को दी
Consider करना है।

⇓

$5^9 \times 2^{10}$

चूंकि Zero तब बनता है
जब 2 और 5, multiply
होते हैं।

⇓

जो less power है, उतनी ही Zero होगी

⇓

(10, no. of Zero's = 9) Ans

⇒

1) A no of when divided by 45, leaves 9 remainer 20, of the same no is divided by 15, what will be the reminde

Sol^n

$45 \overline{)\ x\ } --$

$\underline{-}$

20

$15 \overline{)\ x\ }$

$\underline{-}$

$(\quad)$

जबकि 15, 45 को divide करेगा तब हम

$15 \overline{)\ 20\ }$

$\underline{15}$

5 ✓ Ans

2.) A no. when divided by 80, leave remainder 12. If the square of same no. is divided by 16, what will be the remainder

Sol:

$80 \overline{) x }$

$-$

12

dive करना है

$16 \overline{) x^2 }$

80 / 10

So, square में Remainder कितना है

$(12)^2 = 144$

$16 \overline{) 144 } (9$

144

0 Ans

Provides-

1) $(x^n - a^n)$ is always divisible by $(x-a)$

2) $(x^n - a^n)$ is divisible by $(x+a)$, when

(I) value of n is even.

$(x^n + a^n)$ is divisible by $(x+a)$ for odd value of n.

3) $4^{x+3} - 4^{x+1}$ is divisible by $(4^x - 4^1)$

H.C.F and L.C.M

H.C.F :-

HCF - highest common factor

method 1st :-

30	45
3	3
5	5
6	x
15	15 → H.C.F

check -

$\frac{30}{15} : \frac{45}{15}$

2 : 3 → Nothing is common b/w them!

method 2nd) -

(i) 90 , 363

$$\begin{array}{r} 4 \\ 90 \overline{)363} \\ 360 \\ \hline 3 \end{array}$$

$$\begin{array}{r} 30 \\ 3 \overline{)90} \\ 90 \\ \hline x \end{array}$$

This is H.C.F

method 3rd :-

120 300 450

Concept - long method :-

R1 ✓

120 — 300 — 450

150

300) 450 (
300
(150)) 300 (2
300
×

So, ✓

120) 150 (
120
(30)) 120 (
120
0

So, this is the final H.C.F

H.C.F इसको बहुत सरल method है।

Case 2nd – short method.

3	120 – 300 – 450
10	40 – 100 – 150
	4 – 10 – 15

3 × 10 = (30) H.C.F

L.C.M :-

LCM – Least Common multiple

method 1st :-

6 : 8

6	8
12	16
18	24
24	32
30	40
36	48
42	56
48	
54	

LCM – 24

method 2nd – (short method)

([illegible] value [illegible] divide [illegible])

(i) (4)

20	4 – 12 – 30 – 90 – 120 – 180 – 200
2	6 – 9 – 10
	2 – 9 – 5

Ans – 200 × 9 = 1800

So, L.C.M = 1800

= (20 × 2 × 9 × 5)

Q_1 ✓
$AR_1 \to 2$

(ii) $2^7 \times 3^4 \times 5^7 \times 7^2$, $2^4 \times 3^7 \times 11^5 \times 7^3$, $2^2 \times 3^9 \times 5^9 \times 11^4$

H.C.F $= 2^2 \times 3^4$ ([तीनो में से छोटी से छोटी Power])

L.C.M = [किसी एक में हो उसकी बड़ी से बड़ी Power]

$2^7 \times 3^9 \times 5^9 \times 7^3 \times 11^5$

अगर मैं हटा दे । तो easily find हो जाएगा।

(iii) 30 : ~~4~~5 | HCF = 15

2 : 3

मा

2 : 3

~~4~~ : 6

AR_2 ✓

(i) The ratio of two no. is 6:5 and their H.C.F is 15, find the no.

Soln 90 : 75

Q.1 ✓
AR.1 → 2

(ii) $2^7 \times 3^4 \times 5^7 \times 7^2$, $2^4 \times 3^7 \times 11^5 \times 7^7$, $2^2 \times 3^9 \times 5^9 \times 11^4$

H.C.F = $2^2 \times 3^4$ ([तीनों में हो सबसे छोटी power])

L.C.M = [किसी एक में हो उसकी बड़ी से बड़ी power]

$2^7 \times 3^9 \times 5^9 \times 7^7 \times 11^5$

प्रकार से हटा दे। तो easily find हो जाएगा।

(iii) 30 : ~~4~~5 | HCF = 15

2 : 3

या

2 : 3

~~4 : 6~~

AR 2

(ii) The ratio of two no. is 6:5 and their H.C.F is 15, find the no.

90 : 75

$R_1 - r$
$AR_1 = 3$

Formula :-

If a and b is the ratio of two no. in lowest term than

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

(i) The ratio of two no. is 5:8 and their H.C.F is 16 find the L.C.M

$$8 \times 5 \times 16 = L.C.M$$
$$L.C.M = 480$$

AR-3

(ii) The H.C.F of two no. is 5, and the sum of this is 45, L.C.M is 100 find the numbers.

Sol:

Given

$$x + y = 45$$

$$a \times b \times 5 = 100$$
$$a \times b = 20$$

$$a + b = 45, \quad a \times b = 20$$
$$a = \frac{20}{b}$$

$$\frac{20}{b} + b = 45$$

$$20 + b^2 = 45b \qquad b = \frac{43}{20}$$
$$43b = 20$$

R1 ~

Teache

$$a \times b = \frac{1 \cdot C \cdot m}{H \cdot C \cdot F} = \frac{100}{5} = 20$$

$4 \times 20 = 20$

$2 \times 10 = 20$ ✗

$4 \times 5 = 20$ ✓

a : b	a : b
1 : 20	4 : 5
5, 100	20, 25 ✓

Ans

R-28-7-15

HCF / LCM

Trick → B ✓ L → ✓

Formula! -

Product of two numbers = H.C.F × L.C.M

Q1) The H.C.F of two no's is 15 and their L.C.M is 150, if one no is 75, find the other no.

$75 \times x = 15 \times 150$

$x = 30$

Q2) Find the greatest no. of 4 digits which is divisible by 12, 15, 20

Sol^n

12, 15, 20 — L.C.M

H.C.F = 1 , L.C.M = 60

2 | 12, 15, 20

2 | 6, 15, 20

3 | 3, 15, 10

4, 5, 10

$= 2 \times 2 \times 3 \times 5 = 60$

60 | 9999 | 166

60

399

360

399

360

39

Greatest no = 9999 − 39

= 9960

3.) Find the least no. of 4-digits which is divisible by 12, 15, 20.

Sol^n

2 | 12, 15, 20
2 | 6, 15, 10
3 | 3, 15, 5
5 | 1, 5, 5
1, 1, 1

L.C.M = 2 × 2 × 3 × 5 = 60 (1cm ह)

60) 1000 (16
60
400
360
40

60 - 40 = 20

1000 + 20 = 1020

4.) Find the least no. which when divided by 8, 12, 15, 20, ~~the least~~ no. leaves a remainder 5 each case?

Sol^n

12 - 15 - 20
L.C.M = 60

this is Lcm of 12, 15, 20

No = 60 + 5
= 65

5.) Find the largest no. which divide 96, 528 and 782

Sol^n

4	96, 528, 782
3	24, 132, 198
2	8, 44, 66
	4, 22, 33

HCF = 24

Q2) Find the largest no. which will divide 410, 751 and 1030 and leave the remainder 4.

Soln

| 410, 751, 1030

-4 -4 -4

↓ ↓ ↓

406, 747, 1026

H.C.F find करेंगे।

406 , 747 1026

H.C.F = 31

method and! -

44) 1027 (
744
249) 744 (
550
186) 249 (
186
93) 186 (2
186
0

93) 406 (
372
34) 93 (
68
25) 34 (1
25
9) 25 (2
18
7) 9 (1
7
2) 7 (3
6
1) 2 (2
2
0

So, H.C.F = 31

Q 7) Find the least no which divide 38, 45, 52 leaves the reminder ~~2,3,4~~ 2, 3, 4 resp.

Sol

38, 45, 52

-2 -3 -4 → Reminder जब दिया रहे तो उसे minus करेंगे।

6	36, 42, 45
	6, 7, 8

HCF = 6 Ans

Q 8) Find the least no which when divides by 24, 32, 36 leave the reminder 19, 24 and 31 resp.

Sol

24 − 19 = 5

32 − 24 = 5

36 − 31 = 5

Diff. equal होना चाहिए।

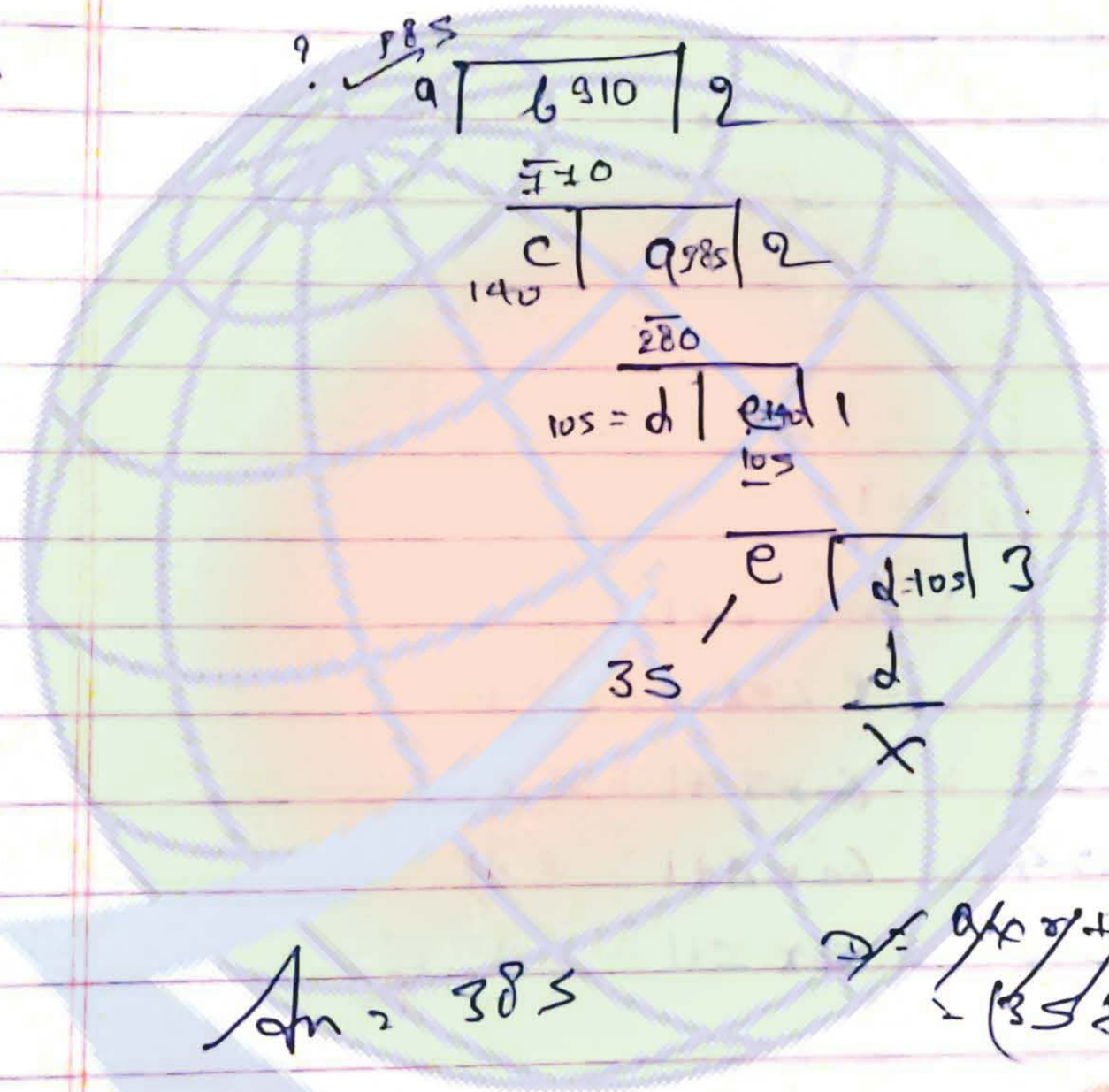
36×2
72×4
288

4	24, 32, 36
2	6, 8, 9
	3, 4, 9

L.C.M = 288 − 5 = 283

Q 5. If we can calculate the H.C.F of two no, the last divisor is 35, from top to bottom, Consonants are 2, 2, 1, 3 resp. then find the two numbers.

Sol^n



Ans: 385

Q6) Find the H.C.F of 3 nos from top to bottom, divisors are 2, 3, 5, 2 resp. and 1, 2, 3 is left in the last row, so, find the no.

Sol^n

[7] Find the least no. which when divided by 2, 3, 4, 5, and 6, leaves the remainder 1, and completly divisible by 7.

Sol:-

2 | X, X, 4, 5, 6

2 | 2, 5, 3

2
2
4
5
1

LCM = 60

No. = 60+1 = 61

= 60k+1

k = 1 = 60+1 = 61

k = 2 = 60x2+1 = 121

k = 3 = 60x3+1 = 181

k = 4 = 60x4+1 = 241

k = 5 = 60x5+1 = 301 Ans

method 2nd:

$$7\overline{)60}\ (8$$
$$\underline{56}$$
$$4$$

4k+1

4x5+1 | 21
7

k = 5

Page 10

* Society :-
  - "Man is a social animal"
  - बिना society के हम रह नहीं सकते हैं

* Culture - way of life of a people living in a particular area
  - Eating habits
  - खान-पान
  - Religion
  - language
  - customs
  - belief

Types of culture :-

Elite culture
Culture of upper class
or
educated class
or
top class

Folk culture
(culture of area)
or
common-man
or
majority of the people of the particular society follow folk culture होती है

⇒ folk, elite को follow करते हैं
⇒ हर गरीब, धनी को follow करता है।

2. Attach-

Language habit -

Religion habit -

eating habit / culture habit -

1. [illegible]

[illegible] - Philosophe की पढ़ी।

<8.> find the least no. which divisible by 3, 5, 6, 8, 10, 12 leaves the remain. 2, and also divisible by 13.

Sol:

2 | 3, 5, 3, 8, 10, 12

4, 5, 6

4 × 5 × 6 = 120

L.C.M = 120

130 = 120 + 2

= 122/13 ← (condition)

13 | 122 | 9
117

05

13 | 120 | 8
104

16

7 × 8 + 2 = 26/13

K = 8

120K + 2 ⇒ K = 8

= 962 ——

[eg.] find the no., which when divisible by 18, 21, 24, leaves the rem. 7, 10, 13 resp. and com. divisible by 23.

sol:

$$\begin{array}{r|l} 3 & 18, 21, 24 \\ \hline 2 & 6, 7, 8 \end{array}$$

LCm = 3 × 7 × 8 = 392

392 + 7 = 399

392 + 10 = 402

392 + 13 = 405

18	21	24
-7	-10	-13
11	11	11

$$\begin{array}{r|l} 3 & 18 - 21 - 24 \\ \hline 2 & 6 - 7 - 8 \end{array}$$

$$7 - 7 - 4$$

$$= 504$$

$$NO = (504 - 11)/23$$

So,

$ND = (504 K - 11)$

where $K > 6$

$21 \overline{)504\ (24}$

48

$\overline{44}$

42

$\overline{24}$

$21K - 11$

$21 \times 6 - 11$

$K > 6$ $\quad 126 - 11 = 115/23$

So, $AJ_2\ 504\ K - 11$

$= 504 \times 6 - 11$

$= 3024 - 11 = 3013$

Unit

"Logic reasoning"

(1) statements : Conclusion

"Choose"

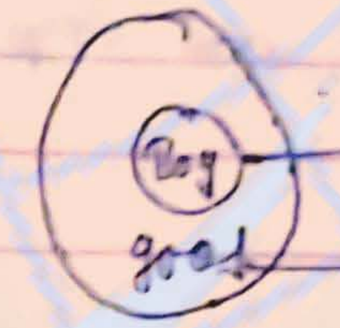
formula

(2) Statements Conclusion.

(i) Universal affirmative
"All boys are good"

"Some good are boys."

Proof:-



All boys are good

Some good are boys.

(ii) Universal negative
"No Boy is good"

No good is Boy.

(iii) Particular Affirmative
'Some boys are good'

'Some good are boys'

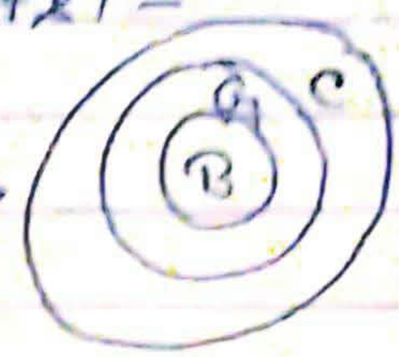
(iv) Particular negative
'Some boy are not good'

No conclusion

(3) Combination of statements -

case (i) -

(a) i. All boys are girls
ii. All girls are cats.



Venn-diagram

पहले पहले Venn diagram बनाते

Conclusion -

i. Some girls are boys
ii. Some cats are girls
(iii) All boys are cats.
(iv) Some cats are boys

} से सभी Venn-diagram से पता चल रहा है।

Case 2nd

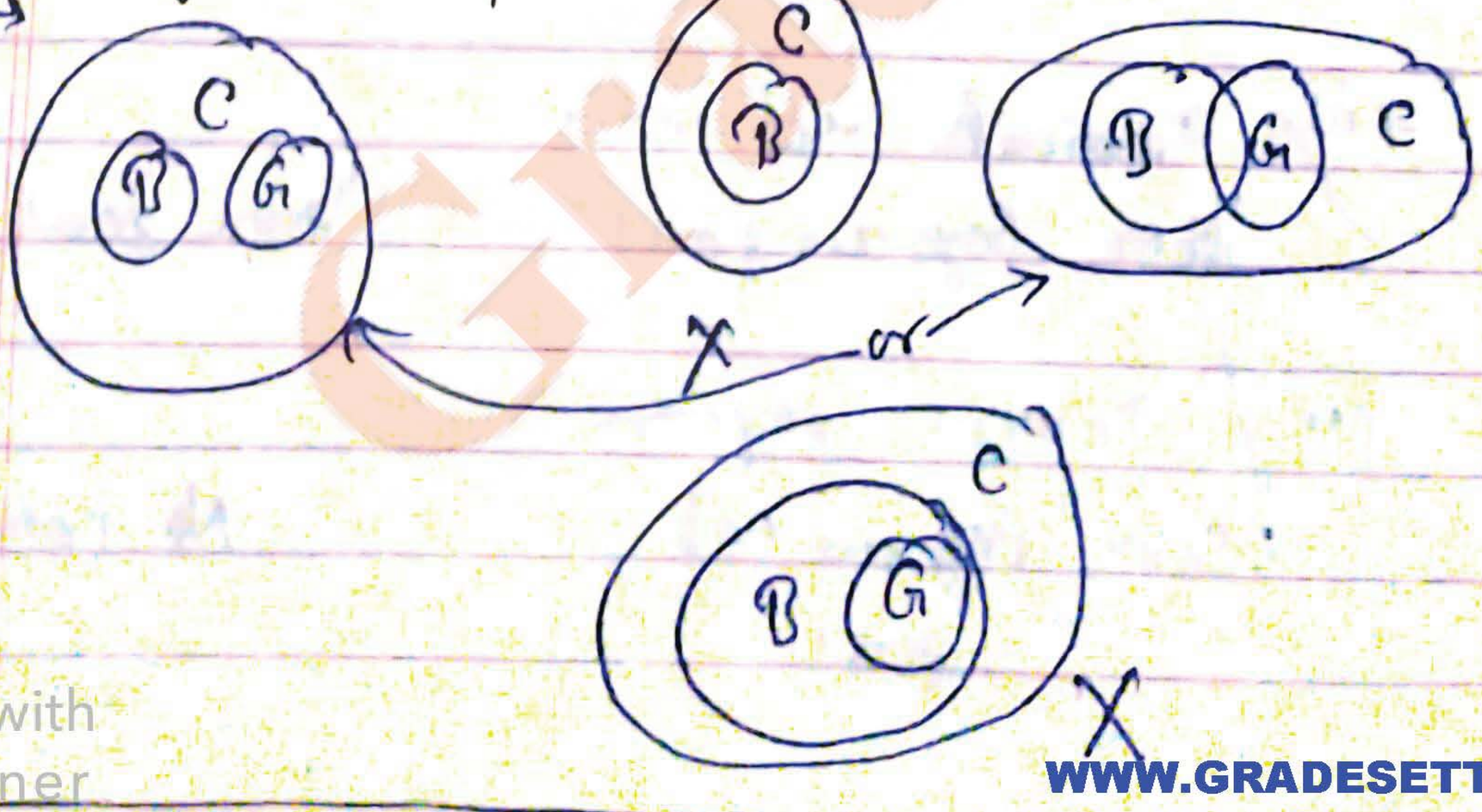
(b)

(i) All boys are cats
(ii) All girls are cats.

⇓

Venn diagram

given question का Venn-diagram बनाना है।



(d)

Conclusion :-

(i) Some cats are boys } पहले दो direct मिल जाएगा
(ii) Some cats are girls.
(iii) either no boy & girls or
Some boys are girls } ven-diagram से पता चलेगा

(e) Case VI :-

(i) All boys are girls
(ii) Some girls are cats.

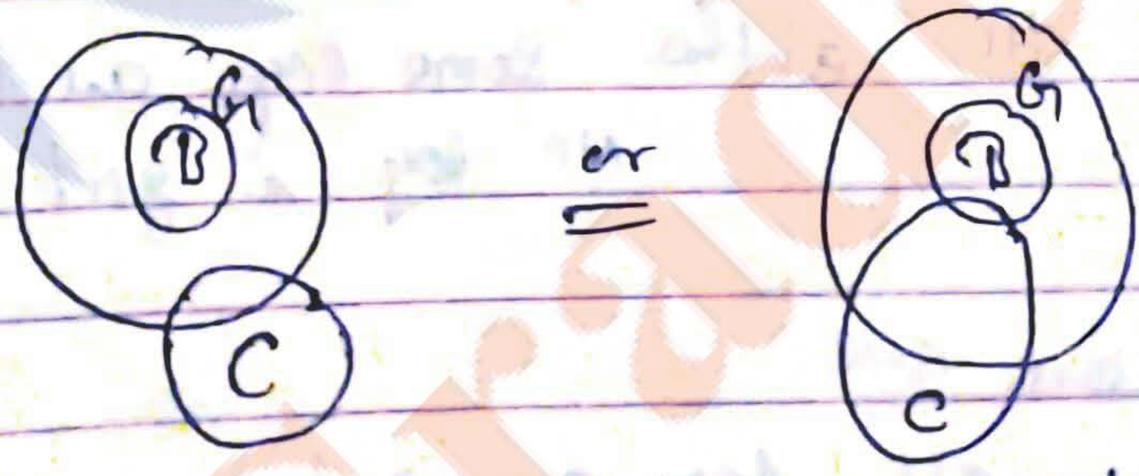
Conclusion :-

(i) Some girls are boys
(ii) Some cats are girls

⇓

Then go to ven-diagram

⇓,



ये संभावना है Some boy या All cat हो

(iii) either Some boys are cats.
or
no boy & cat.

(d) Case 4th:-

(i) Some boys are cats
(ii) Some cats are girls

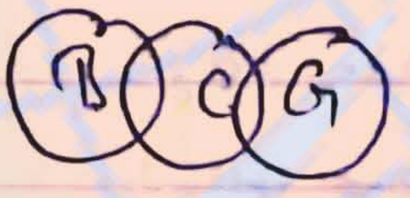
Conclusions:-

(i) Some cats are boys
(ii) Some girls are cats

↓

ven diagram

J,



or

→ यहाँ से confirm नहीं है कि कुछ girls boys है या नहीं।

(iii) either Some boys are girls or NO boy is girl.

(e) One sth.

(i) all boys are girls
(ii) No girl is cat

Conclusion

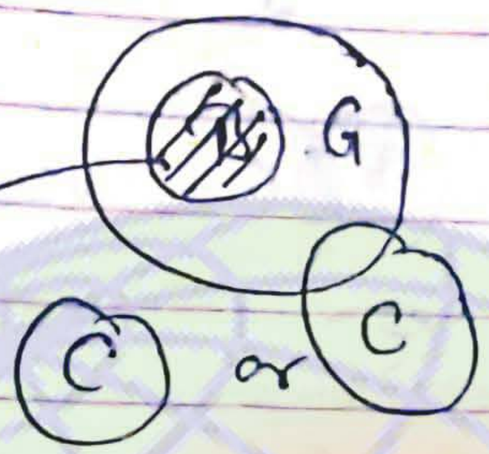
(i) Some girls are boys

(ii) No cat is girl

⇓

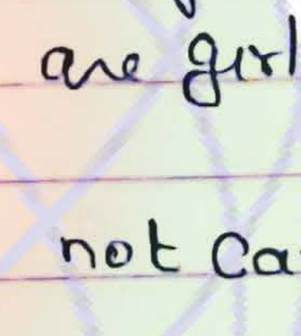
ven-diagram, for ~~some~~ more conclusion

⇓



(iii) either no cat is girls or some cat's are girls.

(iv) some girls are not cat.



कोई girls का ये वाला portion का भी cat's नहीं हो सकता है

Note!: There are 3-level of logic-reasoning.

Ist ⇒ R.S. aggarwal ✓

2nd - time institute ✓

IInd level-

(f) Case 6th

(i) some boys are girls

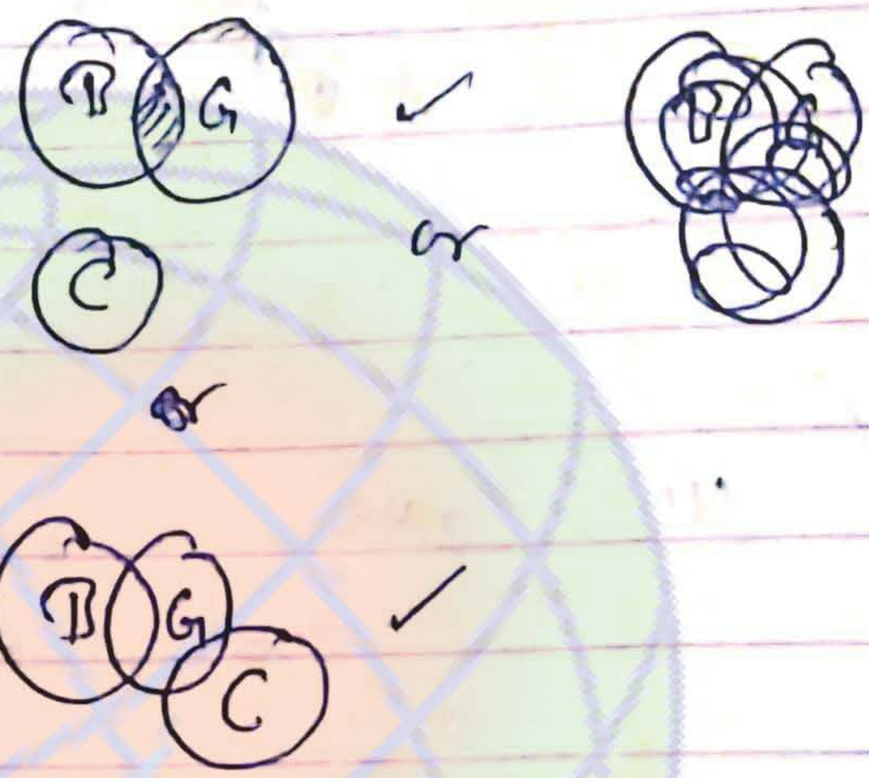
(ii) No boy is cat.

Sol'n

Conclusion:-

(i) Some girls are boys
(ii) No cat is boy

↓



(iii)

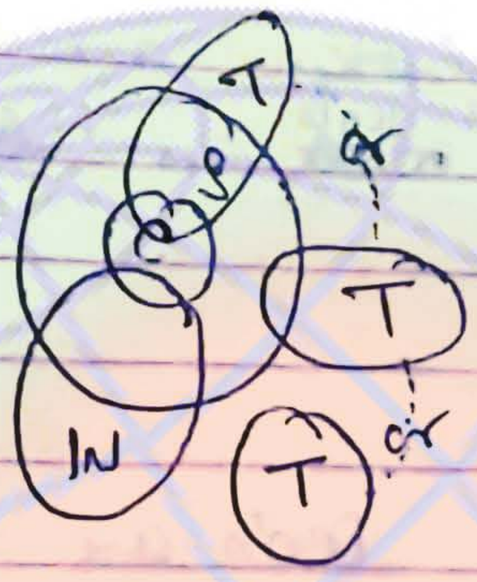
(g) Case 7th:-
(i) No table is woods
(ii) Some woods are chairs.
(iii) All chairs are stone

Conclusion:-
(i) No stone is table
(ii) Some stone are wood

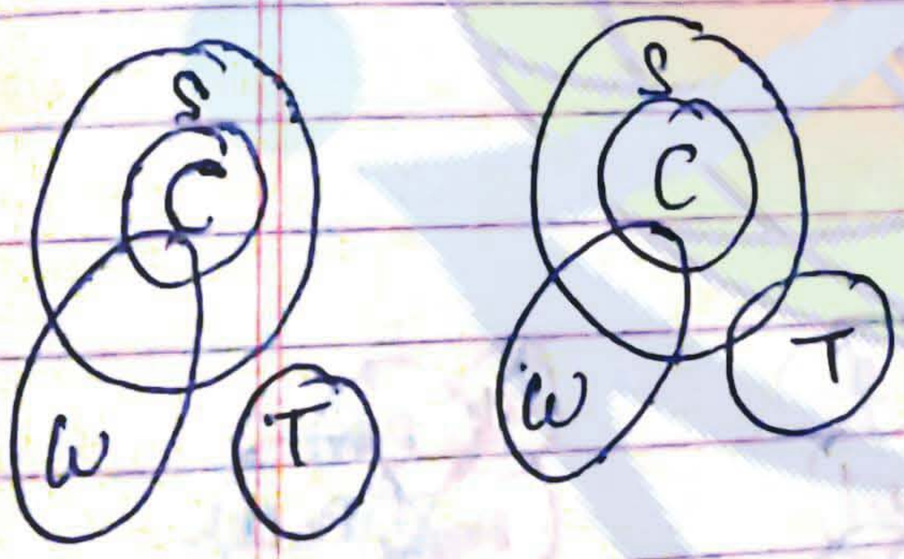
(a) I (b) II (c) I or II are true
(d) I and II false (e) I and II are true

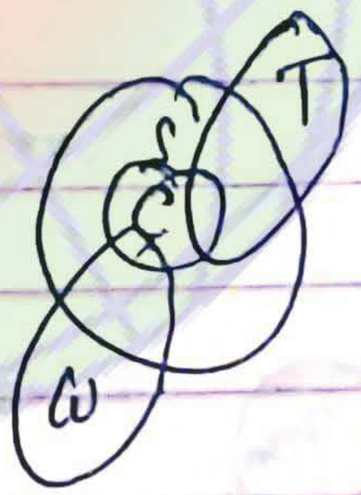
Sol) (I) No wood is table
(II) Some chairs are woods
(III) Some stones are chairs

II,



II,





So, only 'II follows, answer (B) ✓

(i) Arithmetical
(ii) Logic
(iii) non-verbal
(iv) alphabetic Puzzles

Type

Q1) Some books are Pen's.
Some Pen's are Pencils.
Some Pencils are buttons,

Concl.-
(i) Some buttons are Pens
(ii) Some Pencils are books

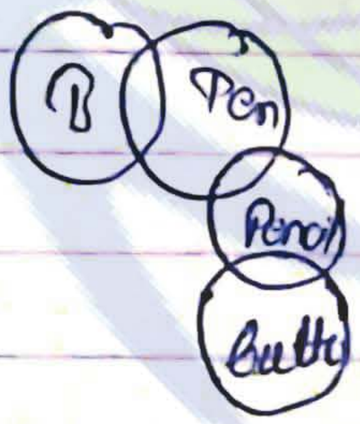
Sol^n

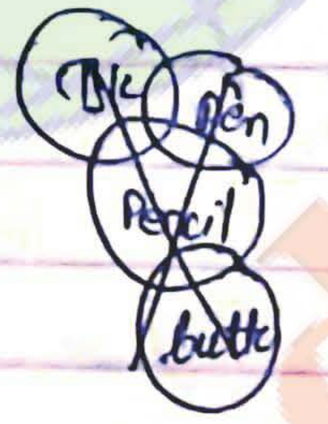
(i) Some Pens are books
(ii) Some Pencils are Pens
(iii) Some buttons are Pencils

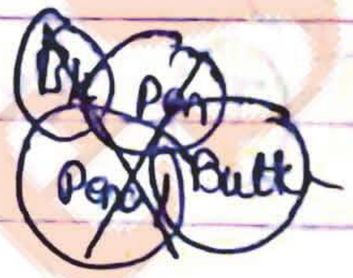
↓

ven-diagram

(i)



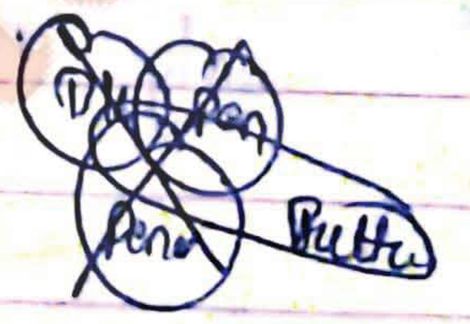




X

(पहले में कोई satisfy नहीं किया।
So, पहले से ही answer हुआ गया, कि
कोई भी answer नहीं आएगा
So NO (i) and (ii) करना

(iii)



Type 2nd:-

Q.[xx] Some Universal aff. type statements-

Universal affirmative	Universal negative
(i) Positive sentence begning with, any, each, every etc. eg. Any one can solve this Problem. It means all can solve this Problems	(ii) Negative sentence begning with non, no one, not a single etc. eg Non can scape from law It means no can scape from law
(ii) Positive sentence with Partiala person as subject eg. Ram is a great author.	(ii) Negative sentence with Particule Person as subject eg. Ram is not a great author.
(iii) Positive sentence with definite exception. eg. all students except Ram have failes	(iii) Negative sentence with definite exception eg. No student except Ram have failes

(ii)

Positive affirmative	Positive negative
(i) Positive sent. ∞ begning with words like almost, mostly, generly, frequencies, often, most a few eg. most of the books have been solved.	(i) Neg. " " " " " mostly, generly, frequently almost, a few, most, etc. eg. most girls are not boys. Conclusion - most.
(ii) Negative sentence with scarcely, rarely, seldom, little, few, hardly. etc. eg.. few people are not hard working. Conclusion It means Some People are hard work.	(ii) Positive sentence Begnins with rarely, scarcely hardly, little, few, seldom. eg, Few People are hard working it means Some people are not hard working.

(1)

(2)

Note:

Average:

(1) **Average = Sum of observations / No. of observations**

Find average of 14, 19, 21, 23, 25

Avg = $\frac{14+19+21+23+25}{5}$

$= \frac{103}{5} = 21$

(2) (a) $1+2+3+4+\dots+n \Rightarrow$ Sum: $\frac{n(n+1)}{2}$, Avg: $\frac{n+1}{2}$

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

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

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

or

$= \frac{n^2(n+1)^2}{4}$

Avg = $\frac{n(n+1)^2}{4_2}$

Note: For finding the average of n number, divide it by n.

(d) first n odd no. $= n^2$, Avg = n

(e) first n even no $= n(n+1)$, Avg = n+1

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

Average :-

(1) **Average = Sum of observations / No. of observations**

Find average of 14, 19, 21, 23, 25

$$Avg = \frac{14+19+21+23+25}{5}$$

$$= \frac{105}{5} = 21$$

(2) (a) $1+2+3+4+\cdots\cdots+n \Rightarrow$ Sum, $\frac{n(n+1)}{2}$; Avg, $\frac{n+1}{2}$

(b) $1^2+2^2+3^2+\cdots\cdots+n^2 = \frac{n(n+1)(2n+1)}{6}$,

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

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

or

$= \frac{n^2(n+1)^2}{4}$

$Avg = \frac{n(n+1)^2}{4}$

Note: For finding the average of n number, divide it by n.

(d) first n odd no. $= n^2$; $Avg = n$

(e) first n even no $= n(n+1)$; $Avg = n+1$

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

(7) Arg. of ~~first~~ even no from 2 upto n

$$\text{Arg} = \frac{\text{last even no} + 2}{2}$$

<01.> The arg. of 5 consecutive odd no is 15 find the smallest and largest no

Sol^n Given

$n = 15$

$n^2 = 225$

Teach

5 no. Arg = 15

$\frac{-1}{4}$

$\frac{4}{}$

15 − 4 = 11 smallest

15 + 4 = 19 largest

02) The arg. of 25 cons. even no. is 72. find the smallest and largest no

Sol^n

25

$\frac{-1}{24}$

72

72 − 24 = 48 smallest

72 + 24 = 96 largest

03.) The avg. of 31 one natural no. is 61, find smallest and largest no

Sol^n

Natural no

31 ⟶ 61

−1

30/2

15

61−15 = 46 (Smallest)
61+15 = 76 (Largest)

04) A cricket player 46, 47, 48, 49 runs in 4 of his innings, how much score he should made in his fifth inning, so that his avg. becomes 50.

Sol^n Our $\frac{46+47+48+49+x}{5}$

Teacher

46 47 48 49 50

4 +3+2+1 = 10 ⟶ 60

05.) A cricket player score 95 runs in his 18th innings and his

Avg. increases by 2 runs find hi avg. in 17 and 18th innings.

Sol^n

18th inning 95

new average = 95 - 17x2

= 61,

old avg = 95 - 18x2

= 59

eg 10) A cricket players scores 2 runs less to comp. the scores in 22nd inning. and increase hi avg. by 2 runs find hi avg. after 2nd innings.

Sol^n 98 - 42 = 46

eg 11) The avg. of 11, cons. natural no. is 41, find the changes in avg. when next. num. no. is odd.

Sol^n 11 —— 41 + 0.5

41.5

Eg 12) Avg. age of 10 Persons is 24 yrs
age of 1 person is included avg.
is reduces by 11 yrs. find the
age of includes Person.

10 — 24 — 240]
11 — 27 — 297] 57

Eg 13) 6 friends went to a hotel for
taking mill, 5 of them spent rupees
32 each, one of person spent Rs 80
more than the avg. of all.
find the avg. expenditure and
total expenditure of the group

80/-

6/x

5 — 1

@ 32 each x+80

16

Avg = 48 — 80/5

Total = 48×6 = 288

Eg 14) 7 friends went to a hotel for taking
mill's 6 of them spent Rs 60 each
while 7th spent Rs 90 more
than the avg. of all 7, find avg.

exp. and total expenditure

sol

+

6 1

(Q71) There are 50 stu. in a hostel, 10 more joined the hostel as a result of each, total exp. is increased by 140 and avg. exp. is reduced by Rs 1.

find the initial exp.

sol^n own

50	total x	y
+10		
60	x + 140	y - 1

Teacher

✓ so, total exp = 50 × 20 = 1000 Ans

Cost

student's old = 50

student's new = 60

Increase in exp = 140

reduction in avg = 1

140 + 60 × 1

⇓

$$\text{old avg} = \frac{140 + 60 \times 1}{10} = \frac{200}{10} = 20$$

ex(16) → 3 year ago, the avg. age of 5 members in a family is 17 years after birth of baby, the avg. age of family remains the same. find the present age of baby?

sol?

3 years ago, 5 member's — 17

at present 5 mem — 20 — 100?

at present 6 mem 17 — 102 — 2 years

(Q17) 7 years ago, at the time of marriage, the avg. age of man and his wife is 25 year.
Now the avg. age of 3 men, wife and the son is 22

sol? 7 years ago, man and wife = 25

at present, " = 32 - 32x2

= 64

at present m/w/s — 22x3 = 66

2 year

Profit and loss

(*) S.P - selling price
C.P - cost price

Profit = S.P - C.P

loss = C.P - S.P

Profit % = $\frac{\text{Profit}}{\text{C.P}} \times 100$

↳ means cost का कितना %. है।

loss % = $\frac{\text{loss}}{\text{C.P}} \times 100$

Note: Profit % या loss % का base, Cost Price है।

Eg. S.P = 12000
C.P = 10000
Profit = 2000
Profit % = $\frac{2000}{10000} \times 100$
= 20%.

या

Profit = 2000
Profit % = 20% = 0.20 of cost

20% of cost = 2000

cost = $\frac{2000}{20} \times 100$

= 10000

formula 2:-

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

or

$$C.P \times \frac{(100 - loss\%)}{100}$$

Note: इसमें selling के case में Profit आएगा।।

Q:-

$$C.P = 5000$$

$$Profit = 20\%$$

$$S.P = ? = 5000 \times \frac{100+20}{100}$$

$$= 5000 \times \frac{120}{100}$$

$$= 6000$$

formula 3:-

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

$$= S.P \times \frac{100}{(100 - loss\%)}$$

Q.1> By selling an article for Rs 9,500 a person suffers 5% loss, at what price he should sell so that his gain is 15%.

Sol^n

S.P = 9500
loss % = 5%
C.P = ?
gain = 15%

$$C.P = \$9500 \times \frac{100}{100 - 5}$$

$$= 9500 \times \frac{100}{95}$$

$$= 10,000$$

So,

$$\text{New } S.P = C.P \times \frac{100 + \text{Profit \%}}{100}$$

$$= 10000 \times \frac{100 + 15}{100}$$

$$= 11500$$

Trick 1
Direct method

$$\text{New } S.P = 9500 \times \frac{100 + 15}{100 - 5}$$

<Q.2> The S.P of 16 articles is equal to Cost Price of 20 article, find gain %

Sol/ own S.P of 16 a = C.P of 20

gain % = $\frac{\text{Profit}}{C.P} \times 100$ | $\underline{4}$

$= \frac{4}{20} \times 100$

$= 20$

Teache

Gain % $= \frac{4}{16} \times 100 = 25\%$

↑ यहाँ पर Unit मान लिये हैं S.P को base मानते

logit :-

let cost of one article = Rs 1

" " 16 " = 16

S.P " 16 " = 20

4

(Q3) The cost Pr of 20 article are equal to S.P of 24 article, find loss %.

Sol own loss % = ~~$\frac{4}{20} \times 100 = 20\%$~~

→ ✓ = $\frac{4}{24} \times 100 = 16.6$

Tooth

↳

loss % = $\frac{4}{24} \times 100 = 16\frac{2}{3}\%$

↳ Article वाले cost price को C.P का base मानता है।

logic

let cost of one article = Re 1

" " 24 " = Rs 24

Sell " 24 = 20

(Q4) By selling 11 article, a person gain S.P of 11 article find gain %.

Sol" gain S.P of 33 = S.P of 11

$$\text{gain} = \frac{22}{33} \times 100$$

Teacher

$$\text{gain \%} = \frac{11}{33-11} \times 100 = 50\%$$

(Q5) By selling 33 article, a man loose SP of 11 article, find loss %?

$$\text{loss \%} = \frac{11}{31+11} = 25\%$$

05) By selling 40 articles a man gains C.P of 4 article. find gain %.

Sol: Gain of $\underline{40}$ a = C.P of $\underline{4}$ a

$$\text{Gain \%} = \frac{4}{40} \times 100 = 10\%$$

Teacher

$$\text{gain} = \frac{4}{40} \times 100 = 10\%$$

06) By selling 40 articles, a man loses Cost Price of 4 article, find loss %.

Sol:

$$\text{loss \%} = \frac{4}{40} \times 100 = 10\%$$

(07) A person buys 12 mangoes @ Rs 15 and sells 10 mangoes at the rate of Rs 15, find the Profit %

get the rate of

Sol:- 12 m = 15

1 = $\left(\frac{15}{12}\right)$ x 10 = $\frac{15 \times 12}{12}$

= $\frac{150}{12}$ = 12.5 %

10 m = 15

1 = $\left(\frac{15}{10}\right)$ x 10 = $\frac{15 \times 10}{10}$

Profit :- $\frac{25}{12.5}$ x 100

= 2 %

Teachi:

Buy 12 → 15 = 150

sell 10 → 14 = 168

gain = 18

gain % = $\frac{18}{150}$ x 100

= 12 %

(Ad) A person buy's mango @ 15 more for 12, and sell's 12 mango for 15, find the Profit or loss.

Buy 15 → 12 = 144

sell 12 → 15 = 225

gain = 81

$$\text{gain} = \frac{81}{144} \times 100 = 56.25$$

Q9) A shopkeeper sell an article at CP but he uses the rate of 800 gm instead of 1 kg. find the gain %.

Sol)

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

$$= \frac{200}{800} \times 100$$

$$= 25\%$$

Q10) A shopkeeper sell an article at profit of 10% and he also uses a weight of 800 gm instead of 1 kg. find the profit %.

Sol) profit % = 10%.

weight % = 20%.

$$\frac{200}{1000} \times 100 = 20\%.$$

↳ पूरी gain 1000 पे है

Q9) A sh
5% lo
24%

Sol)

Gain =

Q11) A

Sol)

Gain = $\frac{10+20}{80} \times 100 = 37.5\%$

(Eg 10) A shopkeeper sold the books at 5% loss, but he uses lesser weight 24%. find the gain %.

Sol^n

gain = $\frac{-5+24}{76} \times 100$

$\rightarrow 25\%$

(Eg 11) A shopkeeper cheating 20% at the time of purchasing and 20% at the time of selling, what is the gain %.

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

$\left(20+20+\frac{20\times 20}{100}\right)\%$

$= 44\%$

(Eg 12) A shopkeeper buys some no of article for Rs 8400 he sells 3/5th of the article at profit of 15%, at what

% Profit he should sell the remaining article to have gain 20% on whole

Sol:

$\frac{3}{5}$ $\frac{2}{5}$

→ 15%

20 20 20 20 20

15 15 15

$\frac{40+15}{2} = \frac{55}{2} = 27.5\%$.

15% less

Sol:

(Q13) A shopkeeper buys some no of article for Rs 520, he sells $\frac{2}{7}$ of the article at profit of 14%, at what % profit he should sell the remaining to have gain 18% on the hole.

Sol:

$\frac{2}{7}$ $\frac{5}{7}$

14%

18 18 18 18 18 18

14 14

$\frac{18 \times 5 + 8}{5}$

$364 - 20 = 26 = 2\ 6$

(14) A shopkeeper sell an article at profit of 12% if he has sell at Rs 18 more, then his profit is 18%. find the Cost. Price of an article

Sol^n

P - 12% ↓
S' → n+1 P
P2 → 18%

C.P : 1

P 12% — 18
1 — $\frac{18}{12}$
1 — $\frac{3}{2}$
$\frac{1}{2}$ + 1 = $\frac{3}{2}$

Teach

Cost of = 18 { 12% Profit
18% Profit

Cost = $\frac{18}{6} \times 100 = 300$.

M-2

Cost = $\frac{\text{more Price} \times 100}{\text{more Profit}}$

(15) A shopkeeper sold an article at 10% loss if he has sold it for Rs 45 more then the profit is 15% find the cost

Sol^n

Ans) cost = $\frac{75}{25} \times 100$

= 300

Ans) 1 shopkeeper sold an article at loss of 10%. if he had bought it 20% less and sold it for Rs 55 more then he gain profit of 10%. find the cost.

Let

Sol) cost = 100, loss = 10

S.P = 90

cost = 80, (20% less)

profit = 10

S.P = 110

if diff is 22, then cost = 100

" " 1 " " = $\frac{100}{22}$

" " 55 " " = $\frac{100}{22} \times 55$

= 250

Ans) A person buys 2 articles for Rs 420, He has sold 1 article at 15% less and other at 20%, He found

than the
sum while selling of both the cost price is –

sol→

Let ₹480
CP / article cost

1st article cost = A
2nd " " = B

A + B = 480

A → SP → 85% of A

B → SP → 119% of B

$\frac{85 \times A}{100} = 119B$

$5A = 7B$

$\frac{A}{B} = \frac{7}{5}$

$A : B = 7 : 5$

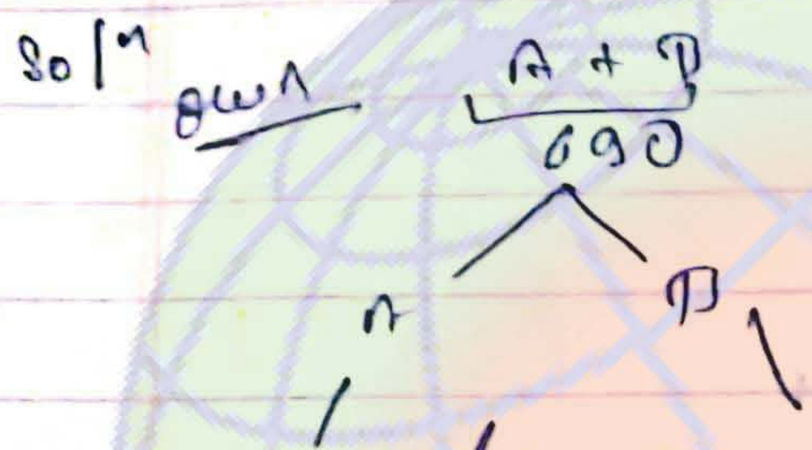
$A = 480 \times \frac{7}{12} = 280$

$B = 480 \times \frac{5}{12} = 200$

Teach

a) A person buys two article at ₹690, the 1st article is sold at 10% profit and 2nd " " " 20% gain if both article cost same price

Soln



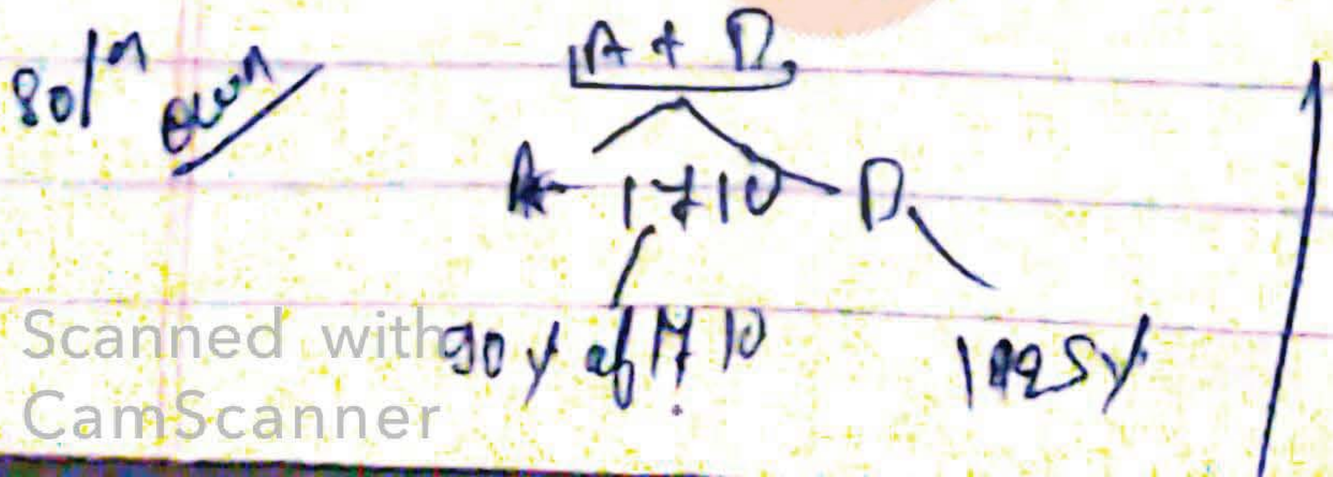
Teach

110 of A = 100 of B

A : B = 12 : 11

(Q17) A shopkeeper selling two article for ₹710, the C.P of 1st is equal to S.P of 2nd. The 1st article is sold at a loss of 10% and 2nd article at Profit of 25%. Find total gain or loss in Rs.

Soln



Teach

	I	II	Total
C.P	100	80	180
S.P	90	100	190
		25% Profit	Profit = 10

$$C.P = S.P \times \frac{100}{100 + Profit}$$

If S.P is 190 Profit = 10

" " " 1 " = $\frac{10}{190}$

" " " 1410 " = $\frac{10}{190} \times 1410$

= 90

(Q18) A shopkeeper two article for Rs 1850, The C.P of 1st article = S.P of 2nd article.

1st article is sold at 15% loss and 2nd article at 25% Profit what is total gain or loss in Rs.

	I	II	Total
C.P	100	80	180
S.P	85	100	$\frac{185}{5}$
			Profit

If s.p of 185 units = 5

" " 1 " $= \frac{5}{185}$

" " 1850 " $= \frac{5}{185} \times 1850$

$= 50$

Discount:-

		eg
List Price/ market Price	—	100
less discount	—	10
selling Price	—	90
less Profit	—	
cost	—	

eg:- M.P = 100

less discount @ 10% = 10

90

less discount @ 20% = $\frac{90 \times 20}{100}$

= 18

selling Pra = 72

formula:-

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

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

A shopkeeper marks his goods
find his Profit %.

<03>

Sol:

Q1. A shopkeeper marks his goods 20% more than the cost Price and earns a Profit of 8%. find his discount %.

Sol:

C.P	S.P	M.P
100	108	120

12

$$\text{discount \%} = \frac{\text{discount}}{\text{M.P}} \times 100$$

$$= \frac{120}{2} \times 100$$

$$= 10\%$$

Q2 Buy 6 articles get 2 free, find the discount %.

Sol:

6 − 2

$$\frac{2}{8} \times 100 = 25\%$$

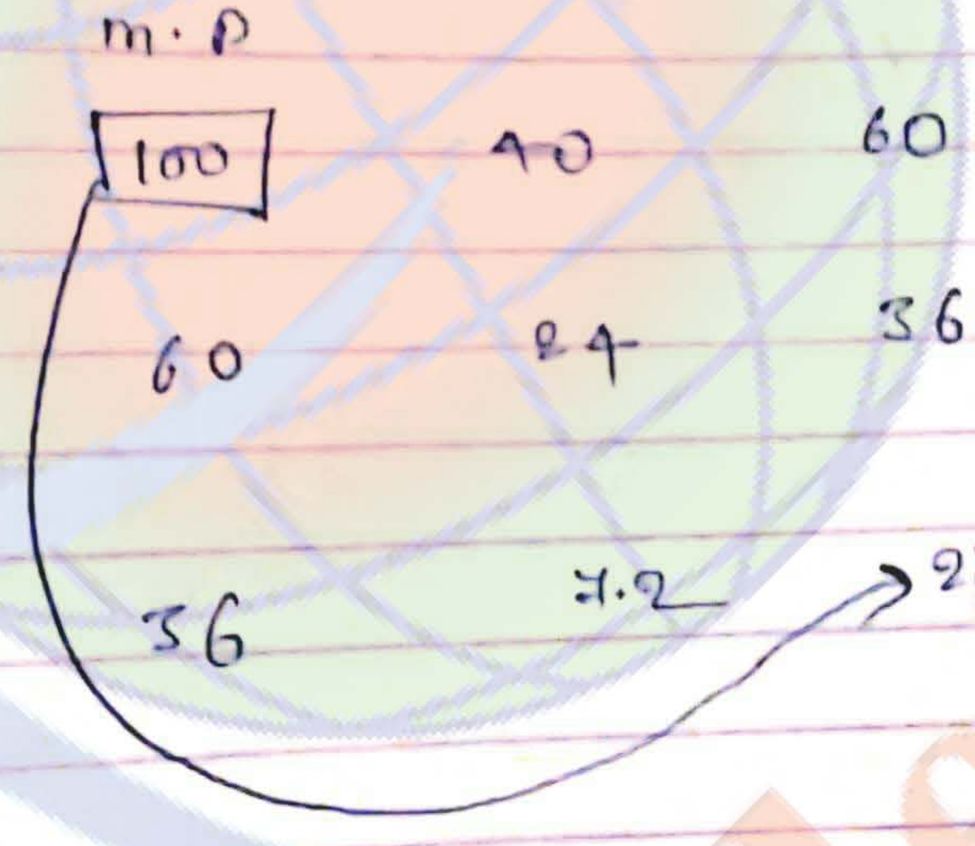
Q3> Find single discount rate of a discount series of 25% and 20%.

Sol^n

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

Q4> Find single discount rate for a discount series of 40%, 40%, 20%

Sol^n



discount = 100 − 28.80 = 71.20

18-4-15

Simple interest

P - Principal
R - rate
t - time
S.I - Simple interest
A = Amount
= P + S.I

Formula

$$S.I = \frac{P \times R \times T}{100}$$

$$R = \frac{S.I \times 100}{P \times T}$$

$$T = \frac{S.I \times 100}{P \times R}$$

$$P = \frac{S.I \times 100}{R \times T}$$

Ex →

P = 10000
R = 10%.
t = 3 year

→ RT %. of P

$$S.I = P \times \frac{(R \times T)}{100}$$

$$= 1000 \times \frac{10 \times 3}{100}$$

$$= 3000$$

Note: S.I is RT % of Principle.

a) A sum of Rs 800 becomes 920, at a certain rate in 3 years find the amount if the rate is increases By 3%.

Soln

P = 800
A = 920
r = ?
t = 3 year

A = ?
new rate = r+3%

SI = A - P
= 920 - 800 = 120

$r = \frac{SI \times 100}{P \times t}$

$= \frac{120 \times 100}{800 \times 3}$

= 5%

SI = 800 x 3/100 = 72

= 192

new amount = 800 + 192 = 992

Trick:

920
+ 72
992

800 x 9/100

↳ तीन साल में 9% है

(04) Ram took certain money at 5% rate of interest for 4 years, 7% " " " next 2 " , 8% " " " " for the 2 " . If he pays 15,000 S.I at the end of 8th year. find the Principle.

Soln Given

$x_1 = 5\%$, $x_2 = 7\%$, $x_3 = 8\%$

$t = 4$, $t = 2$, $t = 2$

Teacher

R	T	RT
5%	4y	20%
7%	2y	14%
8%	2y	16%
		50%

50% of Principle = 15000

$\therefore$ S.I in RT % of Principle.

$$\text{Principle} = \frac{15000}{50} \times 100 = 30000$$

(05) At what rate % per annum, a sum of money will become double in 20 years.

P 100 — A 200 — 100

$r = \frac{100}{2} = 5\%$

$t = \frac{100}{5}$

(Q4) At what rate % per annum a sum of money will become 4 fold

Sol^n

P 1w — A 4w — 3w

$r = \frac{300}{15} = 20\%$

(Q5) If a sum of money doubles in 7 years, in how many years it will become 4-fold

Sol^n 100 — 200 — 7 year

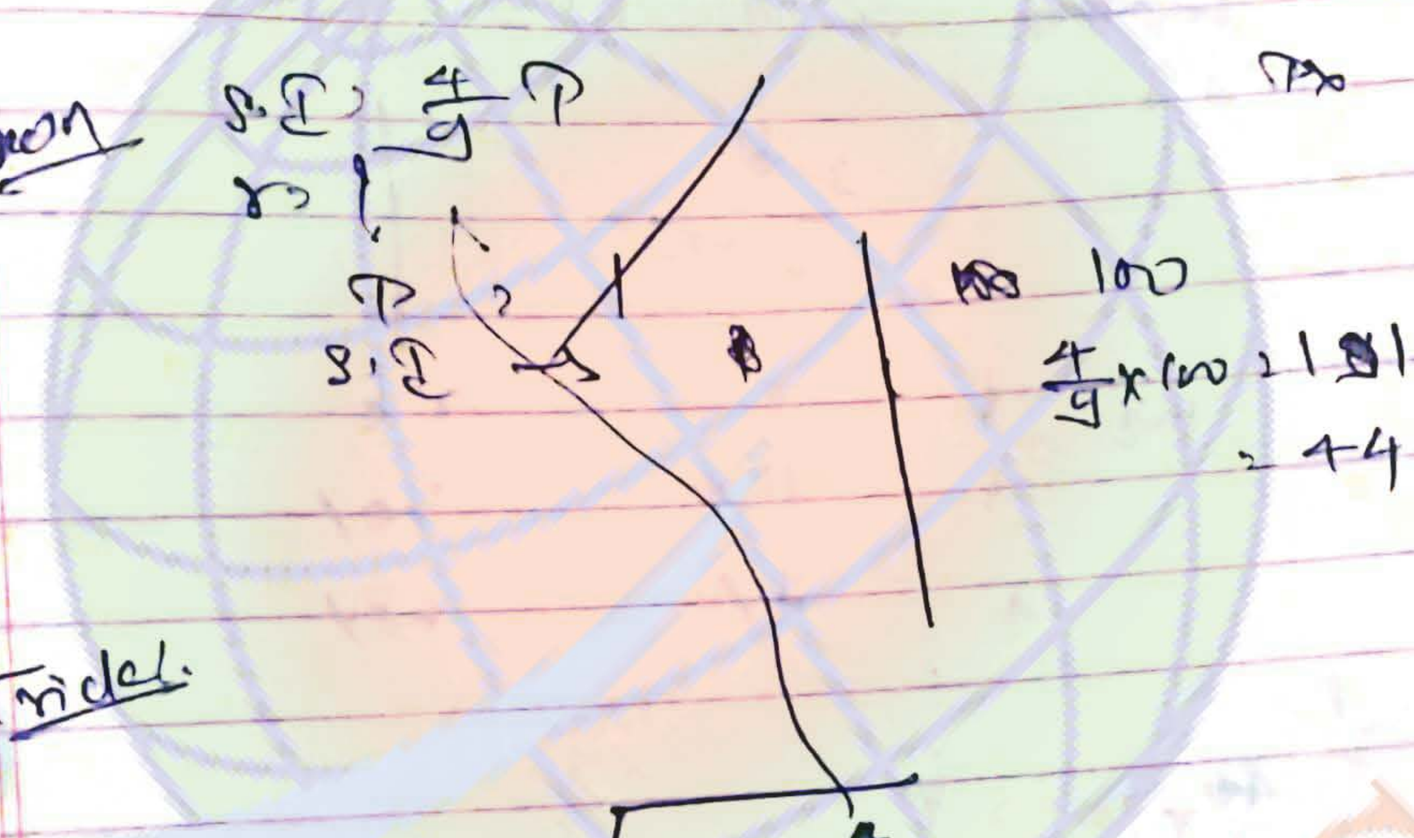
100 → 1

100 → $\frac{7}{21}$

100 → 400 — 300

100 – 100 – 200 – 4
100 – 300 – 4
100 – 400 – 4
2

(6) The S.I is $\frac{4}{9}$ of the principle, find rate % per annum and time if both are numerically equal.



Tridel.

$$r = t = \sqrt{100 \times \frac{4}{9}}$$

$$= \sqrt{\frac{400}{9}} = \frac{20}{3}$$

$$t = \frac{20}{3} \text{ year}$$

$$r = \frac{20}{3}\%$$

(or) The S.I on a certain sum for 3 years at 10%, is 40 less than the S.I on the same sum, find

4 years at 7% per annum, find the Principle.

Sol^n $t = 3$

Sol^n $r = 10\%$

P

$S.I = \frac{P \times R \times T}{100}$

$= \frac{P \times 10 \times 4}{100}$

$\frac{2000}{40} \times 100 = P$

4	10%	70%
3	7%	28%

Test

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

(08) A sum is loaned for 4 years at S.I for at a certain rate if the rate is increased by 5%, S.I increased by Rs 2000, find the Principle.

Sol^n

$$\text{Principle} = \frac{\text{more interest} \times 100}{\text{more rate} \times \text{time}}$$

$$= \frac{2000 \times 100}{5 \times 4} = 20,000$$

(Q9) What annual instalment will discharge a debt of Rs 1092 during 3 years at 12% S.I

Sol:- Debt = ___

r = 12% pa

t = 3 year

I - 3 years : 100 x 3 = 300

II - (2+1) x 12 = 36

336

Instalment = $1092 \times \frac{100}{336}$

= 325

Note

3 → 2+1 , 3+2+1 , 5 → 4+3+2+1

(Q10) A sum of Rs 1550 is lent out into 2 parts, one at 8% and other at 6%, if total interest at the end of the year is Rs 106, find the portion went out in diff parts.

Sol n

1550

8% 6%

1550×8/100 = 124 Ans

1550×6/100 = 93

1240 / 106 / 1346

1346 / 1076 / 0270

Teacher

1550

8% 6%

Interest = 106

Interest of 6% = 93

Extra interest = 13

extra rate = 2%

13/2 × 100 = 650

970 / 106 / 1076

25-1-15

Calender

~~25 August 1987~~

Leap year: 366 days | 52 week + 2 days

ordinary year: 365 days | 52 week + 1 days

Odd day

$\frac{1994}{4}$ =

$\frac{1600}{400}$ ⇒

(1) 100 year: 24 L.P + 76 O.Y ⇒ 5 odd day

(24×2) + (76×1)

48 + 76 = 124

7 | 124 | 17
7
54
49
5

(2) 200 year : $5 \times 2 = 10 \Rightarrow 3$ odd days.

$$7 \overline{)10} \ (1$$
$$\underline{7}$$
$$3$$

(3) 300 years : $5 \times 3 = 15 \Rightarrow 1$ odd day

$$7 \overline{)15} \ (2$$
$$\underline{14}$$
$$1$$

(4) 400 year : $5 \times 4 + 1 = \frac{21}{7} = 0$ odd day

↳ यही 400 वाँ साल leap year है।

Note :-

~~400~~, ~~800~~, 1600

Q.) 25 August 1983

1600 साल तक हमारा 0 odd day

300 साल " 1 odd day

82 year " " 4 4 odd days

6 odd days

11 days

$$4 \overline{)82} \ (20$$
$$\underline{8}$$
$$02$$

$\frac{82}{4} = 20.5$

↳ Jan 1 to 25 Aug = 31 + 28 + 31 + 30 + 25 days

10 ⇒ 3 odd days.

(1)

⇒ 1 odd day

400 वाँ साल leap year है।
0 odd day

d day
1st day
day
odd

820820

$7)\overline{257}(33$
21
 47
 21
  6

$7)\overline{11}(1$
 7
 4

0 – Sunday
1 → monday
2 – Tuesday
3 – wednesday
4 – thursday
5 – friday

Q2) 25 April 2015.

2000 → 0

14   14+7 = 7)17(2 → 3
14
3

4)14(
Jan 1 to April 25

31+28+31+25 = 115
7)115(16
7
45
42
3 → 3
6 odd day

4)14(3
12
2

3 L.Y + 11 odd

3×2 + 11×1

6+11 = 17

Q3) Prove that calendar for the year 2003 will serve for the year 2014.

Soln Hint → दोनों मे 0 odd day हो

2000 ——————— 2014

2003 2004 2005

1+2+1+1+1+2+1+1+1+2+1

7) 14 (2
14
0

eg 4) Jan 1, 2008 — tuesday

Jan 1, 2009 → thursday

eg 5) 1 April 2008 — Tuesday
1 April 2009 — wednesday } 29th feb नियम मुक्त है

eg 6) The last day of centuary can not be "tuesday"

अपवाद है

5 3 1 0 | 2 4 0 → नहीं आएगा

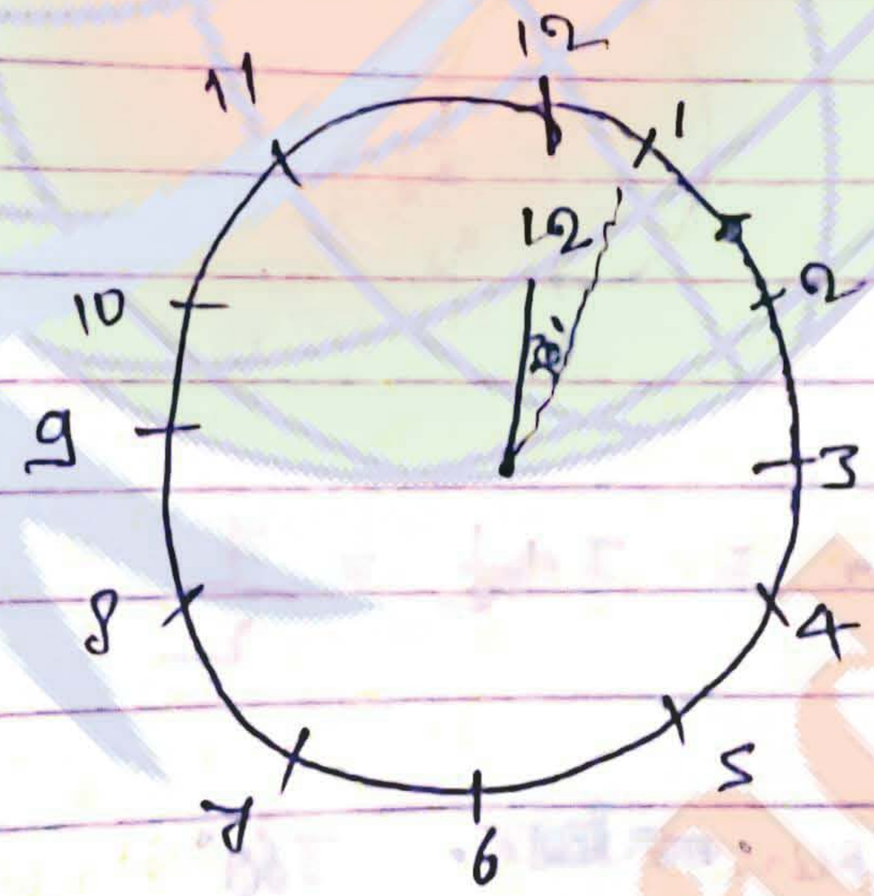
Clocks

The dia of the clock is a circle who circumfe is divided in 12 equal parts called hour space

~~each hours space.~~

Each hour space is further divide in 5 parts.

Thus the whole circle is divided in 60 min space.



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

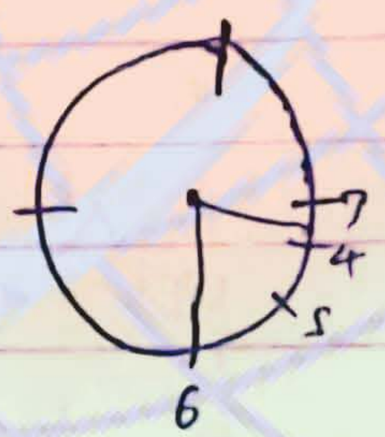
In every hour, both the hands co-incide once, but 11 times in 12 hour co-incide

In every hour both are app. direction once but 11 time in 12 hour.

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

Q Find the angle b/w the hour hand and min. hand in 3:30

80|^



Hour = $3 + \frac{1}{2} = \frac{7}{2}$

12 hours = 360°

1 hour = $\frac{360}{12} = 30°$

$\frac{7}{2}$ ho ⟶ $= 30 \times \frac{7}{2} = \boxed{105°}$

⟵ min hand 1 min = 6°

" 30 " = $6 \times 30° = \boxed{180}$

180 - 105 = 75

Q.)

or direction

dy

hour.

★ Rule of Co-incide

formula:- $\boxed{5x + \frac{12}{11}}$

↳ जहाँ Co-incide होंगे

At what time b/w 4 ans 5 o'clock are the hands of clock are together.

$= 5 \times 4 + \frac{12}{11}$

$= 20 + \frac{12}{11}$

$= \frac{240}{11} = \boxed{21\frac{9}{11}}$.

Q.) At what time b/w 4 & ans 5 o'clock are the hand's of the clock are at right angle.

Sol:

5 —— 6

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

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

$(5x4 - 15) \times \frac{12}{11}$

$(5x4 + 15) \frac{12}{11}$

$5\frac{5}{11}$

$38\frac{2}{11}$

Q) At what time b/w 3 to 4 o^ clock one of the hands of the clock are 2 min apart.

Sol^n

$(5x-2)\frac{12}{11}$ $(5x+2)\frac{12}{11}$