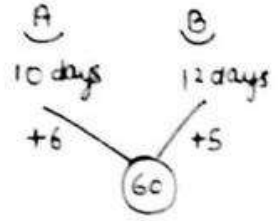
Class 1.

TIME & WORK

(1) A & B can complete a work in 10 and 12 days respectively. A and B start working together and after 3 days, A left the work, find in how many days work will be completed?



A+B
3 days
3×11 = 33

B
60 − 33 = 27/5
= 5 2/5 days

↳ work will be finished in = 3 + 5 2/5 = 8 2/5 days

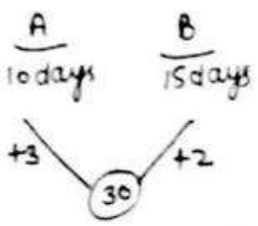
Q8

A B

↓

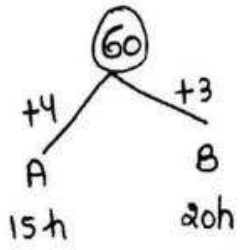
3×6
= 18 + 42/5 = 9 2/5 days

(2) A and B started working together but after some days A left the work and the whole work will complete in 9 days. find after how many days A left. if A & B complete the work in 10 & 15 days resp.



A + B
↓ ↓
12/5 9×2 = 18
4 days

(3) 2 men can build a wall in 15 and 20 hour resp. but if they work together they use 280 less bricks per hour and build a wall in 12 hours. find the no of bricks in the wall.



A+B = 7 unit
A+B = 5 unit
-2 unit —— 280
1 unit —— 140

Total bricks = 60×140
= 8400 Bricks Ans

$A+B = \frac{60}{12} = 5$ (Given)

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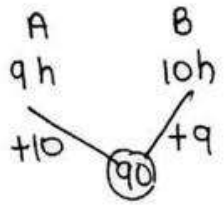
(4) 2 men can build a wall in 9 hrs and 10 hrs resp. But if they work together then they use 10 less bricks per hours and build a wall in 5 hrs. find the no. of bricks in the wall?



A+B = 19 unit
A+B = 18 unit
1 unit —— 10

Total bricks = 90×10 = 900 Ans

$A+B = \frac{90}{5} = 18$

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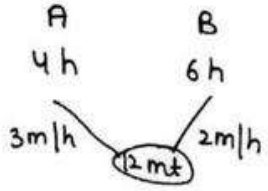
(5) Two candles of same height can burn completely in 4 hrs and 6 hrs resp. If both start burning at same time at their respective constant speed, then find after how much time ratio of their height become 2:3.



$\frac{12-3t}{12-2t} = \frac{2}{3}$

$36-9t = 24-4t$

$5t = 12$

$t = \frac{12}{5} = 2\frac{2}{5} = 2\text{ hr}, 24\text{ min}$

Ans

⑥ Three men A, B, C complete the work 10, 12, 15 days.

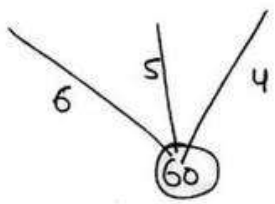
i) if A, B and C starts work together. After 2 days A left the work and next after 2 days C also left. Then find in how many days the whole work will complete.

ii) A, B, C starts work together, A and B left the work 2 days before the completion of the work, then the whole work will finish in how many days.

iii) if A left the work 2 days before the completion of the work and B left the work 3 days before the completion. work will finish in how many days?

i)

A	B	C
10	12	15

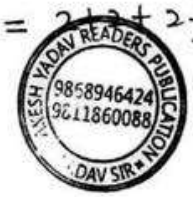


A+B+C — 2 days → 15×2 = 30

B+C — 2 days → 9×2 = 18

B → $\frac{12}{5} = 2\frac{2}{5}$ days

work will finish in = $2+2+2\frac{2}{5} = 6\frac{2}{5}$ days



OR

60
−12 (A's 2 days)
−16 (C's 4 days)

$\frac{32}{5} = 6\frac{2}{5}$ days (Becoz B works for all time.)

Ans.

ii) A+B+C — 2 days → 4×2 = 8

60 − 8 = 52

$\frac{52}{15} = 3\frac{7}{15}$

work will finish in = $3\frac{7}{15} + 2 = 5\frac{7}{15}$ days

OR

60
+22 (A&B's 2 days work)

$\frac{82}{15} = 5\frac{7}{15}$ days

Ans

iii) 60
+12 (A's 2 more days work)
+15 (B's 3 more days work)
$\frac{87}{15} = \frac{29}{5} = 5\frac{4}{5}$ days

(iv) A, B, C starts work together but A left the work after two days. and B left the work 1 day before the completion of the work. In how much time the whole work will be completed?

60
−12 (A's 2 days work)
48 B+C
+5 (B's 1 day work)
$\frac{53}{9} = 5\frac{8}{9}$ days

A+B+C	B+C	C
2d		1d
↓		↓
30	$\frac{26}{9}$	4
	$= 2\frac{8}{9}$	

$2 + 2\frac{8}{9} + 1 = 5\frac{8}{9}$ days.

(v) A, B and C starts work together but after 3 days A left the work, and C left the work 4 day before the completion of work. In how much time the whole work be completed?

✗

A+B+C	B+C	B
3d		4d
↓		↓
45		36

This method fails. & conceptually wrong Becoz we can't justify that C work for 3 days.

✓

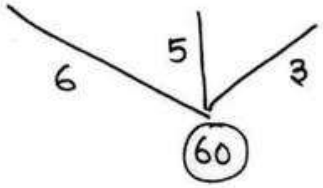
60
−18
42
+16
$\frac{58}{9} = 6\frac{4}{9}$ days.

(7) A+B, B+C, C+A can complete a work in 10, 12, 20 days respectively. In how much they alone do the work.

A+B	B+C	C+A
10	12	20

$2(A+B+C) = 14$ हमेशा Add करके Half कर दो।

$A+B+C = 7$



$A = 2$ $B = 4$ $C = 1$

$A = \frac{60}{2} = 30$ days

$B = \frac{60}{4} = 15$ days

$C = \frac{60}{1} = 60$ days Ans.

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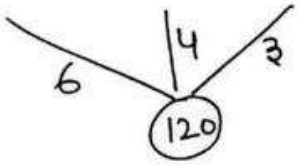
(8) A+B, B+C, C+A can do a work in 20d, 30d and 40 days respectively. In how much time they alone do the work.

A+B	B+C	C+A
20	30	40



$\underbrace{A+B+C}_{c} = \frac{13}{2} = 6\frac{1}{2}$

$C = \frac{1}{2} \Rightarrow \frac{120}{1/2} = 240$ days

$A = \frac{5}{2} \Rightarrow \frac{120}{5/2} = 48$ days

$B = \frac{7}{2} \Rightarrow \frac{120}{7/2} = 34\frac{2}{7}$ days

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(9) A+B, B+C do a work in 12 and 16 days. if A work for 5 days and B work for 7 days and C complete the remaining work in 13 days. Then find C would complete the work in how many days?

A+B = 12d, B+C = 16d

4 : 3 → 48

A = 5d, B = 7d, C = 13d

A+B = 5d → 20, B+C = 2d → 6, C = 11d

$48 - 26 = \frac{22}{11} = 2$ → efficiency of C

C would complete the work $= \frac{48}{2} = 24$ day **Ans.**

B alone $= \frac{B+C}{2} = \frac{48}{1} = 48$ day

(1) → B's efficiency

A alone $= \frac{A+B}{3} = \frac{48}{3}$ days.

(3) → A's efficiency.

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(10) A+B can do a work in 12 days while B+C in $6\frac{2}{3}$ day ~~so~~ work is completed by A, B, C by working 3, 4 and 7 days. find in how many days A alone would complete the whole work.

A+B = 12d, B+C = $\frac{20}{3}$d

5 : 9 → 60

A = 3d, B = 4d, C = 7d

A+B = 3d → 5×3 = 15, B+C = 1d → 9×1 = 9, C = 6d

C = 6

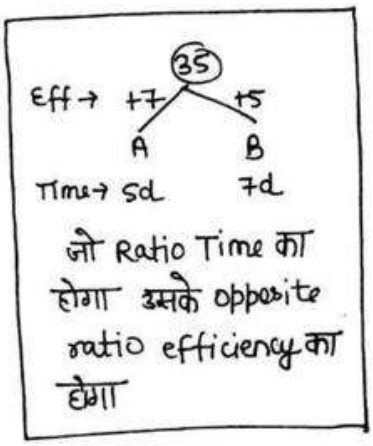
$60 - 24 = \frac{36}{6} = 6$ → Efficiency of C

B+C = 9 ∴ B = 3

A+B = 5 ∴ A = 2

A alone do the work $= \frac{60}{2} = 30$ days. **Ans.**

(11) 3 men A, B, C complete a work in such a way that A works for all the day, B works for 1st & 2nd day and C works for 3rd, 4th and 5th day. if B+C can do as much work in 2 days as A alone does in 3 days in how many days. A, B and C alone do the work if B+C can complete the whole work without the help of A in 6 days.



A (5d) B (2d) C (3d)

$(B+C) \times 2 = A \times 3$

$\frac{A}{B+C} = \frac{2}{3}$ (Efficiency का Ratio)

→ B+C complete the work in 6 days and efficiency of B+C is 3

Hence, Total work = $6 \times 3 = 18$

A (5d) B (2d) C (3d)

A (5d) → $5 \times 2 = 10$ B+C (2d) → $2 \times 3 = 6$ C (1d) → $18 - 16 = \frac{2}{1} = 2$ → Efficiency of C

C = 2

B+C = 3 ∴ B = 1, A = 2.

A alone = $\frac{18}{2} = 9$ days

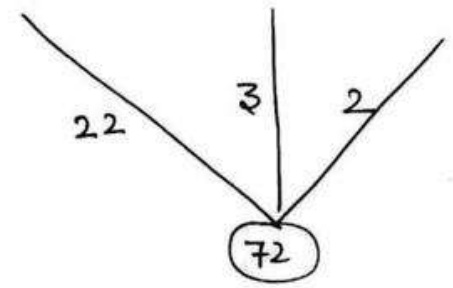
B alone = $\frac{18}{1} = 18$ days

C alone = $\frac{18}{2} = 9$ days Ans

(12) A man has 3 sons. 1st one and 2nd one can complete a work in 24 days and 36 days respectively. In how many days the 3rd son will complete the work, if the man could alone complete the whole work in $3\frac{3}{11}$ days. The man can do double the work in same time. In what time all his sons together can complete the work.

M A B

$\frac{36}{11}$ d 24 d 36 days



M (A+B+C)

T→ 1 : 2

Eff→ 2 : 1

↓ ↓

22 11

1→ 11

$A + B + C = 11$

↓ ↓

3 2

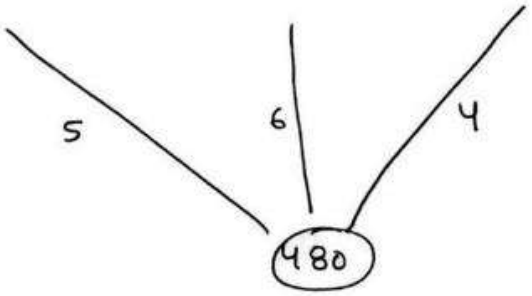
$\boxed{C = 6}$

C complete the work

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

(13) 1m+3w+4c does a work in 96 hours while 2m+8c can complete the same work in 80 Hrs. and 2m+3w can complete the same work in 120 Hrs.. find in how much time will 10 men + 5 women complete the work.

$$\underbrace{1m+4c+3w}_{96\text{ Hr}} \qquad \underbrace{2m+8c}_{80\text{ Hr}} \qquad \underbrace{2m+3w}_{120\text{ Hr}}$$



$2m+8c = 6$

$\therefore 1m+4c = 3$

$1m+4c+3w = 5$ (3)

$3w = 2$

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

$2m+3w = 4$ (2)

$2m = 2$

$m = 1$

$10m + 5w$

$10 + 5\times\frac{2}{3} = \frac{40}{3}$

10m+5w complete the work $= \frac{480}{40/3} = \frac{12}{\cancel{480}\times 3}{\cancel{40}} = 36$ Hrs.

(14) A, B, C can complete a work in 30 days by working together. A+C are twice efficient than B and A+B are thrice efficient than C. find in how many days A alone complete the work.

$\frac{A+C}{B} = \frac{2}{1} \Rightarrow \frac{8}{4}$

$\frac{A+B}{C} = \frac{3}{1} \Rightarrow \frac{9}{3}$

दोनो जगह A, B, C है, so दोनो जगह (A+B+C) की efficiency same होनी चाहिए.

B	C	A
4	3	5

Total work = $12 \times 30 = 360$ units

A alone = $\frac{360}{5} = 72$ days. Ans

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(15) A+B can complete a work in half the time of C, while B+C can complete the same work in 1/3rd time than A. If they together complete the work in 20 days. m how many days they alone do the work.

	Time	Eff.	
$\frac{A+B}{C}$	$= \frac{1}{2}$	$= \frac{2}{1}$	$= \frac{8}{4}$
$\frac{B+C}{A}$	$= \frac{1}{3}$	$= \frac{3}{1}$	$= \frac{9}{3}$

C	:	B	:	A
4		5		3

Total work = 12×20
= 240 unit

A alone = $\frac{240}{3} = 80$ days

B alone = $\frac{240}{5} = 48$ days.

C alone = $\frac{240}{4} = 60$ days

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(16) A+B can complete a work in 40% lesser time than C while B+C can complete the same work in 60% lesser time than A, if they together can complete the whole work in 20 days, then in how many days will they alone complete the same work.

$$\frac{A+B}{C} = \frac{\text{Time}}{60:3} = \frac{\text{Eff.}}{5} = \frac{5}{3} = \frac{35}{21}$$

$$\frac{B+C}{A} = \frac{40:2}{100:5} = \frac{5}{2} = \frac{40}{16}$$

A	:	B	:	C
16		19		21

Total work = $56 \times 20 = 1120$ unit

A alone = $\frac{1120}{16} = 70$ days Ans

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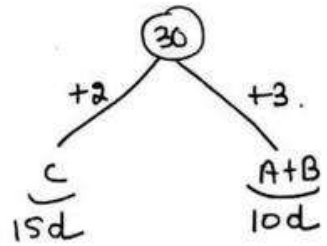
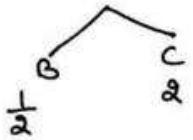
(17) A takes as much time as B+C take to finish a job, A+B finish the job in 10 days, C can alone do the same job in 15 days. In how many days B alone can do the work.

	A	:	B+C
Time -	1	:	1
Eff -	1	:	1
	↓		↓
	$2\frac{1}{2}$		$2\frac{1}{2}$



Eff. (A+B+C) = 5



B alone = $\frac{30}{1/2} = 60$ days Ans

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(18) A complete half as much work as B in equal time. C complete half as much work as A & B together in equal time. If C alone can complete the work in 40 days. Then in how many days they all together complete the work.

	A	:	B		C
Time	1	:	2		
Eff.	1	:	2	:	$\frac{3}{2}$
	2	:	4	:	3

Total work = 3×40 = 120

All together = $\frac{120}{9}$ days.

(19) In a factory there are 3 shifts of work for a day. During the 3 shift the avg. working efficiency of workers is 80%, 70% and 50% respectively. A work is complete in 60 days by the group working in the 1st shift. If the work is done in all the shift then how many days less are required to complete the work.

	I		II		III
E→	~~80~~	:	~~70~~	:	~~50~~
	8	:	7	:	5

Total work = 8 × 60 = 480

if work in all shifts work will complete in $\frac{480}{20}$ = 24 day.

less days = 60 − 24 = 36 days Ans

(20) Two workers A & B working together can complete a job in 5 days. If A work twice as efficiently as he actually did and B work $\frac{1}{3}$ efficiently as he actually did, then the work would have been completed in 3 days. A alone can complete the work in how many days.

$(A+B)\times 5 = \left(2A + \frac{B}{3}\right)\times 3$

$5A + 5B = 6A + B$

$A = 4B$

$\frac{A}{B} = \frac{4}{1}$

Eff. (A+B) = 5 & they complete the work in 5 days

∴ Total work = 5×5 = 25 unit

A alone = $\frac{25}{4} = 6\frac{1}{4}$ days.

(21) A+B can complete a work in 8 days but if A & B work twice & $\frac{1}{3}$ of their respective efficiency, then the work is completed in 6 days. In how many days A alone can complete the work ?

$(A+B) \times 8 = \left(2A + \frac{B}{3}\right) \times 6$

$8A + 8B = 12A + 2B$

$4A = 6B$

$\frac{A}{B} = \frac{6}{4} = \frac{3}{2}$

Total work $= (3+2) \times 8 = 40$ unit

A alone $= \frac{40}{3}$ days.

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(22) A started a work and left working 4 days. B finished the remaining work in next 18 days. Had A left the work after working for 6 days then B would have finished the remaining work in next 12 days. Then find in how many days A & B alone can complete the work.

	A	B	
	4 day	18 day	
+2			−6
	6 day	12 day	

$A \times 2^{1} = B \times 6^{3}$

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

Total work $=$ A: $4 \times 3 = 12$ + B: $18 \times 1 = 18$

$= 30$

A alone $= \frac{30}{3} = 10$ days

B alone $= \frac{30}{1} = 30$ days

(23) P, Q, R are 3 typists working simultaneously can type 216 pages in 4 Hrs. In one Hr R can type as many pages more than Q as Q can type more than P. R can type as many pages in 5 Hrs as P in 7 Hrs. How many pages does much of them type per hour.

$R \times 5 = P \times 7$

$\frac{R}{P} = \frac{7}{5}$

P	Q	R
$5x$	$6x$	$7x$
	1	1

$\frac{5+7}{2} = 6$

$18x \times 4 = 216$

$x = 3$

$P = 5 \times 3 = 15$ page | hour

$Q = 6 \times 3 = 18$ page | hour

$R = 7 \times 3 = 21$ page | hour.

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(24) Three typist working together 8 Hrs per day can type 900 pages in 20 days. The no. of pages typed by A in 4 Hrs equal to the no. of pages typed by C in 1 Hr. How many page typed by C in 1 Hr if in a day B types as many pages more than A as C types as many pages more than B.

$A \times 4 = C \times 1$

$\frac{A}{C} = \frac{1}{4}$

A	B	C
$1x$	$2.5x$	$4x$
	1.5	1.5

$\frac{1+4}{2} = 2.5$

$\frac{\cancel{5}}{\cancel{7.5}} x \times \frac{4}{\cancel{8} \times \cancel{20}} = \frac{\cancel{45}\,3}{90}$

$x = \frac{3}{4}$

$C = 4 \times \frac{3}{4} = 3$ Page | Hr. Ans.

(25) A+B can complete a work in 30 days. They start work together and after 23 days B left the work and whole work complete in 33 days. Find the time in w/c A alone can complete the work.

A + B → 30 day

↓ ↓

33 day 23 day

$A \times 3 = B \times 7$

$\frac{A}{B} = \frac{7}{3}$

Total work = $(7+3) \times 30 = 300$ unit

A alone = $\frac{300}{7}$ days

B alone = $\frac{300}{3} = 100$ days.

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(26) A+B can complete a work in 24 days. In how many days A alone does the 2/3 of the total work if they start working together after 20 days A left the work, work is completed in 26 days.

A + B → 24 day

↓ ↓

20 day 26 day

$A \times 4^{2} = B \times 2^{1}$

$\frac{A}{B} = \frac{1}{2}$

Total work = $(1+2) \times 24 = 72$ unit

$\frac{2}{3}$ of total work = $72 \times \frac{2}{3} = 48$ unit

$\frac{2}{3}$ of work completed by A alone = $\frac{48}{1} = 48$ days

Ans

(27) A & B can complete a work in 12 days. A alone works for 8 days & B completes the remaining work in 20 days. by doing alone. In how much time B alone does the complete work.

A + B → 12 days

↓ 8d ↓ 20d

$A \times 4 = B \times 8$

$\frac{A}{B} = \frac{2}{1}$

Total work = $3 \times 12 = 36$ unit

A alone = $\frac{36}{2} = 18$ days

B alone = $\frac{36}{1} = 36$ days.

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(28) P & R complete a work in 10 days doing together. if P works for 2.5 days and R for 8.5 days, they finish half work. In How much time P alone complete the work.

P + R → 10 days

↓ 2.5d ↓ 8.5d

$P \times 2.5 = R \times 3.5$

$\frac{P}{R} = \frac{7}{5}$

(they complete half work in 5 days)

Total work = $(7+5) \times 10 = 120$ unit

P alone = $\frac{120}{7}$ days.

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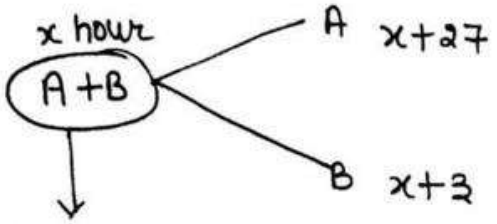
(29) A alone would take 27 Hrs more to complete a work than A & B work together. B takes 3 Hrs more to complete a work alone than A&B work together. In how many days A alone can do it.



$\sqrt{27 \times 3} = 9$

$x = 9$ Hr

A alone = $9 + 27 = 36$ Hrs

B alone = $9 + 3 = 12$ Hrs.

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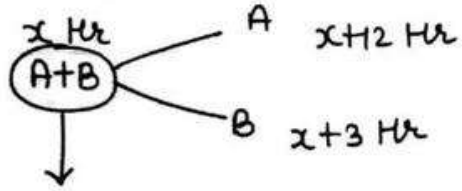
(30) A and B alone complete a work in 12 days and 3 days more days respectively than A+B, then find in how many days A alone does the work.



$\sqrt{12 \times 3} = 6$

$x = 6$ Hrs

A alone = $6 + 12 = 18$ Hrs

B alone = $6 + 3 = 9$ Hrs.

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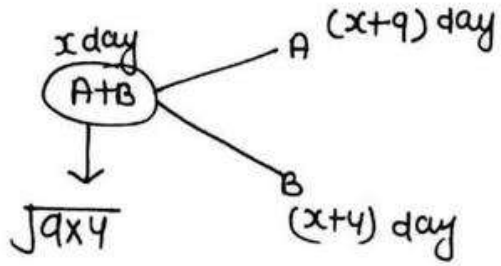
(31) A can complete a work in 5 more days than B while A does the same work in 9 more days than C. If A+B can complete the whole work in same time in w/c C alone does the whole work. In how many days A alone could complete the same work.

A (x+9) B (x+4) C x day

A 95 → x+9. B 90 → x+4 C 86 → x

A+B = C

x day x day



$\sqrt{9 \times 4}$

$= 6$

$x = 6$ day

A = 6+9 = 15 day

B = 6+4 = 10 day

C = 6 day.

---

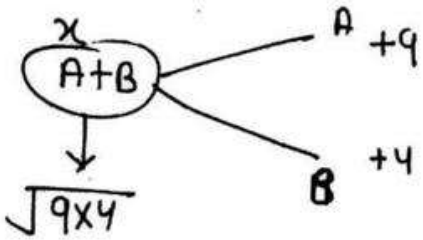
(32) A swimming pool is fitted with 3 pipes, the 1st two pipes working simultaneously fill the pool in the same time as the 3rd pipe alone, the 2nd pipe alone fills the pool 5 hrs faster than the 1st pipe & 4 Hrs slower than 3rd pipe. In what time 2nd & 3rd pipe together fill the pool.

A	B	C
x+9	x+4	x

A	B	C
100	95	91
↓	↓	↓
x+9	x+4	x

A+B = C

x x



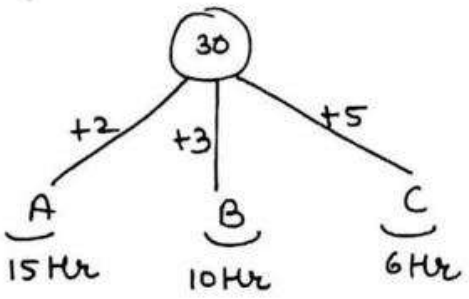
$\sqrt{9 \times 4}$

A = 15 Hrs

B = 6+4 = 10 Hrs

C = 6 Hrs.

Ans



$B+C = \frac{30}{8}$ Hrs.

Class 3.

(33) 3 men A, B and C working together can do a job 6 Hrs less time than A alone did, 1 Hr less time than B alone and half the time needed by C. In how many days will A finish the work alone?

A+B+C	A	B	C
x hr	x+6	x+1	2x

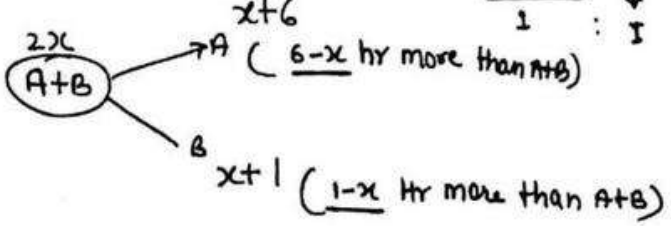
	A+B+C		C
T	1	:	2
Eff.	2	:	1

$C = 1$

$\underbrace{A+B}_{1} + C = 2$

$A+B : C$

$1 : 1$



$\Rightarrow x+6-2x$

$6-x$

$\Rightarrow x+1-2x$

$1-x$

$A+B = \sqrt{(6-x)(1-x)} = 2x$

$(6-x)(1-x) = 4x^2$

$4x^2 = 6 - 7x + x^2$

$3x^2 + 7x - 6 = 0$

$+9 \quad -2$

$3x^2 + 9x - 2x - 6 = 0$

$3x(x+3) - 2(x+3) = 0$

$(3x-2)(x+3) = 0$

$3x = 2$ | $x = -3$

$x = \frac{2}{3}$ | $\times$

A will finish the work $= \frac{2}{3} + 6 = \frac{20}{3}$ days. Ans.

(OR)

A	B	C
$x+6$	$x+1$	$2x$

$2x(x+1)$ $\quad$ $2x(x+6)$

$2x(x+1)(x+6)$

$$\frac{2x(x+6)(x+1)}{2x^2+2x+2x^2+12x} = \frac{2x}{1}$$

$x^2 + x + 6x + 6 = 4x^2 + 14x$

$x^2 + 7x + 6 = 4x^2 + 14x$

$3x^2 + 7x - 6 = 0$ (same eqn as above)

---

(34) 3m and 4w can complete a work in 16 days while 4m and 3w can complete the same work in 12 days. Then find 7m & 7w can complete the same work in how many days.

$(3m+4w)\times 16 = (4m+3w)\times 12$

$48m + 64w = 48m + 36w$

$28w = 0$

$w = 0$

$(3m+0)\times 16 = (4m+0)\times 12$

T.W $= 16\times 3 = 48$

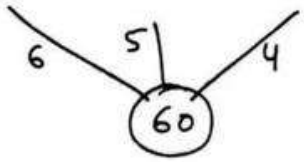
$7m+7w = 7+0 = 7$

Hence $7m+7w = \frac{48}{7}$ days.

---

(35) A, B, & C can complete a work in 10, 12 and 15 days respectively. if they start work together till the whole work complete, find the share of wages of A, B & C out of the total wages of Rs 750.

A	B	C
10	12	15



$\frac{60}{15} = 4d$

$15 \rightarrow 750$

$1 \text{ unit} \rightarrow 50$

wages are distributed in the ratio of the work

A	B	C
$6\times 4d$:	$5\times 4d$:	$4\times 4d$
6 :	5 :	4

$A = 6\times 50 = 300$ Rs

$B = 5\times 50 = 250$ Rs

$C = 4\times 50 = 200$ Rs.

अगर सारे मिलकर खत्म होने तक काम करते रहे तो उनके काम का ratio और efficiency का ratio same होता है।

---

(36) B+C can complete a work in 50% more time than A+B+C. If they work together on a job till the whole work completes then B earns 120 out of total earning of Rs 450. Then find in how many days they together complete the whole work while A+B takes $\frac{8}{3}$ more no. of days to complete the work than A+B+C.

$$\frac{B}{A+B+C} \xrightarrow{E} \frac{4}{15}$$

$$\frac{B}{A+B+C} = \frac{\cancel{120}\,4}{\cancel{450}\,15}$$

$$\frac{B+C}{A+B+C} = \frac{2\times5}{3\times5} = \frac{10}{15}$$

	B+C	A+B+C
T	~~150~~ 3	~~100~~ 2
E	2	3

	A		B		C
E→	5	:	4	:	6

	A+B		A+B+C
E	~~4~~ 3	:	~~15~~ 5

Time→ $5x$: $3x$

$2x = \frac{8}{3}$

$x = \frac{4}{3}$

$A+B+C = 3x \text{ days} = 3\times\frac{4}{3} = 4 \text{ days}$ Ans

---

(37). A & B complete a work in 12 and 15 days. They started the work alternatively for 1 day each & A started the work first. In how much time 60% of work will be completed.

A	B
12	15
5	4

(60)

60% of work $= \frac{60\times60}{100} = 36$

1 cycle (2 days) $= 5+4 = 9$

$\times4$ ↓ $\times4$

8 days 36

Ans

(38) 3 men A, B, C can make 12,000 pens in 2 Hrs, 4 Hrs 3 Hrs respectively, if they work half hr every time, but they do not work together and A starts the work first. find in how much time they can make 18500 pens.

A	B	C
2 h	4 h	3 h

6000 3000 4000

12000

½ A	½ B	½ C
3000	1500	2000

1 cycle ($\frac{3}{2}$ Hrs) → 6500 pens

1×2 1×2

3 Hrs → 13000

$\frac{1}{2}$ Hr → 3000

$\frac{1}{2}$ Hr → 1500

15 min → 1000

4 Hr 15 min Ans 18500

(39) A & B complete a work in 24 & 30 days respectively, working 10 hrs per day the work is to be done in 2 shifts. morning shift is for 6 hrs and evening is for 4 hrs. On the 1st day A works in morning and B works in evening & they interchange their shifts everyday, find in how much time and on w/c day the work will be completed.

A	B
24 d	30 d

5 4

120

	1st 6 Hrs	IInd 4 Hrs
1st day	A (6)	B (4)
2nd day	B (6)	A (4)

1 cycle (2 day) → 9 (5+4)

1 cycle (2d) ——— 9
|×13 |×13
26 d ——— 117
A- 6 Hr ——— 3
120
26 d 6 Hr Ans

$A = \frac{5}{10} \times 63$
$= 3$

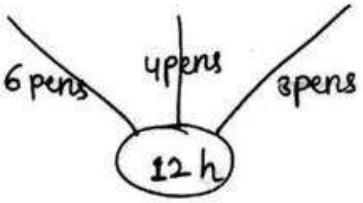
(A = 5 in — 10 Hrs
in 1 Hr — $\frac{5}{10} = \frac{1}{2}$
in 6 Hr — $\frac{1}{2} \times 6 = 3$)

work will finish on 27th day.

---

(40) A, B, C have to supply an order of 100 pens. A, B, C make a pen in 2, 3, 4 Hrs respectively. In how many days they will complete the work if each one make a complete pen himself without the help of others.

A B C
2h 3h 4h



A B C
2h 3h 4h

12 h ⟶ 13 pens
|×7 |×7
84 Hrs ⟶ 91 pens
9 hrs ⟶ 9 pen
93 Hrs Ans 100 pen

8 h → 4 pen 2 pen 2 pen (8 pen) ×
9 h → 4 pen 3 pen 2 pen (9 pen) ✓

---

(41) A, B, C finished a work in 10 days. Initially they started work together but C works only for 3 day, & in these 3 days 37% of the work had been completed and Rest of the work is done by A & B. find in how many days they individually complete the work if A's 5 days work = B's 4 days work.

$A + B + C$ ——— 3d ——— 37 Total work = 100

$A + B$ ——— 7d ——— 63

$(A+B)1d = \frac{63}{7} = 9$

$(A+B)3d = 9 \times 3 = 27$

$A + B + C$ ——— 3d ——— 37

$A + B$ = 27, C = 10

$(C)1d = \frac{10}{3}$

C will do complete work

$= \frac{100 \times 3}{10} = 30$ days

$A \times 5 = B \times 4$

$\frac{A}{B} = \frac{4}{5}) = 9$

A = 4
B = 5

9
4 : 5
A B
4 5

$A = \frac{100}{4} = 25$ days

$B = \frac{100}{5} = 20$ days

Ans

---

(42) 40 men can complete a work in 30 days. They start work together and after every 10 days 5 men left the work in how much time work will be completed?

40 men × 30 day = 1200

40 men × 10 day = 400

35 men × 10 day = 350

30 men × 10 day = 300

1050

25 men × 6 day = 150

1200

36 days.

1 men = 1 Rs

40 " = 40 Rs.

CLASS 4

By Pardeep Chhoker
7206446517

(43) 60 men can complete a work in 40 days. They start work together but after every 10 day, 5 men leave the work. In how time the work will be completed ?

60 men x 40 day = 2400

60 men x 10 day = 600
55 men x 10 day = 550
50 men x 10 day = 500
45 men x 10 day = 450

2100

40 men x $7\frac{1}{2}$ day

$\frac{300}{40} = 7\frac{1}{2}$ d

Total days = $40 + 7\frac{1}{2} = 47\frac{1}{2}$ days.

---

(44) 33 men can do a job in 30 days. If 44 men started the work together & after every day 1 person leave the work. then what is the minimum no. of days required to complete the whole work.

33 men x 30 day = 990

maximum 44 दिन काम हो सकता।

44 + 43 + 42 - - - - - - - - -

$\frac{n}{2}[2a + (n-1)d]$

$\frac{n}{2}[88 + (n-1)(-1)] = 990$

$\frac{n}{2}[89 - n] = 990.$

Put value of n from options.

or assume yourself.

$n = 44$

$\frac{44}{2}[89-44] \Rightarrow 22 \times 45 = 990$.

$\therefore$ min. no. of days to finish the work = 44 days.

---

(45) A group of men decided to do a job in 4 days but 20 men dropped out everyday, the job was completed at the end of 7th day. find the men who are in the work initially?

Total work = $m \times 4 = 4m$

$m + (m-20) + \cdots\cdots$

$\frac{7}{2}[2m + 6(-20)] = 4m$

$\frac{7}{2}[2m - 120] = 4m$

$7m - 420 = 4m$

$3m = 420$ 140

$\boxed{m = 140}$

---

(46) 3 cooks have to make 80 burgers. They are known to make 20 pcs every minute by working together. The 1st cook began working alone and made 20 pcs having worked for sometime more than 3 min and rest work completed by 2nd & 3rd cook and it takes a total of 8 min to complete the whole work. In how much time the 1st will make 160 burgers.

$A \rightarrow (3+x)$ min — 20 burger

$A(\text{eff}) = \frac{20}{3+x}$

$(B+C) \rightarrow (5-x)$ min — 60 burger

$B+C(\text{eff}) = \frac{60}{5-x}$

$A+B+C = 20$

Total time = 8 min

A take = $3+x$ min

(B+C) take = $8-3-x$
$= (5-x)$ min

$\Rightarrow \frac{20}{3+x} + \frac{60}{5-x} = 20$

Assume values of x.

$x = 4.1$

satisfies the equation

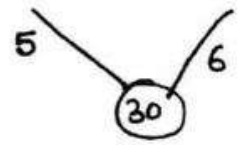
$A(\text{eff}) = \frac{20}{3+1} = 5$ burger/min

$A \longrightarrow 160$ burger $\rightarrow \frac{160}{5} = 32$ min Ans.

---

(47) A+B can complete a work in 6 days. In how many days they alone do the same work if A+C can complete the same work in 2½ days lesser than B+C. They together complete the work in 5 days.

$\underbrace{A+B}_{6d}$ $\underbrace{\overset{5}{\overbrace{A+B+C}}}_{5d}$ $\overset{1}{\overbrace{\quad}}$



A+B (eff) = 5

C (eff) = 1

A+C → 3+1

B+C → 2+1

$\frac{30}{4}$ $7\frac{1}{2}$

$\frac{30}{3}$ 10

$2\frac{1}{2}$ → True.

C is same in both place.

Hence A ? B.

Assume values.

A+B = 5

A	B
3	2
4	1

Hence A = 3

B = 2

C = 1.

C alone $= \frac{30}{1} = 30$ days

B alone $= \frac{30}{2} = 15$ days

A alone $= \frac{30}{3} = 10$ days.

---

(48) Four men can do a piece of work in 6 days while 3 women can complete the same work in 16 days. In how many days 1 men + 2 women can complete the work.

$4m \times 6 = 3w \times 16 \div 2$

$m = 2w$

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

Total work $= \underline{4 \times 2} \times 6 = 48$ unit

$1m + 2w$

$\downarrow \quad \downarrow \Rightarrow 4$

$2 \times 1 \quad 2 \times 1$

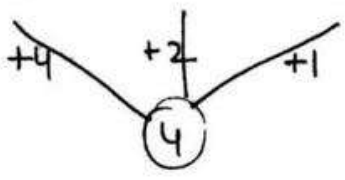
$(1m + 2w)$ complete the work $= \frac{48}{4} = 12$ days.

---

(49) 2 men can complete a work in 3 days, while 3 women can complete the same work in 4 days & 4 children can complete the same work in 6 days. In how many days 1 men + 2 children can complete the same work.

$2m \times 3 = 3w \times 4 = 4c \times 6$

$1m = 2w = 4c$



Total work = $2m \times 3 = 2 \times 4 \times 3 = 24$ unit

$1m + 2c = 4 + 2 = 6$

$(1m + 2c)$ complete the work $= \frac{24}{6} = 4$ days Ans

---

(50) 6 men + 8 women complete a work in 10 days while 26 men + 48 women in 2 days. In how many days 7 men + 3 women will complete the work?

$(6m + 8w) \times 10^{5} = (26m + 48w) \times 2$

$30m + 40w = 26m + 48w$

$4m = 8^{2}w$

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

T.W $= (6 \times 2 + 8 \times 1) \times 10 = 20 \times 10 = 200$ unit

$(7m + 3w) = 7 \times 2 + 3 \times 1 = 17$

$(7m + 3w)$ complete the work in $= \frac{200}{17} = 11\frac{13}{17}$ days.

---

(51) 12 men + 18 women can complete a work in 10 days while 3 men + 18 women can complete the same work in 12 days. In how many days 2 men + 3 women will complete the work?

$(12m + 18w) \times 10^{5} = (3m + 18w) \times 12^{6}$

$60m + 90w = 18m + 108w$

$^{7}42m = {}^{3}18w$

$\frac{m}{w} = \frac{3}{7}$

T.W $= (12 \times 3 + 18 \times 7) \times 10$

$= 1620$ unit

$2m+3w = 2\times3+3\times7 = 27$

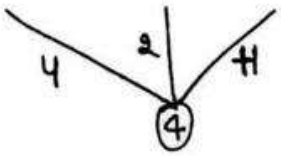
$(2m+3w)$ will finish the work $= \frac{\overset{60}{\cancel{+620}}}{\cancel{27}} = 60$ days.

---

(52) 2 men can complete a piece of work in 3 days while 3w can complete the same work in 4 days and 4 children can complete the same work in 6 days. Then find in how many days 1 men + 1 women + 2 children can complete the same work.

$\cancel{2}m \times \cancel{3} = \cancel{3}w \times \cancel{4}^{2} = 4c \times \cancel{6}^{2}$

$1m = 2w = 4c$



Total work $= (2\times4)\times3 = 24$

$(1m+1w+2c) = 4+2+2 = 8$

$(1m+1w+2c)$ complete the work $= \frac{\cancel{24}}{\cancel{8}}$

$= 3$ days Ans.

---

(53) There is sufficient food for 400 soldiers for 32 days. After 28 days 280 soldiers left the camp. for how many days will the rest of the food lasts for the rest of the soldiers.

$^{10}\cancel{400} \times 3 = \overset{4}{\cancel{120}} \times D$

$D = 10$ days

(54) There is sufficient food for 1600 soldiers for 50 days and each person ~~is~~ eat 900 gm food everyday. After 40 days, 400 soldiers left the camp. Now for how many days will the rest of the food lasted for the rest of the soldiers if each soldier ate 1000 gm food everyday.

$$\overset{4}{\cancel{160}}\cancel{0} \times \overset{3}{\cancel{40}}\cancel{0} \times 10 = \overset{4}{\cancel{12}}\cancel{0} \times 1000 \times D$$

$D = 12$ days Ans.

---

(55) There are sufficient food for certain no. of soldiers for certain no. of days. After 20 days 1/4 th soldier left the camp and the rest of the food will last for the same no. of days that are in starting. find the no. of days. In the starting.

$$\cancel{8} \times (D-20) = \frac{3}{4}\cancel{8} \times D$$

$$D-20 = \frac{3D}{4}$$

$$4D - 80 = 3D$$

$D = 80$ days Ans.

---

(56) A complete 7/10 of a work in 15 days, then he completes the remaining work with the help of B in 4 days. find in how much time (A+B) can complete the whole work.

A —— $\frac{7}{10}$ → 15 days

(A+B) —— $\frac{3}{10}$ work = 4 days

(A+B) — complete work = $4 \times \frac{10}{3} = \frac{40}{3}$ days.

---

(57) A team of 30 men is supposed to do a work in 38 days. After 25 days, 5 more men were employed on work due to w|c the work is completed 1 day earlier. How many days would it have been delay if 5 more men were not employed.

30 men × 38 day

30 men × 25 d = 750

35 men × 12 d = 420

1170

$\frac{1170}{30}$ = 39 days

1 day would delay.

(OR)

5 men × 12 d = 60

अगर 5 men ना आते तो ये 60 काम 30 men करते

$\frac{60}{30}$ = 2 दिन में

37 + 2 = 39 days

1 day would delay.

---

(58) A contractor undertook to finish a road in 40 days & he employ 100 men. After 35 days he employed 100 more men, the work finished on time. Then find if more men were not employed then work will complete how much late?

100 m × 35d = 3500

200 m × 5d = 1000

T·W = 4500

अगर इसको 100 men ही करते $\frac{4500}{100}$ = 45 days

5 days would delay.

(OR)

100 men × 5d = 500

अगर 100 नहीं आते तो इस 500 को पुराने वाले 100 कर रहे होते. $\frac{500}{100}$ = 5 days delay.

---

(59) 5m can prepare 10 toys in 6 days working 6 Hrs per day. In how many days can 12 m prepare 16 toys working 8 Hrs per day.

$$\frac{m_1 h_1 d_1}{w_1} = \frac{m_2 d_2 h_2}{w_2}$$

$$\frac{5 \times 3 \times 6}{10} = \frac{12 \times 8 \times D}{16}$$

D = 3 days Ans.

---

(60) A contractor undertook to dig a canal of 12 km long in 350 days & employed 45 men. After 200 days only 4.5 km work was completed. How many more men should he employe to complete the whole work on time.

$$\frac{45 \times 200}{3} = \frac{(m+45) \times 150}{5}$$

$m = 55$

55 men should be employed.

---

(61) 8 men working 9 hrs per day complete a work in 20 days. In how many days can 7 men working 10 Hrs a day complete the same work.

$8 \times 9 \times 20 = 7 \times 10 \times D$

$D = \frac{144}{7}$ days.

---

(62) A contractor employed 200 men for a work. They finish 5/6 of the total work in 10 days, due to rain the work was stopped & 2/5 of the work was destroyed. After rain only 150 men come on work. In how many days the whole work will be completed.

$\frac{200 \times 10}{5} = \frac{150 \times D}{3}$

$D = 8$ days

$\frac{5}{6}$ — done. (T.W)

$5 \times \frac{2}{5}$ — spoiled

Left work $= 5 - 2 = 3$

or $6 - 3 = 3$

---

(63) 38 men can complete a work by working 6 Hrs per day in 12 days then calculate in how many days 51 men can do a double of the work by working 8 hrs per day. If two men of 1st group doing same work of two men of 2nd group?

$$\frac{38m \times 6 \times 12}{1} = \frac{51m \times 8 \times D}{2}$$

$$2m = 2M$$

$$D = \frac{228}{17} = 13\frac{7}{17} \text{ days.}$$

---

(64) 6 men + 10 women can reap 5/12 part of 360 hectare land in 15 days by working 6 Hrs per day. If now 2 more men & 4 women are employed, then the work will be finished in how many days by working 7 Hrs per day. It is also given that work of 2m = 3 women work?

$$\frac{(6m+10w) \times 6 \times 15}{\frac{5}{12}} = \frac{(8m+14w) \times 7 \times D}{\frac{7}{12}}$$

$2m = 3w$

$\frac{m}{w} = \frac{3}{2}$

$6m+10w = 6\times3+10\times2 = 38$

$8m+14w = 8\times3+14\times2 = 52$

$$\frac{19 \quad 3}{38 \times 6 \times 15} = \frac{26 \quad 13}{52 \times 7 \times D}$$

$$D = \frac{171}{13} = 13\frac{2}{13} \text{ days}$$

---

(65) A contractor undertook to finish a work in 150 days and he employs 20 men + 30 women + 75 children. After 60 days only 1/4 work is complete. Now he have removed all the women & 50 children and employed some more men so that the work will finish in 5 days earlier. find the extra men if 3 men = 5 women & 2 women = 3 children.

$$\frac{(20m + 30w + 75c)\times 60}{\frac{1}{4}} = \frac{(20m + 25c + x)\times 85}{\frac{3}{4}}$$

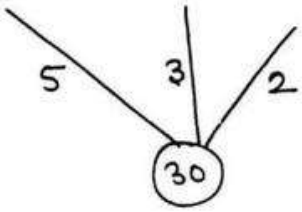
37
150
−5
145
−60
85

$x \rightarrow$ extra men.

$3m_{\times 2} = 5w_{\times 2}$

$2w_{\times 5} = 3c_{\times 5}$

$6m = 10w = 15c$



$\Rightarrow (20m + 30w + 75c) = (20\times 5 + 30\times 3 + 75\times 2) = 340$

$20m + 25c + x = 20\times 5 + 25\times 3 + x = 150 + x$

Now, $\frac{340 \times 60}{1} = \frac{(150 + x)\times 85}{3}$

$\Rightarrow 340 \times \overset{12}{\cancel{60}} \times 3 = (150 + x)\,\cancel{85}\,17 \Rightarrow x = 114$ आदमी Ans

---

(66) A does half as ~~w~~ much work as B in 3/4th time as B. Together they took 18 days to complete the work then how much time shall B take to do it.

$\frac{A\times 3}{1} = \frac{B\times 2}{2}$

$3A = 2B$

$\frac{A}{B} = \frac{2}{3}$

Total work $= (2+3)\times 18 = 90$

A does $= \frac{90}{2} = 45$ days.

B does $= \frac{90}{3} = 30$ days.

(67) A can complete $\frac{3}{4}$th work of B in $\frac{5}{6}$ time than B. If the whole work completes in 10 days by working together. Then A alone complete the work in how many days?

$$\frac{A \times 5}{3} = \frac{B \times \cancel{6}^{\,3}}{\cancel{4}_{\,2}}$$

$$10A = 9B$$

$$\frac{A}{B} = \frac{9}{10}$$

Total work $= (9+10) \times 10 = 190$ unit

A does $= \frac{190}{9}$

$= 21\frac{1}{9}$ days.

B does $= \frac{190}{10} = 19$ days.

By Pardeep Chhoker
7[illegible]94627

CLASS 5, 6

PIPE AND CISTERNS.

(1) Two taps A & B can fill a tank in 48 min and 36 min. if both taps are opened together after how much time tap A is closed so that the whole tank fill in 25 min 30 sec.

A 48 m B 36 m

+3 +4

144

A + B

$25\frac{1}{2}$ m

402

$\frac{42}{3}$

14 min Ans

$\frac{2}{4} \times \frac{51}{2} = 102$

(2) Two fill pipes A & B can fill a cistern in 18 and 24 min respectively. Both fill pipes are opened together, but 6 minutes before the cistern will fill pipe A is closed. In how much time will the cistern take to fill ?

A 18 min B 24 min

+4 +3

72

A+B

↓

$\frac{54}{7}$

$7\frac{5}{7}$ min + 6 min

$13\frac{5}{7}$ min Ans

B

↓

6 min

↓

6 × 3 = 18 unit

OR

72

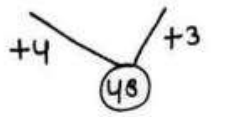
+24

$\frac{96}{7}$

$= 13\frac{5}{7}$ min.

(3) Two fill pipes A & B can fill a cistern in 18 & 24 min. respectively. Both fill pipes are opened together but 4 min before the cistern is full, pipe A is closed. How much time will the cistern take to fill.

A — 12 min, B — 16 min



A+B ↓ $\frac{36}{7}$

$5\frac{1}{7}$ min + 4 min

$= 9\frac{1}{7}$ min

B ↓ $4 \times 3 = 12$

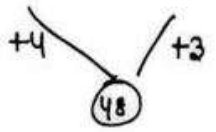
(OR)

$\frac{48 + 16}{7} = \frac{64}{7} = 9\frac{1}{7}$ min.

---

(4) A cistern can be filled by two pipes filling separately in 12 & 16 min respectively. Both pipes are opened together, for a certain time out being clogged only 7/8 of quantity of water flows through the former and only 5/6 through the latter pipe. The obstruction is removed, the cistern is filled in 3 min from that moment. How long was it before the full flow began.

A — 12 min, B — 16 min



A+B ↓ $= \frac{27}{6}$

A+B ↓ 3 min ↓ $7 \times 3 = 21$

$48 - 21$

$A = \frac{4 \times 7}{8_2} = 3.5$

$= 4\frac{1}{2}$ min Ans. ($4\frac{1}{2}$ min तक खराब रहे)

$B = \frac{3 \times 5}{6_2} = 2.5$

& (~~Total time~~ to fill tank) $= 4\frac{1}{2} + 3 = 7\frac{1}{2}$ min.

---

(5) A cistern can be filled by two pipes in 15 & 25 min respectively. Both pipes are opened together, for a certain time out being clogged, only 5/6 of quantity of water flows through the former and 5/8 through the latter pipe. The obstruction is removed, the

cistern is filled in 5 min. from that moment. How long was it before the full flow begans.

A B

15 25

+5 +3

75

A+B

75−40

= 35 unit

A+B

↓

5 min

↓

5×8 = 40 unit

$A = 5 \times \frac{5}{6} = \frac{25}{6}$

$B = 3 \times \frac{5}{8} = \frac{15}{8}$

decreased efficiency

$\frac{25}{6} + \frac{15}{8} = \frac{145}{24}$

$\Rightarrow \frac{7}{35} \times 24$ / $\frac{}{29}$

$\Rightarrow \frac{168}{29}$ min Ans

---

⑥ A cistern can be filled by two pipes in 30 & 36 min respectively. Both pipes are opened together for a certain time but being particularly clogged only 5/6 of the full quantity of water flows through the former and only 9/10 through the latter. The obstruction is removed, the cistern is filled in $15\frac{1}{2}$ min from that moment. How long was it before full flow began?

A B

30 36

5 +6 +5 $4\frac{1}{2}$

180

A+B

↓

180−175

= 9.5

A+B

↓

$15\frac{1}{2}$ min

↓

$\frac{31}{2} \times 11$

$= \frac{341}{2} = 170.5$ unit

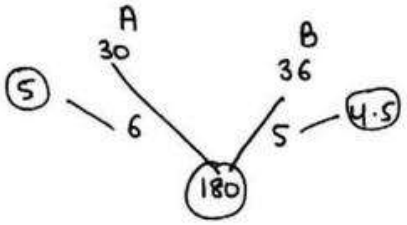
$A = 6 \times \frac{5}{6} = 5$

$B = 5 \times \frac{9}{10} = 4.5$

$\frac{9.5}{9.5}$

= 1 min Ans

(7) Two taps A and B can fill a tank in 30 min & 36 min respectively. Both tapes are opened together but due to some problem they work 5/6 and 9/10 of their efficiency, after some time the problem was removed and the whole tank will fill in $16\frac{1}{2}$ min. Then after how much time the problem is removed?



	clogged Eff.	full Eff
	A+B	A+B
	x min	$\left(\frac{33}{2}-x\right)$ min
	↓	
	9.5x unit	$11\left(\frac{33}{2}-x\right)$ unit

$16\frac{1}{2} = \frac{33}{2}$

$$9.5x + 11\left(\frac{33}{2}-x\right) = 180$$

$$9.5x + 181.5 - 11x = 180$$

$$x = 1 \text{ min}$$

∴ Problem was fixed after 1 min. **Ans.**

(∵) OR

$16\frac{1}{2}$ min

9.5 | 9.5 + 1.5

$\frac{95}{10} \times \frac{33}{2} = 156.75$

$180 - 156.75 = 23.25$

1.5 → 23.25

1 → $\frac{23.25}{1.5} = 15\frac{1}{2}$

$15\frac{1}{2}$ min → full efficiency से करते हैं.

1 min clogged efficiency से.

(8) Taps A & B can fill a cistern in 20 Hr & 30 Hr resp. Both the pipes are opened to fill the tank but when the tank is 1/3rd full a leak develops in the bottom of the tank, through which 1/3rd of water supply by both pipes leak out. find in how much time the tank will full?

A	B	C	A+B	A+B−C
20	30		↓	
+3	+2	$\frac{-5}{3}$	$60\times\frac{1}{3}=20$	$\frac{40}{10}\times 3$
	60	leakage	$\frac{20}{5}=4$ min	$=12$ min

A+B = 5

Leakage = $\frac{-5}{3}$

Hence eff = $5-\frac{5}{3}=\frac{10}{3}$

$12+4=16$ min Ans.

---

(9) A & B can fill a tank in 15 & 20 Hr respectively. Both the taps are opened together, when the tank was 1/4th full a leak develop in the bottom of the tank. through which 1/5th of the water supply by both the pipes leak out. find in how many hours tank will full.

A	B	C	A+B	A+B−C
15	20			
+4	+3	$-\frac{7}{5}$ leak out	$60\times\frac{1}{4}=15$	45
	60		$\frac{15}{7}=2\frac{1}{7}$ Hr	$\frac{28}{5}$

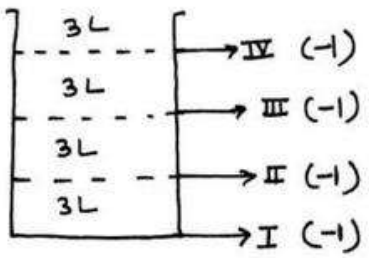
Leak out = $(4+3)\times\frac{1}{5}=-\frac{7}{5}$

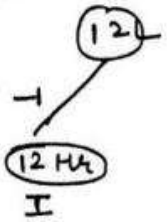
A+B−C = $4+3-\frac{7}{5}=\frac{28}{5}$

$=\frac{45\times 5}{28}=\frac{225}{28}$

Total time = $\frac{15}{7}+\frac{225}{28}=10\frac{5}{28}$ Hrs.

(10) In a tank four taps of equal efficiency are fitted on equal height intervals. The 1st pipe is at the base of the tank and the 4th pipe is at 3/4th of height of the tank. Then calculate in how much time the whole tank will empty if the 1st pipe can empty the tank in 12 Hours.





$\frac{3}{4} + \frac{3}{3} + \frac{3}{2} + \frac{3}{1}$ → only 1st pipe is working.

(3) → 3 pipe working; (2) → Two pipe working

All 4 pipes are working

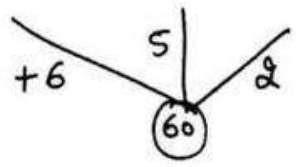
$$\frac{9+12+18+36}{12} = \frac{75}{12} = 6\frac{1}{4} \text{ Hrs.}$$

---

(11) Two taps A & B can fill a tank in 10 Hrs & 12 Hrs respectively. There is an outlet tap C. If all the taps are opened together the tank will fill in 30 Hrs. In how many hours tap C alone can empty the tank?

∴

A	B	A+B−C
10	12	30



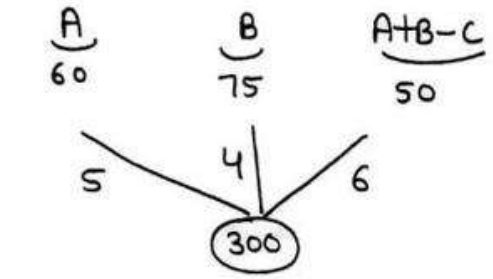
$A + B - C = 2$

6 5 9

C will empty the tank =

$$\frac{60}{9} = 6\frac{2}{3} \text{ Hrs.}$$

(12) Two pipe A & B can fill a cistern in 1 Hr & 75 min respectively. There is also an outlet pipe C. If all the three pipes are opened together, the tank is full in 50 min. How much time will be taken by C to empty the full tank.



$A + B - C = 6$

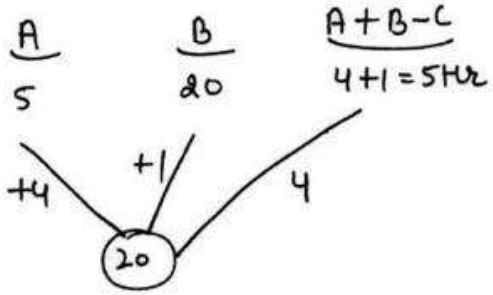
$\downarrow \quad \downarrow \quad \downarrow$

$5 \quad 4 \quad (3)$

C will empty the tank in $= \frac{300}{3} = 100$ min.

---

(13) Two pipes are running continuously to fill the tank. The 1st pipe could have filled it in 5 Hrs by itself & 2nd one in 20 Hrs. But a 3rd pipe was there to empty it but the operator did not notice it due to which it caused a delay of 1 Hr in filling the tank. Find the time in which the 3rd pipe would empty the filled tank?



$A+B = \frac{20}{5}$

$= 4$ Hrs

$A + B - C = 4$

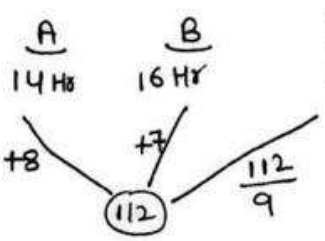
$\downarrow \quad \downarrow \quad \downarrow$

$4 \quad 1 \quad (-1)$

C will empty $= \frac{20}{1}$

$= 20$ Hrs.

(14) Two pipes can fill a cistern in 14 & 16 Hrs respectively. The pipes are opened simultaneously and it is found that due to leakage in the bottom, it took 92 min more to fill the cistern. When the cistern is full, in what time will the leak empty it?



$A+B = \frac{112}{15} \times \frac{4}{60}$

$= 448$ min

$A+B-C = 92$ min more

$448+92 = 540$ min

$\frac{540}{60} = 9$ Hrs.

$A+B-C = \frac{112}{9}$

$8 + 7$

$15 - C = \frac{112}{9}$

$C = 15 - \frac{112}{9} = \frac{23}{9}$

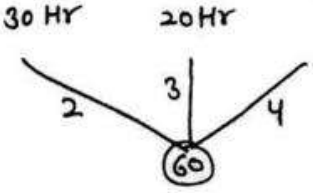
C will empty $= \frac{112}{23/9}$

$= \frac{112 \times 9}{23} = \frac{1008}{23}$

$= 43\frac{19}{23}$ Hrs Ans

---

(15) Three pipes A, B and C are attached to a cistern. A & B can fill it in 30 Hrs and 20 Hrs respectively & 3rd pipe C leaks out 45 L water per minute. If all the three pipes are opened simultaneously the tank will fill in 15 Hr. find the capacity of the tank.



$A+B-C = 4$

$2 \quad 3 \quad 1$

$C = 1$

C will empty the tank $= \frac{60}{1} = 60$ Hrs

Efficiency of C of taking out = 45 litre/min

Capacity of Tank $= 60 \times 60 \times 45$

$= 162000$ ltr.

(16) A leak in the bottom of the tank can empty it in 6 Hrs. A tap fill the tank @ 4L/min is turn on. if both taps are opened then the tank will empty in 8 Hrs. Find the capacity of the tank ?

A	−A+B
−6 Hr	−8 Hr
−4	−3

(24)

$-A + B = -3$

-4 ↓, (+1) ↓

B = 1

B will fill the tank $= \frac{24}{1} = 24$ Hrs

B can fill 4 litre/min

∴ capacity of Tank $= 24 \times 60 \times 4$

$= 5760$ litre.

---

(17) A leak in the bottom of a tank can empty it in 12 Hrs. A tap which can added 20L/min is turn on. Both the taps are opened now, then the tank is emptied in 20 Hrs. find the capacity of the tank.

A	−A+B
−12 Hr	−20 Hr
−5	−3

(60)

$-A + B = -3$

-5 ↓, (+2) ↓

B = 2

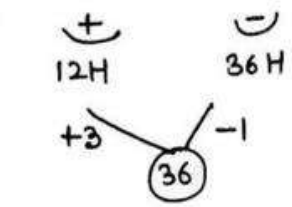
B will fill $= \frac{60}{2} = 30$ Hrs.

B can fill 20 litre/min

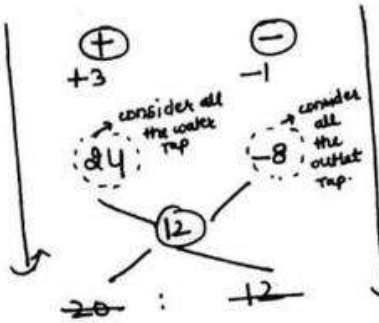
∴ capacity of Tank $= 30 \times 60 \times 20$

$= 36000$ litre.

(18) 8 taps are fitted in a tank, some are water taps & rest are outlet tap. Each water tap can fill the tank in 12 Hrs and each outlet tap can empty in 36 Hours. Then calculate the no. of water taps if the whole tank fill in 3 Hrs.



$\frac{36}{3} = 12$



5+3 = 8 unit — 8

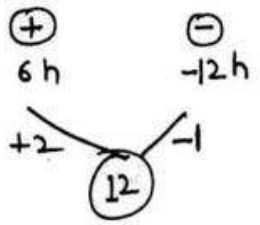
1 unit — 1

water Taps = 5

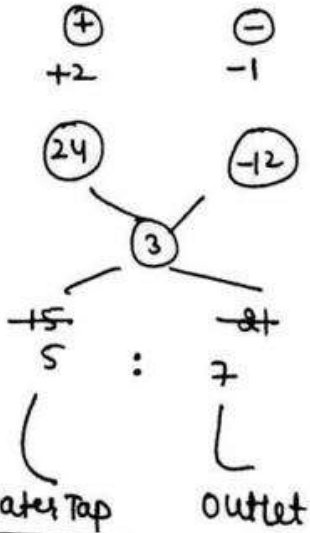
outlet Taps = 3.

Ans

(19) 12 taps are fitted in a tank, some are water taps & rest are outlet taps. Each water tap can fill the tap in 6 Hr and each outlet tap can empty the tap in 12 Hr. If all the taps are open together then the tank is full in 4 Hrs. find the no. of water taps.

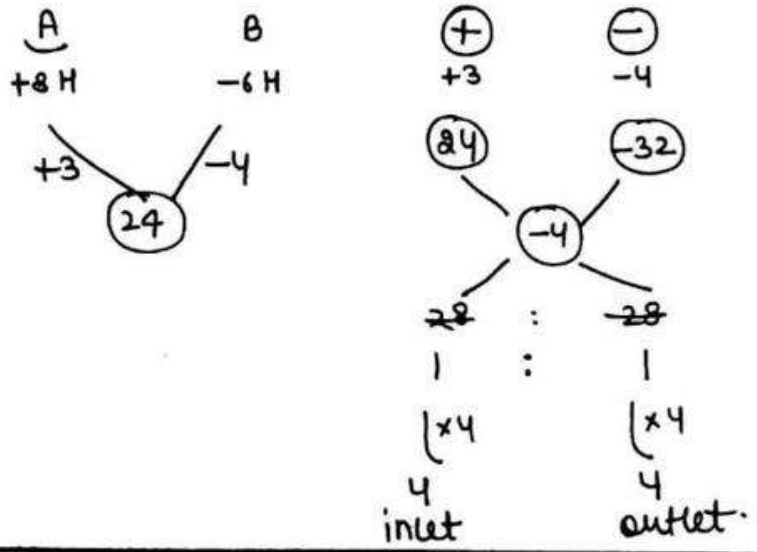


$\frac{12}{4} = 3$.



5+7=12.

(20) A tank is connected with 8 pipes. Some of them are inlet pipes and rest are outlet pipes. Each of the inlet pipe can fill the tank in 8 Hrs individually while each outlet pipe can empty the tank in 6 Hrs individually. If all the pipes are kept open when the tank is full, it will take 6 Hrs for the tank to empty. How many of these are inlet pipes?



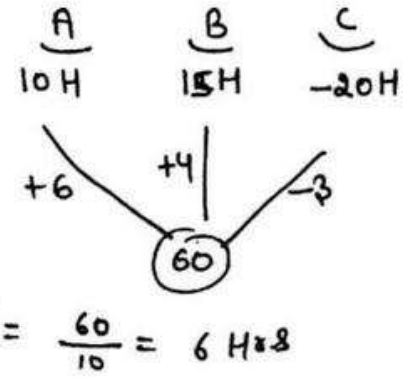
$\frac{84}{6} = -4$.

1+1 = 2 ⟶ 8

1 ⟶ 4

---

(21) If A & B can fill a tank in 10 Hrs & 15 Hrs respectively An outlet tap C can empty it in 20 Hrs. Initially the tap A and tap B are opened and when the tank was supposed to be filled it was found that tap C was open mistakenly, now C is closed. After how much time tank will fill?



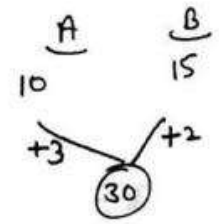
(A+B) = $\frac{60}{10}$ = 6 Hrs

C = −3×6 = −18

A&B fill it = $\frac{18}{10}$

= $1\frac{4}{5}$ Hrs.

(22) A bath can be filled by the cold water pipe in 10 minutes and by the hot water pipe in 15 minute. A person leaves the bathroom after turning on both pipes simultaneously and returns at the moment when the bath should be full. finding however, that the waste pipe has been open, he now closed it. In 4 min more the bath is full. In what time would the waste pipe empty it?



$A+B = \frac{30}{5} = 6$ Hrs

$\frac{3}{6} \times$ waste pipe $= (A+B) \times 4 \div 2$

$3 \times$ waste pipe $= (3+2) \times 2$

$3 \times$ waste pipe $= 10$

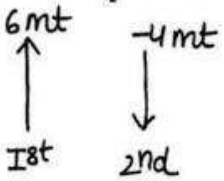
waste pipe $= \frac{10}{3}$

waste pipe will empty $= \frac{30}{10/3} = \frac{\overset{3}{\cancel{30}} \times 3}{\cancel{10}}$

$= 9$ min

---

(23) A monkey climb a pole of height 100 m. It climbs 6 m above in 1st min and 4 m below in 2nd min. In how many minutes monkey will climbs on the pole?



1 cycle (2 min) — 2 mt.

↓ ×47 ↓ ×47

94 min — 94 mt

1 min — 6 mt

95 min — 100 m

(24) A monkey climb a pole of height 60 m. It climb 5 m above in 1st min and 4 m below in 2nd min. In how many minutes monkey will climb on the pole ?

+5 ↑ 1st, −4 ↓ 2nd

1 cycle (2 min)	1 mt.
↓ ×55	↓ ×55
110 min	55 mt.
1 min	5 mt
111 min	60 mt.

Starting में इतने पानी लगाने हैं कि diff (−) वाली term से ज्यादा रहे।

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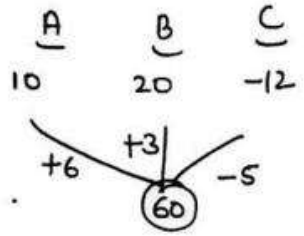
(25) A, B, C are pipes attached to a cistern. A & B can fill it in 20 min & 30 min respectively while C can empty in 15 min. If A, B, C kept open successively for 1 min each, how soon the cistern will be filled ?

A	B	C
20	30	15
+3	+2	−4

60

A B C	1
+3 +2 −4	
1 cycle (3h)	
↓ ×55	↓ ×55
165	55
1 min	+3
1 min	+2
167 min	60

(26) Tap A and Tap B can fill a tank in 10 Hrs & 12 Hrs respectively. Tap C can empty it in 12 Hrs. If all the taps are open alternatively 1 Hr each, then the whole tank will fill in how many hours.

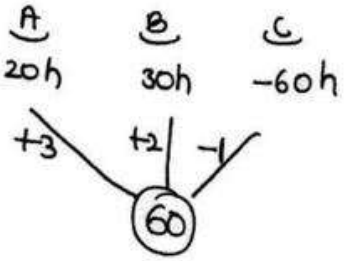


A B C
+6 +3 -5

1 cycle (3H) —— 4
|x13 |x13
39H 52
1h +6
$\frac{2}{3}$ h 2
60

$40\frac{2}{3}$ Hr.

(27) Three pipes A, B, C are attached to a cistern. Pipe A & B can fill the cistern in 20 & 30 Hr respectively and the pipe C can empty in 60 Hrs. Pipe A&C are opened for the 1st Hour and the pipe B&C are opened for the 2nd Hour & this process continues till the cistern does not fill. In how much time the tank will be filled?



I II
A+C B+C
↓ ↓
2 1

1 cycle (2 Hr) —— 3 unit
|x20 |x20
40 Hr 60 unit

(28) In what time would a cistern is filled by 3 pipes whose diameters are 1cm, $1\frac{1}{3}$ cm, 2cm running together, when the largest alone fill it in 61 min. The amount of water flowing in by each pipe being proportional to the square of its diameter?

1 : $\frac{4}{3}$: 2

D→ 3 : 4 : 6

Eff→ 9 + 16 + (36)

capacity of tank = 36×61

$\Rightarrow 9+16+36 = 61$

cistern will fill = $\frac{36\times 61}{61}$ = 36 min

---

(29) In what time would a cistern be filled by 3 pipes whose diameters are 1cm, 2cm, 4cm running together. When the largest alone fill it in $1\frac{1}{20}$ Hours, the amount of water flowing in by each pipe being proportional to the square of its diameter.

D→ 1 : 2 : 4

Eff→ 1 : [illegible] (16)

$1+4+16 = 21$

capacity of Tank = $16 \times \frac{21}{20}$

Tank will fill = $\frac{16\times\frac{21}{20}}{21}$

$\frac{16\times 21}{20}\times\frac{1}{21} = \frac{4}{5}$ Hr.

---

(30) One fill pipe A take three min more to fill the tank than two pipes A & B opened together to fill it. 2nd fill pipe B takes $21\frac{1}{3}$ min more to fill the tank than A+B together take. When the tank will be full if both pipes are opened simultaneously?

(A+B) → A+3 min

(A+B) → B + $\frac{64}{3}$ min

$\sqrt{3\times\frac{64}{3}} = 8$ min

A+B will fill = 8 min Ans

(31) 3m+4b can earn Rs 756 in 7 days. 11m+13b can earn Rs 3008 in 8 days. In what time will 7 men+9 boys earn Rs 2480.?

$$\frac{(3m+4b)\times 7}{\begin{matrix}756\\+108\\54\end{matrix}} = \frac{(11m+13b)\times 8}{\begin{matrix}3008\\374\\187\end{matrix}}$$

$$\frac{m}{b} = \frac{5x}{3x}$$

$(3m+4b) = (15x+12x) = 27x$

$(11m+13b) = (55x+39x) = 94x$

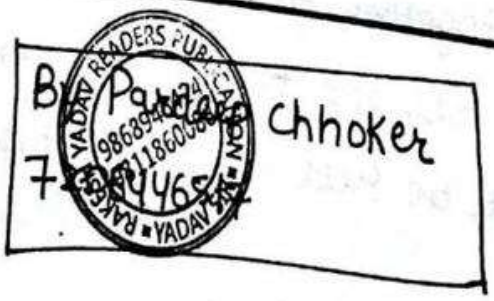
$27x \times 7 = 756\ 108$

$\boxed{x=4}$

$$\frac{m}{b} = \frac{20}{12}$$

$7m+9c = 140+108 = 248$

(7m+9c) will earn in $= \frac{2480}{248} = 10$ days.



Chhoker