

Points to remember

1. If A can finish a piece of work in 'n' days, then A's 1 day's work is $\frac{1}{n}$.

2. If the number of men engaged to do a piece of work is changed in the ratio a:b, the time required for the work will be changed in the ratio b:a

3. If A is X times as good a workman as B, then A will take $\frac{1}{X}$ of the time that B takes to do a certain work.

4. If M_1 persons can do 'W₁' works in D_1 days for T_1 hours and M_2 persons can do 'W₂' works in D_2 days for T_2 hours then $M_1 D_1 T_1 W_2 = M_2 D_2 T_2 W_1$.

5. If A can finish a work in 'x' days and B can finish the same work in 'y' days, then

time taken by both to finish the work is $\frac{xy}{x+y}$

days

6. If A and B together can do a piece of work in xdays and A alone can do it in y days

then B alone can do it in $\frac{xy}{y-z}$ days

7. If A, B and C can do a work in x,y, and z days respectively, then all of them working

together can finish the work in $\frac{xyz}{xy + yz + xz}$

days

8. If two taps A and B take a and b hours resepctively to fill a tank, then the two taps

together fill $\frac{1}{a} + \frac{1}{b}$ part of the tank in an hour

and the entire tank is filled in $\frac{1}{(\frac{1}{2} + \frac{1}{b})} = \frac{ab}{(a+b)}$

hours.

Solved Examples:

1. 8 boys can arrange all the books of school library in 12 days. In how many days can 6 boys arrange them?

Ans: $M_1 D_1 = M_2 D_2$

$$\therefore D_2 = \frac{8 \times 12}{6} = 16 \text{ days}$$

2. A can do a piece of work in 12 days and B alone can do it in 15 days. How much time will both take to finish the work?

Ans: A's 1 day's work = $\frac{1}{12}$

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

$$(A+B)'s \text{ 1 day's work} = \frac{1}{12} + \frac{1}{15} = \frac{3}{20}$$

\therefore Both together can finish the work in

$$\frac{20}{3} \text{ or } 6\frac{2}{3} \text{ days}$$

Using formula :

Time taken to finish the work

$$= \frac{xy}{x+y} = \frac{12 \times 15}{12 + 15}$$

$$= \frac{12 \times 15}{27} = \frac{20}{3} \text{ or } 6\frac{2}{3} \text{ days}$$

3. A and B together can do a piece of work in 12 days. B alone can finish it in 30 days. In

how many days can A alone finish the work?

Ans: (A+B)'s 1 day's work = $\frac{1}{12}$

B's 1 day's work = $\frac{1}{30}$

A's 1 day's work = $\frac{1}{12} - \frac{1}{30} = \frac{1}{20}$

∴ A alone can finish the work in 20 days

Using formula :

Time taken by A to finish the work = $\frac{xy}{y-x}$

= $\frac{12 \times 30}{30 - 12} = \frac{12 \times 30}{18} = 20$ days

4. 16 men can do a piece of work in 10 days. How many men are needed to complete the work in 40 days?

Ans: Using formula.

$M_1 D_1 = M_2 D_2$

$M_1 = 16, D_1 = 10, D_2 = 40$

$16 \times 10 = M_2 \times 40$

$M_2 = \frac{16 \times 10}{40} = 4$ men

5. A and B can do a piece of work in 18 days, B and C in 24 days, A and C in 36 days. In what time can they do it all working together?

Ans: [(A+B)+(B+C)+(A+C)]'s 1 day's work

= $\frac{1}{18} + \frac{1}{24} + \frac{1}{36} = \frac{1}{8}$

or 2 (A+B+C)'s 1 day's work = $\frac{1}{8}$

or (A+B+C)'s 1 day's work = $\frac{1}{16}$

So they all can finish the work in 16 days

6. 4 men and 6 women finish a job in 8 days, while 3 men and 7 women finish in 10 days. In

how many days will 10 women finish it?

Ans: Considering one day's work,

$4M + 6W = \frac{1}{8}$ (1)

$3M + 7W = \frac{1}{10}$ (2)

(1) x 3 - (2) x 4 gives

$18W - 28W = \frac{1}{10}$ or $10W = \frac{1}{40}$

∴ 10 Women can do the work in 40 days

7. A certain number of men complete a piece of work in 60 days. If there were 8 men more, the work could be finished in 10 days less. How many men were there originally?

Ans: Let the original number of men be x

$M_1 = x, D_1 = 60, M_2 = x+8, D_2 = 50,$

$M_1 D_1 = M_2 D_2$

$x \times 60 = (x+8) \times 50$

$60x - 50x = 400$

$10x = 400 \Rightarrow x = 40$

8. A cistern can be filled separately by two pipes in 12 and 16 minutes respectively. If both pipes are opened together, when will the cistern be filled?

Ans: Work done by 1st pipe in 1 minute = $\frac{1}{12}$

Work done by 2nd pipe in 1 minute = $\frac{1}{16}$

Work done by both in 1 minute = $\frac{1}{12} + \frac{1}{16}$

= $\frac{4+3}{48} = \frac{7}{48}$

∴ Both the pipes together will fill the cistern in $\frac{48}{7}$ minutes ie, $6\frac{6}{7}$ minutes.

Using formula :

Time taken to fill the cistern by both the pipes

$$= \frac{ab}{a+b} = \frac{12 \times 16}{12+16} = 6\frac{6}{7} \text{ minutes}$$

9. Two inlet pipes of filling rate 10 minutes per cistern and 6 minutes per cistern and one outlet pipe of emptying rate 15 minutes per cistern are all fitted to a cistern and are opened together. Find when the cistern will be full?

Part of the cistern filled by working the three pipes in one minute.

$$= \frac{1}{10} + \frac{1}{6} - \frac{1}{15} = \frac{1}{5}$$

\therefore Time needed to fill the full cistern = 5 minutes

10. A cistern can be filled separately by two pipes A and B in 36 minutes and 45 minutes respectively. A tap C at the bottom can empty the full cistern in 30 minutes. If the tap C is opened 7 minutes after the pipes A and B are opened, find when the cistern becomes full.

Ans: Part of the tank filled by A and B in 7 minutes

$$= 7 \times \left(\frac{1}{36} + \frac{1}{45} \right) = \frac{7}{20}$$

$\therefore 1 - \frac{7}{20} = \frac{13}{20}$ of the tank should be filled.

Part filled by A, B and C in 1 minutes

$$= \frac{1}{36} + \frac{1}{45} - \frac{1}{30} = \frac{1}{60}$$

\therefore Time needed to fill $\frac{13}{20}$ part of the tank

$$= \frac{13}{20} \times 60 = 39 \text{ minutes}$$

\therefore Total time taken to fill the tank

$$= 39 + 7 = 46 \text{ minutes}$$

PRACTICE TEST

1. Ramesh alone does a piece of work in 4 days and Suresh does it in 12 days. In how many days will the two do it together?

- 1) 3 days 2) $1\frac{1}{2}$ days
3) 4 days 4) 8 days

2. Pranesh and Sumesh can finish a work in 16 days while Pranesh can do the same work in 24 days. In how many days can Sumesh alone finish the same work?

- 1) 40 days 2) 25 days
3) 48 days 4) 20 days

3. Vinod can do a work in 15 days, Vijay in 25 days and Vinay in 30 days. How long will they take to do the work if they work together?

- 1) 12 days 2) $7\frac{1}{7}$ days
3) 70 days 4) 20 days

4. If A, B and C together can finish a piece of work in 4 days, A alone in 12 days and B in 18 days, then C alone can do it in

- 1) 21 days 2) 15 days
3) 12 days 4) 9 days

5. 3 men or 6 women can do a piece of work in 20 days. In how many days will 12 men and 8 women do the same work?

- 1) $\frac{7}{2}$ 2) $\frac{15}{4}$
3) 5 4) 4

6. Some persons can do a piece of work in 12 days. Two times the number of those persons will do half of that work in

- 1) 3 days 2) 4 days
3) 6 days 4) 12 days

7. 3 men can do a work in 6 days. After 2 days 3 more men joined them. How many days will they take to complete the remaining work?

- 1) 5 days 2) 4 days
3) 3 days 4) 2 days

8. A is twice as good a workman as B and they took 7 days together to do the work. B alone can do it in:

- 1) 12 days 2) 18 days
3) 21 days 4) 16 days

9. A can do a piece of work in 25 days and B can do the same work in 30 days. They work together for 5 days and then A leaves. B will finish the remaining work in

- 1) 21 days 2) 11 days
3) 20 days 4) 19 days

10. An army of 2000 men had enough food to last for 30 days. After 10 days 500 more men joined them. How long did the food last then?

- 1) 20 days 2) 15 days
3) 12 days 4) 16 days

11. Amar can do a piece of work in 15 days. When he had worked for 3 days, Sameer joined him and the remaining work was finished in 8 days. In how many days can Sameer alone finish the whole work?

- 1) 30 days 2) 27 days
3) 20 days 4) 24 days

12. A, B and C can do a piece of work in 18 days, 27 days and 36 days respectively. They start working together. After working for 4 days, A goes away and B leaves 7 days before the work is finished. Only C remains at work from beginning to end. In how many days was the whole work done?

- 1) 17 days 2) 18 days
3) 16 days 4) 15 days

13. A and B can do a piece of work in 6 days. B and C in 4 days and A and C in 5 days. How long will they take to complete the work if they work together?

- 1) $3\frac{9}{37}$ days 2) 15 days
3) $1\frac{23}{37}$ days 4) $6\frac{9}{37}$ days

14. A man, a woman or a boy can do a piece of work in 3,4 and 12 days respectively. How many boys must assist 1 man and 1 women to do the work in 1 day?

- 1) 5 boys 2) 6 boys
3) 2 boys 4) 20 boys

15. Two pipes can fill a tank in 9 hours and 12 hours respectively. In how much time will they fill the tank when opened together?

- 1) $3\frac{1}{2}$ hours 2) $5\frac{1}{7}$ hours
3) 5 hours 4) $3\frac{2}{3}$ hours

16. A tap can fill a tank in 8 hours and another can empty it in 16 hours. If both the taps are opened simultaneously, the time (in hours) to fill the tank is:

- 1) 8 2) 10 3) 16 4) 24

17. A cistern can be filled by a pipe in 15 hours. But due to a leak in the bottom the cistern is just full in 20 hours. When the cistern is full, the leak can empty it in:

- 1) 60 hours 2) 40 hours
3) 45 hours 4) 30 hours

18. A cistern can be filled by pipes A and B in 20 hours and 30 hours respectively. When full, the tank can be emptied by pipe C in 60 hours. If all the taps be turned on at the same time the cistern will be full in

- 1) 10 hours 2) 15 hours
3) 16 hours 4) 30 hours

19. Two pipes A and B can separately fill a tank in 12 minutes and 15 minutes respectively. Both the pipes are opened together but 4 minutes after the start, pipe A is turned off. How much time will it take to fill the tank?

- 1) 11 min 2) 12 min
3) 6 min 4) 8 min

20. Two pipes A and B can fill a cistern in 24 minutes and 32 minutes respectively. If both

the pipes are opened together, then after how many minutes B should be closed so that the tank is full in 18 minutes?

- 1) 6 2) 8 3) 10 4) 12

21. Two pipes A and B can separately fill a cistern in 18 minutes and 24 minutes respectively. If they are turned alternatively for one minute each, how long will it take to fill the cistern?

- 1) 21 min 2) 24 min
3) 25 min 4) $20\frac{1}{2}$ min

22. A tank can be filled by one tap in 20 minutes and by another in 25 minutes. Both the taps are kept open for 5 minutes and then the second is turned off. In how many minutes more is the tank completely filled?

- 1) 6 2) 11
3) 12 4) $17\frac{1}{2}$

23. If 12 men or 18 women can reap a field in 14 days; then the number of days that 8 men and 16 women will take to reap the same field is

- 1) 5 2) 7 3) 8 4) 9

24. 6 men and 6 women finish a job in 8 days, while 3 men and 7 women finish it in 10 days. How many days will 10 women take to finish the job?

- 1) 24 2) 32 3) $10\frac{2}{3}$ 4) 36

25. A can do a piece of work in 12 days and B can do it in 18 days. They started the work

together but A left 3 days before the completion of work. The total number of days to complete the work is

- 1) $6\frac{3}{5}$ days 2) 9 days
3) $9\frac{1}{5}$ days 4) $10\frac{1}{5}$ days

26. 9 men have finished one-third of the work in 10 days. The number of additional men required for finishing the remaining work in 2 more days will be

- 1) 81 2) 78 3) 55 4) 30

27. Two pipes A and B can fill a tank in 20 and 24 minutes respectively and a third pipe can empty 3 gallons per minute. If A, B and C working together can fill the tank in 15 mts, The capacity of the tank in gallons is

- 1) 60 2) 120 3) 150 4) 180

28. A, B and C together can do a piece of work in 20 days. After working with B and C for 8 days, A leaves and then B and C complete the remaining work in 20 days more. In how many days, A alone could do the work?

- 1) 40 2) 50 3) 60 4) 80

29. A certain job was assigned to a group of men to do in 20 days. But 12 men did not turn up for the job and the remaining men did the job in 32 days. The original number of men in the group was

- 1) 32 2) 34 3) 36 4) 40

30. If x men can do a piece of work in 8 days and $(x-4)$ men can do the same work in 6 days. Then x is equal to

- 1) 6 2) 10 3) 12 4) 24

ANSWERS TO PRACTICE TEST

1. (1) 2. (3) 3. (2) 4. (4) 5. (2) 6. (1) 7. (4) 8.(3)
9. (4) 10. (4) 11. (1) 12. (3) 13. (1) 14. (1) 15. (2) 16.(3)
17. (1) 18. (2) 19. (3) 20. (2) 21.(4) 22. (2) 23. (4) 24. (3)
25. (b) 26. (1) 27. (2) 28.(2) 29.(1) 30. (3)