

**Formulas:**

1) If a person can do a piece of work in  $n$  days (hours), then that person's 1 day's (hour's) work is  $1/n$ .

Work done in  $m$  days (hours) is  $m/n$ .

2) *Total Work = Work done in units per day  $\times$  Time taken*

3) If a person is  $n$  times efficient than the second person, then work done by

First person: Second person =  $n:1$

And time taken to complete a work by

First person: Second person =  $1:n$

4) If A can do a piece of work in  $x$  days and B can do the same piece of work in  $y$  days then, together A and B will complete the work in  $\frac{xy}{x+y}$  days

5) If A can do a piece of work in  $x$  days, B can do the same piece of work in  $y$  days and C can do the same piece of work in  $z$  days then, together A, B and C will complete the work in  $\frac{xyz}{xy+yz+zx}$  days

6) If A and B can do a piece of work in  $x$  days and A alone can do the same piece of work in  $y$  days then, B will complete the work in  $\frac{xy}{y-x}$  days

7) If A and B can do a piece of work in  $x$  days, B and C can do the same piece of work in  $y$  days and C and A can do the same piece of work in  $z$  days, then working together A, B and C will complete the work in  $\frac{2xyz}{xy+yz+zx}$  days

**Practice Questions**

**Q1) A and B can finish a piece of work in 30 days, B and C can finish a piece of work in 40 days, while C and A can finish a piece of work in 60 days. How long will they take to finish it together?**

- 1) 80/3 days    2) 50/3 days    3) 25 days    4) 24 days

Work = LCM(30, 40, 60) = 120 units

Work done in a day: A =  $a$  units/day, B =  $b$  units/day, C =  $c$  units/day

$a + b = 120/30 = 4$  units/day;  $b + c = 120/40 = 3$  units/day;  $c + a = 120/60 = 2$  units/day

On adding the above equations,  $2(a + b + c) = 9$  i.e.  $a + b + c = 4.5$  units/day

Say the work is completed by A, B and C in ' $n$ ' days so,  $4.5n = 120$  i.e.  $n = 80/3$  days

**Q2) A can finish a piece of work in 5 days, B in 4 days and A, B and C together in 2 days. In what time will C do it alone?**

- 1) 25 days    2) 12 days    3) 15 days    4) 20 days

Work = LCM(5, 4, 2) = 20 units

Work done in a day: A =  $a$  units/day, B =  $b$  units/day, C =  $c$  units/day

$a = 20/5 = 4$  units/day;  $b = 20/4 = 5$  units/day;  $a + b + c = 20/2 = 10$  units/day

On solving,  $c = 1$  unit/day

Say the work is completed by C in 'n' days so,  $1(n) = 20$  i.e.  $n = 20$  days

**Q3) A and B can together finish a work in 30 days. They worked on it for 20 days and then B left. The remaining work was done by A alone in 20 more days. A alone can finish the work in**

- 1) 54 days      2) 40 days      3) 60 days      4) 48 days

Work = LCM(30, 20) = 60 units

Work done in a day: A = a units/day, B = b units/day

$a + b = 60/30 = 2$  units/day

Work done by A and B in 20 days = 40 units {2 units/day so, 40 units in 20 days}

Remaining Work =  $60 - 40 = 20$  units.

$$a = \frac{\text{Work}}{\text{Number of days}} = \frac{20}{20} = 1 \text{ unit/day}$$

Say the work is completed by A in 'n' days so,  $1(n) = 60$  i.e.  $n = 60$  days

**Q4) A, B and C can do a piece of work in 12, 18 and 24 days respectively, they work at it together, A stops the work after 4 days and B is called off 2 days before the work is done. In what time is the work finished?**

- 1) 12 days      2) 14 days      3) 16 days      4) 8 days

Work = LCM(12, 18, 24) = 72 units

Work done in a day: A = a units/day, B = b units/day, C = c units/day

$a = 72/12 = 6$  units/day;  $b = 72/18 = 4$  units/day;  $c = 72/24 = 3$  units/day

Say the work is completed in 'n' days.

A works for 4 days, B for  $(n - 2)$  days and C for n days

$$6(4) + 4(n - 2) + 3n = 72$$

On solving,  $n = 8$

**Q5) A can do a piece of work in 50 days and B in 40 days. They work together for 10 days and then A leaves B to finish the work alone. How long will B take to finish it?**

- 1) 11 days      2) 22 days      3) 26 days      4) 18 days

Work = LCM(50, 40) = 200 units

Work done in a day: A = a units/day, B = b units/day, C = c units/day

$a = 200/50 = 4$  units/day;  $b = 200/40 = 5$  units/day

Work done by A and B together in 10 days =  $(4 + 5)10 = 90$  units.

Remaining Work =  $200 - 90 = 110$  units.

Say the work is completed by B in 'n' days so,  $5n = 110$  i.e.  $n = 22$  days

**Q6) Two women, Ganga and Jamuna, working separately can mow a field in 8 and 12 hours respectively. If they work for an hour alternately, Ganga beginning at 9 am, when will the mowing be finished?**

- 1) 6:30 pm    2) 5:30 pm    3) 9:30 pm    4) 7:30 pm

Work = LCM(8, 12) = 24 units

Work done in a day: Ganga = a units/ hour, Jamuna = b units/hour

$a = 24/8 = 3$  units/ hour;  $b = 24/12 = 2$  units/ hour

As they are working alternatively so, 5 units are done in every 2 hours. i.e. 20 units in 8 hours

9<sup>th</sup> hour: Ganga does 3 units. So, 23 units are done after 9 hours.

Remaining work =  $24 - 23 = 1$  unit

Time taken by Jamuna to do this 1 unit =  $1/2 = 30$  minutes.

Total time taken is 9.5 hours i.e. work is completed at 6:30 pm.

**Q7) A can complete a work in 24 days and B can do the same work in 18 days. If A after working for 4 days, leaves the work, find in how many days B will do the remaining work?**

- 1) 10 days    2) 12 days    3) 15 days    4) 16 days

Work = LCM(24, 18) = 72 units

Work done in a day: A = a units/day, B = b units/day

$a = 72/24 = 3$  units/day;  $b = 72/18 = 4$  units/day

Work done by A in 4 days =  $3(4) = 12$  units.

Remaining Work =  $72 - 12 = 60$  units.

Say the work is completed by B in 'n' days so,  $4n = 60$  i.e.  $n = 15$  days

**Q8) A and B can do a piece of work in 20 days and 30 days. Both start the work together for sometime, but B leaves the job 5 days before the work is completed. Find the time in which work is finished.**

- 1) 7 days    2) 12 days    3) 14 days    4) 16 days

Work = LCM(20, 30) = 60 units

Work done in a day: A = a units/day, B = b units/day

$a = 60/20 = 3$  units/day;  $b = 60/30 = 2$  units/day

Say the work is completed in 'n' days.

A for n days, B for (n - 5) days

$3n + 2(n - 5) = 60$

On solving,  $n = 14$

**Q9) A and B can do a piece of work in 6 and 12 days, respectively. They (both) will complete the work in how many days?**

- 1) 9 days    2) 6 days    3) 4 days    4) 18 days

Work = LCM(6, 12) = 12 units

Work done in a day: A = a units/day, B = b units/day, C = c units/day

$a = 12/6 = 2$  units/day;  $b = 12/12 = 1$  units/day

When A and B are working together then work done by A and B in a day is  $1 + 2 = 3$  units/day

Say the work is completed by A and B (together) in 'n' days so,  $3n = 12$  i.e.  $n = 4$  days

**Q10) A does 20% less work than B. If A can complete a piece of work in 7.5 h, then B can do it in**

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

Say, work done by B = 5 units/h so, work done by A = 4 units/h (80% less work than B)

Work =  $4(7.5) = 30$  units {A does the work in 7.5 h}

Say the work is completed by B in 'n' days so,  $5n = 30$  i.e.  $n = 6$  h

**Q11) X can do a work in 16 days. In how many days will the work be completed by Y, if the efficiency of Y is 60% more than that of X?**

- 1) 10 days      2) 12 days      3) 25 days      4) 30 days

Say, efficiency of X = 5 units/day so, efficiency of Y = 8 units/day (60% more than X)

Work =  $5(16) = 80$  units {X does the work in 16 days}

Say the work is completed by Y in 'n' days so,  $8n = 80$  i.e.  $n = 10$  days

**Q12) A and B each working alone can do a work in 15 days and 25 days, respectively. They started the work together but B left after sometime and A finished the work in 7 days. After how many days from the start did B leave?**

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

Work =  $\text{LCM}(15, 25) = 75$  units

Work done in a day: A = a units/day, B = b units/day

$a = 75/15 = 5$  units/day;  $b = 75/25 = 3$  units/day

Say B left the work after 'n' days from start so,  $5n + 3n + 35 = 75$  i.e.  $n = 5$  days

**Q13) A, B and C can do a piece of work in 8, 12 and 15 days, respectively. A and B start working together but A quits after working for 2 days. After this, C joins B till the completion of work. In how many days will the work be completed?**

- 1)  $53/9$  days    2)  $34/7$  days    3)  $85/13$  days    4)  $15/4$  days

Work =  $\text{LCM}(8, 12, 15) = 120$  units

Work done in a day: A = a units/day, B = b units/day, C = c units/day

$a = 120/8 = 15$  units/day;  $b = 120/12 = 10$  units/day;  $c = 120/15 = 8$  units/day

Say the work is completed in 'n' days.

A works for 2 days, B for n days, C for (n - 2) days

$15(2) + 10n + 8(n - 2) = 120$

On solving,  $n = 53/9$  days.