

Note -: In conventional Method work is always treated as 1

**Example:** So if I say that a person can complete a work in 15 days that means he will do  $1/15$  work in one day, It's simple maths.

Now another person does the same work in 30 days. So he will do  $1/30$  work in 1 day.

Now if I ask in how many days they will complete the work together.

What we gonna do is Add their 1 day of work

like  $1/15 + 1/30 = (2+1)/30 = 3/30 = 1/10$

Now this  $1/10$  we got is actually their 1 day work, So if they do  $1/10$  work in one day then it's simple they will complete the whole work in 10 days.

Now that was the conventional method and I believe that you all know how to solve Questions through Conventional method.

**So now lets move on to the Faster method i.e efficiency method.**

In efficiency method the Work is not treated in numerical value, Like in Conventional method the work is 1 but here the work is treated as percentage.

**So by common sense the work is always treated as 100%**

So when I say a person completes a work in 15 days it means he will do  $100/15\%$  work in 1 day i.e  $6.66\%$  work in 1 day

If another person does the work in 30 days that means he will do  $3.33\%$  work in 1 day.

And together they will do  $6.66 + 3.33 = 9.99$  or  $10\%$  work in one day So in how many days they will do the complete work, that will be  $100/10 = 10$  days.

Now it may sound difficult That we have to convert Each value in % but don't worry you don't have to convert each value, You just have to learn all the values till  $1/30$  and then it will be a cakewalk.

Now we will take Some standard Cases Of time and work and you all are free to ask any problem if you have in any case.

**Case 1 - A does a work in X days, B does a Work in Y days In how many days they will complete the work.**

**Question- A completes the work in 10 days and B completes the work in 15 days In how many days they will complete the work.**

**Conventional Method**

Work done by A in 1 day =  $1/10$

Work Done by B in 1 day =  $1/15$

Work done By A & B together in 1 day =  $1/10 + 1/15 = (3+2)/30 = 5/30 = 1/6$

As A & B Completes  $1/6$  work in one day So they will complete the whole work in 6 Days.

**Efficiency method.**

Efficiency of A =  $100/10 = 10\%$

Efficiency of B =  $100/15 = 6.66\%$

Efficiency of A & B Together =  $10 + 6.66 = 16.66\%$

So the time taken by A & B together to Complete the work will be  $100/16.66 = 6$  Days.

**Case -2 A can do a work in X days and B can do it Y days, In how many days the work is completed if they work alternatively Started by A.**

Now in these type of question the person are not actually working together, what happens in this type of question is that A works for 1 day and then on 2nd day B work and on 3rd again A work and on Fourth again B works and so on till the work is completed.

For example A can do a work in 10 days B can do it 15 days and how many

For example A can do a work in 10 days B can do it in 15 days and how many days they will finish it if The work is started by A

So again work done by A in one day =  $1/10$

" " " " " B " " " =  $1/15$

Now the work done by Together will be =  $1/10 + 1/15 = 1/6$  [ Note now this  $1/6$  work is not done by them in 1 day but in 2 days Actually, See A worked for 1 day and did  $1/10$  work on the second day B worked and finished the  $1/15$  work So in total 2 days they did  $1/6$  work]

So in 2 days they did  $1/6$  work so in how many days they will complete the whole work, Simple 12 days.

#### Efficiency Method

A's Efficiency = 10%

B's Efficiency = 6.66%

A + B Efficiency = 16.66%

Work done by A and B in 2 days [ remember 2 days because they are not working together but working alternatively] = 16.66%

So time taken by them to complete 100% work =  $100/(16.66) = 6$  [ but always remember multiply this by 2, Because 16.66% work is done by them in 2 days and not in 1 day.

So The answer will be  $6*2 = 12$  days.

#### Case 3: A can do a work in X days, B can do the work Y days and A leaves after working Z days.

**Question- A can do a work in 10 days and B can do it in 15 days, A works for 2 days and then leaves, In how many days will the work be completed?**

Now here we can see that A leaves after 2 days that means A and B only worked for 2 days and the remaining work is done by B alone.

So first we have to calculate the work done by A and B together in 2 days.

So work done by A in 1 day =  $1/10$

" " " " B " " " =  $1/15$

Work done by A & B together in 1 day =  $1/10 + 1/15 = 1/6$

Work done by A & B together in 2 days =  $(1/6) * 2 = 1/3$

So remaining work =  $1 - 1/3 = 2/3$

Now this  $2/3$  work has to be done by B alone.

So it takes 15 days for B to do Complete work, How much time it will be taken by B to do  $2/3$  work ? So it will be  $15*(2/3) = 10$  days

So the work will be completed in  $2 + 10$  days = 12 days

#### Efficiency method

A's efficiency = 10%

B's Efficiency = 6.66%

Total a+b = 16.66%

work done by A and B together in 2 days =  $16.66*2 = 33.33\%$

Work remaining = 66.66%

time taken by B to complete 66.66% work =  $66.66/6.666 = 10$  days

Total time =  $10+2 = 12$  days

#### Case 4

**A can do a piece of Work in 10 days and B can do it in 15 days, In how many days will the work be completed if B leaves 2 days before the completion on work.**

Now in this question B leaves before 2 days

Together they can do the work in what =  $1/10 + 1/15 = 1/6$

That means 6 Days.

That means Together they could have completed the work in 6 days but B works only till 4th day and The remaining work will be done by A alone

So they worked together for 4 days in all So work done by them in 4 days =  $(1/6)*4 = 4/6 = 2/3$

remaining work =  $1/3$

Now this  $1/3$  work will be done by A alone

Now A can do the complete work in 10 days, So the time taken by him to do  $1/3$  work =  $10 * (1/3) = 10/3$  days or 3.33 days

So total time taken =  $4 + 3.33$  days = 7.33 days

#### Efficiency method

A's efficiency = 10%

B's efficiency = 6.66%

Total = 16.66%

Work will be completed in 6 days

Work done in 4 days = 66.66%

remaining = 33.33%

A will complete the remaining in =  $33.33/10 = 3.33$

Total =  $4+3.33 = 7.33$

**Case 5: A can do a Work in X days B can Do it in Y days, In how many days The work will get completed if B leaves 2 days before the actual completion of work.**

**Question: A can do a work in 10 days B can do it in 15 days, In how many days The work will get completed if B leaves 2 days before the**

**Actual Completion of Work.what is the difference between this Actual completion of work and Completion of Work?**

See in last example the work was supposed to get completed in 6 days, So we just Solved the question taking into consideration that B leaves 2 days before the completion of work i.e B worked for 4 days and the rest 2 days

before the completion of work i.e B worked for 4 days and the rest 2 days work was done by A alone and Completes that work in 3.33 days Total 7.33 days.

So if i ask In this question If B left 2 days before the actual completion then it means B should have left on 5.33 days Got it ?

Now back to the question.

Now just imagine that the work gets completed in x days.

So A would work for x days[ A works for the whole time ]

And B would work for x-2 days[ because B left 2 days before the actual completion of work]

So now According to Question

$$x/10 + (x-2)/15 = 1 \text{ [ Because work is always one ]}$$

$$(3x+2x-4)/30 = 1$$

$$5x - 4 = 30$$

$$5x = 34$$

$$x = 6.8 \text{ days.}$$

So the work will be completed in 6.8 Days.

It can also be asked That after how many days B left, So the answer would be Simple  $6.8 - 2 = 4.8$  days

### **Efficiency Method**

A's Efficiency = 10%

B's Efficiency = 6.66%

Let the no. of days be x

so According to question

$$10x + 6.66(x-2) = 100 \text{ [ Work is always 100% in efficiency method ]}$$

$$10x + 6.66x - 13.33 = 100$$

$$16.66x = 113.33$$

$$x = 113.33/16.66 = 6.8$$

Answer = 6.8 days