



How to approach work men effort questions



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Here, I will give you few points to remember, keep those in mind, whenever you are approaching a question that is related to work and efficiency.

(i) Remember one formula : **Efficiency = Job/ Time taken**

(ii) Let's take few cases and check , how it works:

Case 1 : Pool capacity - 15000 Cubic liter, Drain can drain the water at 8000Cubic liter per hour. Find the time taken to drain the pool.

First, find the efficiency of drain, Efficiency of Drain = $8000/1$.

In order to empty the tank, we need to have the efficiency of drain to do the job of emptying the tank of capacity 15000 cubic liter. So, use the same formula.

Efficiency = Job/Time taken

Here, efficiency is the efficiency of the drain.

Job is nothing but, emptying the 15000 cubic liter pool.

So, $8000/1 = 15000/\text{Time taken}$

Therefore, Time taken = $15000/8000 = 1.875$ hours.

Case 2 : Pool Capacity - 15000 Cubic liter , tap can fill the entire pool at 10000Cubic liter per hour.

Here, use the same method as previous case.

Efficiency of tap = $10000/1$

In order to fill the pool , we need to have the efficiency of tap.

So, $10000/1 = 15000/\text{Time taken}$

Therefore, Time taken = $15000/10000 = 1.5$ hours.

Case 3 : Pool Capacity - 15000 Cubic liters, It need to be emptied with the drain and then filled with water.

So, we have a drain with 8000Cubic liter/hr and a tap with 10000Cubic liter/hr.

Here, our first work is to drain the pool and the second work is to fill the pool.

Treat it as a separate questions, find the time taken for draining the water and then find the time taken to fill the water. Then adding both the time taken is the solution for this case.

The solution will be $1.875 + 1.5 = 3.375$ hours.

Case 4 : If an additional point is added to Case 3, say, both the drain and tap are opened simultaneously.

Then how should we proceed.

Efficiency of tap = $10000/1$, Efficiency of Drain = $8000/1$

In this case, we will be filling the pool by opening the tap and the drain together. If that happens, some amount of water will be added and some amount of water will be drained. So, the efficiency of tap will be added and the efficiency of drain will be deducted.

Hence, the formula will be,

(Efficiency of Tap - Efficiency of drain) * Time taken = Capacity of the pool

$[(10000/1) - (8000 / 1)] * \text{Time taken} = 15000$

Therefore, Time taken = $15000/2000 = 7.5$ hours.

Case 5 : If we have two drains to empty the pool.

Then, the formula to find the time taken to empty the pool will be

$(\text{Efficiency of Drain 1} + \text{Efficiency of Drain 2}) = \text{Capacity of the pool} / \text{Time taken.}$

Case 6 : What will be time taken to fill the pool with water if we have two taps.

The formula will be

$(\text{Efficiency of Tap 1} + \text{Efficiency of Tap 2}) = \text{Capacity of the pool} / \text{Time taken.}$

Case 7 : In this case we have , two drains to drain the water and two taps to fill the water. What will be the time taken to fill the water in the pool, if drains are operated first and tap operated after that.

First find the time taken to drain the water from the pool.

$(\text{Efficiency of Drain 1} + \text{Efficiency of Drain 2}) = \text{Capacity of the pool} / \text{Time taken}$

Now find the time taken to fill the water in the pool

$(\text{Efficiency of Tap 1} + \text{Efficiency of Tap 2}) = \text{Capacity of the pool} / \text{Time taken}$

We will get the solution, by adding both the time taken.

Case 8 : It is the extreme case, where both the drains and both the taps will be opened simultaneously.

The formula will be

$[(\text{Efficiency of Tap 1} + \text{Efficiency of Tap 2}) - (\text{Efficiency of Drain 1} + \text{Efficiency of Drain 2})] = \text{Capacity of the pool} / \text{Time taken.}$

Hope you are clear with all the cases. If you remember the basic formula, it will be easy to solve any question.

Let's take two questions from the test, to solve in the similar way.

Question 1 :

“Andy started on a job he could complete in 100 min. Exactly after 50 minutes, he handed it over to Bernie, who could have seen it through in 40 min, but after 20 minutes he had to hand it over to Charlie, who saw it through in 15 minutes. Compare the rate ?”

Efficiency = Job done/ Time taken

Efficiency of Andy = Job/100 ----- (1)

After 50 minutes , Andy left the job.

So, Andy has completed only $\frac{1}{2}$ the job.

It is said, the remaining $\frac{1}{2}$ will be completed by Bernie.

In the question, it is given, Bernie could have completed the remaining job in 40 Minutes.

It means, Bernie will complete half the job in 40 minutes.

So, Bernie will complete the entire job(that is 1 full job) in 80 Minutes.

Therefore, Efficiency of Bernie = $J/80$ -----(2)

It is mentioned that, Bernie worked only for 20Minutes.

So, in 20 Minutes, how much of the Job, he must have completed.

$\frac{1}{2}$ of the Job, Bill can complete in 40 Minutes

In 20 minutes, he must have completed $\frac{1}{2} * 20 * 1/40 = 1/4^{\text{th}}$ of the Job is left out by Bernie in the $\frac{1}{2}$ of the Job given to him.

So, by Andy and Bernie, the amount of Job, that is completed are $\frac{1}{2} + \frac{1}{4} = \frac{3}{4}$

Left out Job = $1 - \frac{3}{4} = \frac{1}{4}$

This $\frac{1}{4}$ th of the job was worked by Charlie : Charlie worked for 15 minutes

For $1/4^{\text{th}}$ of the Job = Charlie spends 15 minutes

So, for one whole job = 60 Minutes

Therefore, Efficiency of Charlie = $J/60$ -----(3)

Equation (1) , (2) and (3) are the efficiencies of 3 people to do the entire job, so, find the Ratio between their efficiencies

$J/100 : J/80 : J/60$

12: 15 : 20

Question 2 :

"A job can be done individually or jointly by Sam and Ham. Sam takes normally 6 days and Ham 8 days. In how many days will both working together on it will complete 60% of it?"

Sam takes normally to complete a job in 6 days.

Efficiency = Job/Time taken

Efficiency of Sam = $\text{Job}/6$ -----(1)

Ham takes normally to complete a job in 8 days

Efficiency of Ham = $\text{Job}/8$ -----(2)

Both working together wants to complete 60% of Job.

Formula will be: (Efficiency of Sam + Efficiency of Ham) = Job to be done/ Time taken

Which means : $(\text{Job}/6 + \text{Job}/8) = 60\% \text{Job} / \text{Time taken}$

$(14\text{Job} / 48) * \text{Time taken} = (60/100)\text{Job}$
Therefore, **Time taken = 2 (4/70).**

Hope you got the concept clear.

