AILET

# Quantitative Techniques: Time and Work Explained for CLAT 2020

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**Time and Work**

The concept of how much time one takes to complete a job/work or how much work is done in the stipulated time is known as TIME AND WORK relation. It eventually leads to finding the efficiency of a person to complete a work.

Suppose A and B are assigned the same job of painting a wall, it's not necessary that both will complete the job at the same time, one might take 2 hours and the other 4 for completion of the task. Thus, both A and B will differ in the efficiency of doing a job.

Now the question arises how we measure this time and efficiency. There's an inverse relationship here, understand this Is the person who is taking more time to complete a job is efficient the same way the like the other one who is taking less time to do the same job?

In your head, you would have automatically answered no because you know that the one who is taking more time to complete a job is not working thoroughly hence the word efficiency comes in play. As more time is taken we say less efficient the person is hence time and efficiency have an inverse relation. When the question comes in the form of Pipes and Cistern, the word efficiency is replaced by Rate of falling.

When it is said that the person has completed work the inherent assumption in such a case is that he/she would have completed 100% work. For example, if A completes a work in 2hrs then in 1 hr he/she would have completed 50% of the work.

Now as we have established the relation between time work and efficiency, let's see how to solve the basic numerical portion. *When we say that A can do a job in n days or hours, then we go back to the basic unitary method to deduce how much work a can do in 1 day or 1hr. The formula for the above would be:*

**If A can do a work in n day then work done in 1 day would be 1/n**

Now comes the part when a comparative case of work done is given. Suppose in a question a situation is given that A is twice as good as B. Then we would say that **Ratio of work done by A and B = 2:1**

**As the time taken is inverse of work done hence, the ratio of time taken by A & B to finish work= 1:2.**

**When work is complete we symbolise the completion of task as 1, hence no matter how many people are doing a task the equation has to be equated to be 1.**

**Example**

Payal can do a task in 7 days while Neha can do the same task in 10 days. Who is more efficient in the given situation.

**Solution**

*Payal can do a task in 7 days, hence she can complete 1/7th of the task in one day.*

*Neha can do a task in 10 days, hence she can complete 1/10th of the task in one day.*

**As 1/7th work is more than 1/10th work, hence Payal can do more work in 1 day, i.e., Payal is more efficient.**

**Example**

If A can do a task in x hours, B can do the same task in y hrs and C can do the task z hrs. Thus, the generalised equation is: 1/x + 1/y + 1/z = 1. 9 [As task by A+B+C = 1 ]

**Example**

If A can do complete work alone in 8 hrs while B can do the same work in 12 hrs alone, How long it will take to do the job if they work together?

**Solution**

*One day work of A = 1/8*

*One day work of B = 1/12*

*Together they can do 1/8 + 1/12 work = 5/24 work*

***A and B can complete the work in 24/5 hrs.***

**Example**

A can do a piece of work in  9 days by working 8 hours a day while b can complete the work in 8 days by working 10 hrs a day. How long it will take to do the work together if they work 9hrs a day.

**Solution**

As days and hours concept is combined, we will first convert the work in hours to make it easier.

A can complete the whole work in 9*8 hrs = 72 hrs: A's 1hr work = 1/72

B can complete the whole work in 8*10 hrs = 80hrs: B's 1hr work = 1/80

A and B's 1hr work = 1/72 + 1/80 = 1/8(1/9 + 1/10) = 19/90*8

Both will finish the work in 720/19 hrs

Together they take 9 hrs*n days to complete the task.

***No of days A and B will together take to complete a task  = 720/19*9 = 80/19 days***

**NOTE:** When you will solve questions it might get a bit tricky because of fraction conversion hence do practice as many questions as you can. Also, read the article repeatedly whenever you get stuck with the concept it will take 2-3 reads to be thorough.

Read the theory on Simple and Compound Interest here.

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