Answer on Question #42730 – Math - Other

A and B together can complete a piece of work in 15 days. A alone undertakes the work. He works for 18 days and leaves the job. Then B alone undertakes the remaining work and completes it in another 10 days. Had A continued the work, how many more days he would have required to complete the work alone?

A 8 days

B 6 days

C 9 days

D 12 days

Solution.
Let the piece of work equal 1. Let a and b be A and B's individual rate of working, respectively.
We add the individual rates of working to get the rate of working together.
Then, we can write an equation for each sentence concerning shared work.
"A and B together can complete a piece of work in 15 days":

$$\frac{1}{a+b} = 15$$

"A alone undertakes the work. He works for 18 days and leaves the job. Then B alone undertakes the remaining work and completes it in another 10 days":

$$18a + 10b = 1$$

Now we solve the system of equations:

$$\begin{cases} \frac{1}{a+b} = 15, \\ 18a + 10b = 1; \end{cases} \begin{cases} a + b = \frac{1}{15}, \\ 18a + 10b = 1; \end{cases} \begin{cases} b = \frac{1}{15} - a, \\ 18a + 10(\frac{1}{15} - a) = 1; \end{cases} \begin{cases} b = \frac{1}{15} - a, \\ 8a = \frac{1}{3}; \end{cases} \begin{cases} b = \frac{1}{15} - a, \\ a = \frac{1}{24}. \end{cases}$$

So, we have $a = \frac{1}{24}$, and now we should calculate how many days x are needed for A to do the piece of work which equals $(1 - 18a)$, since he has already done $18a$.

$$x = \frac{1 - 18a}{a} = \frac{1}{a} - 18 = 6$$

Hence, A needs 6 more days to complete the work alone.
Answer: 6 days.