

A, B and C can finish a piece of work in 10, 12 and 15 days respectively. If B stops work after 2 days, how long will it take A and C to finish the work?

Solution:

$$\begin{array}{l}
 \text{rate for A: } \frac{1}{10} \frac{\text{work}}{\text{day}} \\
 \text{rate for B: } \frac{1}{12} \frac{\text{work}}{\text{day}} \\
 \text{rate for C: } \frac{1}{15} \frac{\text{work}}{\text{day}}
 \end{array}
 \left. \vphantom{\begin{array}{l} \text{rate for A: } \\ \text{rate for B: } \\ \text{rate for C: } \end{array}} \right\} \begin{array}{l}
 \rightarrow \text{work rate for} \\
 \text{all 3 together:} \\
 \frac{1}{10} + \frac{1}{12} + \frac{1}{15} \\
 = \frac{6}{60} + \frac{5}{60} + \frac{4}{60} \\
 = \frac{15}{60} = \frac{1}{4} \frac{\text{work}}{\text{day}}
 \end{array}$$

After 2 days:

$$2 \text{ days} \cdot \frac{1}{4} \frac{\text{work}}{\text{day}} = \frac{1}{2} \text{ work is done.}$$

How much do we have left to do?

$$1 - \frac{1}{2} = \frac{1}{2} \text{ work}$$

rate of A and C together:

$$\frac{1}{10} + \frac{1}{15} = \frac{3}{30} + \frac{2}{30} = \frac{5}{30} = \frac{1}{6} \frac{\text{work}}{\text{day}}$$

$$\text{time} = \frac{\text{work (amount)}}{\text{rate}} = \frac{\frac{1}{2}}{\frac{1}{6}} = \frac{1}{2} \times \frac{6}{1} = 3 \text{ days}$$