

5. A worker can complete a project in 12 hours. His colleague does it in 8 hours. A third worker can do the same in 16 hours. The first two start working together. After 4 hours, the second worker leaves, and the third one takes over. How long will it take to complete the project?

Date: _____

Day: _____

Sol:

① $P(A) + P(B) + P(C) = P(A+B+C)$

Worker A 12 hours $\frac{1}{12}$

Worker B 8 hours $\frac{1}{8}$

Worker (C) 16 hours $\frac{1}{16}$

② Combine task of 4 hours of A/B

③ $\frac{4}{A} + \frac{4}{B} = \frac{1}{3} + \frac{1}{2}$

⑤ $\frac{2}{6} + \frac{2}{6} = \frac{4}{6}$

④ LCM

$$\begin{array}{r|l} 2 & 3, 2 \\ 3 & 3, 1 \\ & 1, 1 \end{array}$$

⑥ ~~After~~ So, after 4 hours $\frac{5}{6}$ hours work done

$3 \times 2 = 6$

⑦ Finding the remaining work $= 1 - \frac{5}{6} = \frac{1}{6}$

$\frac{1}{12} + \frac{1}{16} =$

⑨ $\frac{4+3}{48} = \frac{7}{48}$

⑧ LCM

$$\begin{array}{r|l} 2 & 12, 16 \\ 2 & 6, 8 \\ 2 & 3, 4 \\ 2 & 3, 2 \\ 3 & 3, 1 \\ & 1, 1 \end{array}$$

⑩ Simplification

⑪ Final time

$\frac{1}{6} \div \frac{7}{48}$

⑫ $\frac{1}{6} \times \frac{48}{7} = \frac{8}{7}$

Thus, the work will take $\frac{8}{7}$ hours to be complete

Date: _____

Day: _____

In short, total time taken in both the phases:

~~First st~~
First phase $\frac{4}{6}$ hours
Second phase $\frac{8}{7}$ hours