

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:

$$\textcircled{1} \quad P(A) + P(B) + P(C) = P(A+B+C)$$

Worker A 12 hours  $\frac{1}{12}$ Worker B 8 hours  $\frac{1}{8}$ Worker (C) 16 hours  $\frac{1}{16}$ 
 $\textcircled{2}$  Combine task of 4 hours of A/B

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

$$\textcircled{5} \quad \frac{2}{6} + \frac{2}{6} = \boxed{\frac{4}{6}}$$

 $\textcircled{4}$  LCM

$$\begin{array}{r} 2 \mid 3, 2 \\ 3 \mid 3, 1 \\ \hline 1, 1 \end{array}$$

 $\textcircled{6}$  ~~Remaining~~ So, after 4 hours  $\frac{5}{6}$   $3 \times 2 = 6$   
 hours work done

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

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

$$\textcircled{8} \quad \frac{4}{48} + \frac{3}{48} = \boxed{\frac{7}{48}}$$

 $\textcircled{9}$  LCM

$$\begin{array}{r} 2 \mid 12, 16 \\ 2 \mid 6, 8 \\ 2 \mid 3, 4 \\ 2 \mid 3, 2 \\ \hline 3 \mid 3, 1 \\ \hline 1, 1 \end{array}$$

 $\textcircled{10}$  Simplification

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

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

 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