

# CHAPTER 9

## TIME AND WORK—APPLICATION OF DIRECT VARIATION

### More Questions for Practice

1. Answer the following questions:
  - (i) Joseph can do half of a certain work in 6 days. How much work can he do in 1 day?
  - (ii) Radhika can embroider  $\frac{1}{3}$ rd portion of a shawl in 10 days. In how many days can she complete the shawl?
2. Sanjay and Rajan can build a wall in 12 days, while Rajan and Chetan in 15 days and Chetan and Sanjay in 20 days. How long would each take to do the same work?
3. Nidhi can do a piece of work in 20 days and Seema in 30 days. They began to work together but Nidhi left after some days. Seema finished the remaining work in 10 days. After how many days did Nidhi leave?
4. Murlidharan can plough a field in 18 hours. After he worked for 2 hours, Sohan joined him in work and finished the work in 10 hours. How many hours will Sohan take to finish this work if he works alone?

[Hint: Murlidharan's 2 hours work =  $\frac{2}{18} = \frac{1}{9}$

Remaining work after 2 hours =  $1 - \frac{1}{9} = \frac{8}{9}$

Let Sohan complete the work alone in  $n$  hours. Then,

Murlidharan's + Sohan's 1 hour work =  $\frac{1}{18} + \frac{1}{n} = \frac{n+18}{18n}$

This 10 hours work =  $\frac{10(n+18)}{18n}$

Equating  $\frac{10(n+18)}{18n}$  to  $\frac{8}{9}$ , we get  $n = 30$ .]

5. Asif is thrice as good a workman as Bijoy, and Bijoy is twice as good a workman as Raj. If the total wages for the work is ₹ 1800, find the amount each will receive in proportion to the work done by each.
6. Mohan can do a certain job in 12 days. Sohan is 60% more efficient than Mohan. Find the number of days taken by Sohan to finish the job.
7. Anjali can do  $\frac{1}{5}$ th of a piece of work in 12 days and Shivani can do  $\frac{1}{6}$ th of the work in 15 days. In how many days can both do it together?

8. Sakshi and Surbhi can do a job in 12 days. After working for 2 days, they are assisted by Vinni, who works at the same rate as Sakshi. The work takes  $6\frac{1}{4}$  days more to finish. In how many days will Surbhi alone do the work?

[Hint: Let Sakshi and Surbhi complete the work while working alone in  $x$  and  $y$  days respectively. Then,

$$\frac{1}{x} + \frac{1}{y} = \frac{1}{12}$$

$$\text{and} \quad \frac{25}{4} \left( \frac{1}{x} + \frac{1}{y} + \frac{1}{x} \right) = 1 - \left( \frac{2}{x} + \frac{2}{y} \right)$$

$$\Rightarrow \frac{25}{4} \left( \frac{1}{12} - \frac{1}{y} + \frac{1}{x} + \frac{1}{12} - \frac{1}{y} \right) = 1 - \left( \frac{2}{12} - \frac{2}{y} + \frac{2}{y} \right)$$

$$\Rightarrow \frac{25}{4} \left[ \frac{1}{6} - \frac{1}{y} \right] = \frac{5}{6} \Rightarrow \frac{1}{6} - \frac{1}{y} = \frac{2}{15} \Rightarrow \frac{1}{y} = \frac{1}{30} \Rightarrow y = 30.]$$

9. Two taps can fill a tank in 10 minutes and 15 minutes respectively while a third tap can empty it in 30 minutes. If all three are opened at the same time, then in how many minutes will the tank be filled?
10. A man and a woman working together can do a piece of work in 30 days. If their one day's work is in the ratio 6 : 7, how many days will a man working alone take to do the work?
11. A tank is normally filled in 8 hours but takes 2 hours longer to fill because of a leak in its bottom. If the tank is full, in how many hours will the leak empty it?
12. Three pipes X, Y and Z can fill a cistern in 6 hours. After working together for 2 hours, Z is closed and X and Y fill the cistern in 8 hours. Find in how much time the cistern can be filled by the pipe Z.
13. A pipe can fill a tank in 12 minutes and another pipe in 15 minutes, but a third pipe can empty it in 6 minutes. The first two pipes are kept open for 5 minutes in the beginning and then the third pipe is also opened. In what time is the tank emptied?

## ANSWERS

1. (i)  $\frac{1}{12}$       (ii) 30 days
2. Sanjay will take 30 days, Rajan will take 20 days and Chetan will take 60 days.
3. 8 days      4. 30 hours      5. Asif = ₹ 1200, Bijoy = ₹ 400 and Raj = ₹ 200.
6.  $7\frac{1}{2}$  days      7. 36 days      8. 30 days.      9.  $7\frac{1}{2}$  minutes      10. 65 days
11. 40 hours      12. 12 hours      13. 45 minutes