

Work done depends upon the number of people who are working and the number of days.

$$Work \propto n \dots(1)$$

Where n is the number of people who are working.

$$Work \propto d \dots(2)$$

Where d is the number of days.

Merging equation 1 and equation 2

$$Work \propto nd$$

$$Work = knd, \text{ where } k \text{ is the constant of proportionality}$$

$$Work = k(\text{Men})(\text{Days}), \text{ if men and days are given}$$

$$Work = k(\text{Men})(\text{Hours}), \text{ if men and hours are given}$$

$$Work = k(\text{Men})(\text{Days})(\text{Hours}), \text{ if men, days and hours are given}$$

NOTE: If one parameter increases, then other parameter is bound to decrease and vice-versa.

SHORTCUT:

1) If $\frac{1}{n}$ of the work is done in a day, then the entire work is done in n days.

2) If the cost of n articles is c , then the cost of m articles is $\frac{c \times m}{n}$

However, if a student does not wish to use the formulas specified above then the student can use the formulas given below.

$$\frac{M_1 D_1 H_1}{W_1} = \frac{M_2 D_2 H_2}{W_2} \text{ if men, days and hours are given.}$$

$$\frac{M_1 D_1}{W_1} = \frac{M_2 D_2}{W_2} \text{ if men and days are given.}$$

$$\frac{M_1 H_1}{W_1} = \frac{M_2 H_2}{W_2} \text{ if men and hours are given.}$$

where W is the work, M is the number of men/women (whichever is given to us in the question), H are the number of hours and D are the number of days.

Q1) If cost of 15 eggs is Rs 75, then find the cost of 4 dozen eggs.

- 1) Rs 240 2) Rs 300 3) Rs 150 4) Rs 185

Solution:

$$15 \text{ eggs} = \text{Rs } 75$$

$$1 \text{ egg} = \text{Rs } 5$$

$$1 \text{ dozen eggs i.e. } 12 \text{ eggs} = \text{Rs } 60$$

$$4 \text{ dozen eggs} = \text{Rs } 240 \quad (\text{Using Unitary method})$$

SHORTCUT: If the cost of n articles is c , then the cost of m articles is $\frac{c \times m}{n}$.

Q2) If 8 men can do a piece of work in 6 days. Then, 24 men can do twice the work in how many days?

- 1) 4 2) 6 3) 8 4) 9

Solution:

Let d be the required days.

$$\frac{8 \times 6}{W} = \frac{24 \times d}{2W}$$

On solving, $d = 4$ days

Q3) If 12 women can do a piece of work in 8 days working 6 hours a day. Then, 16 women can do the same piece of work in how many days, working 4 hours a day?

- 1) 4 2) 6 3) 8 4) 9

Solution:

Let d be the required days.

$$\frac{12 \times 8 \times 6}{W} = \frac{16 \times d \times 4}{W}$$

On solving, $d = 9$ days

Q4) A hostel had provision for 240 girls for a few days. After 10 days 48 girls joined the hostel and the provision lasts for 15 days?

- 1) 22 days 2) 36 days 3) 42 days 4) 28 days

Solution:

Say the hostel had a provision for x days

$$240 \times x = 240 \times 10 + (240 + 48) \times 15$$

On solving, $x = 28$ days

Q5) 18 men promised to do a job in a few days. 2 of them were absent and it took 1 more day than the planned number of days. Find the planned number of days?

- 1) 16 2) 12 3) 10 4) 8

Solution:

Let x be the planned number of days. So, 18 men can do the job in x days.

16 men did this job in $(x+1)$ days.

So, $18x = 16(x + 1)$

On solving, $x = 8$

Q6) If 'n' cats can eat 'n' rats in 'n' hours. At the same rate, how many rats would be eaten by '3n' cats in '3n' hours?

- 1) n 2) 6n 3) 3n 4) 9n

Solution:

As 'n' cats can eat 'n' rats in 'n' hours so, 1 cat can eat 1 rat in 'n' hours.

'3n' cats can eat '3n' rats in 'n' hours

'3n' cats can eat '9n' rats in '3n' hours

Q7) If 2 birds can eat 4 worms in 3 hours. At the same rate, how many birds are required to eat 32 worms in 8 hours?

- 1) 12 2) 21 3) 4 4) 6

Solution:

As 2 birds can eat 4 worms in 3 hours so, 1 bird can eat 2 worms in 3 hours.

6 birds can eat 32 worms in 8 hours

Q8) If 10 women can make 725 pencils in 12 days working 8 hours a day. Then how many pencils can be made by 4 women in 16 days working 9 hours a day?

- 1) 1200 2) 435 3) 480 4) None of these

Solution:

Let p be the pencils made.

$$\frac{10 \times 12 \times 8}{725} = \frac{4 \times 16 \times 9}{p}$$

On solving, $p = 435$

Q9) 4 boys or 5 girls can do a piece of work in 39 days. If m boys and n girls can do this piece of work in 20 days then find m, n ?

- 1) 5, 6 2) 3, 6 3) 6, 5 4) 6, 3

Solution:

$$4b = 5g$$

$$\frac{4 \times 39}{W} = \frac{x \times 20}{W}$$

On solving, $x = 7.8$ i.e. 7.8 boys are required to do this piece of work in 20 days.

$$1g = 0.8b.$$

$$6g = 4.8b$$

$$3b + 6g = 3b + 4.8b = 7.8b$$

Q10) 240 people working 9 hours per day can complete $\frac{3}{5}$ of a work in 16 days. The number of additional people working 6 hours a day required to complete the remaining work in 12 more days?

- 1) 320 2) 80 3) 60 4) None of these

Let x be the number of additional people required.

$$\frac{240 \times 9 \times 16}{\frac{3}{5}W} = \frac{(240 + x) \times 6 \times 12}{\frac{2}{5}W}$$

On solving, $x = 80$