

Time and Work

Type: Sum total of work, One variable Algebra

Q1. A and B undertake to do a piece of work for Rs. 600. A alone can do it in 6 days, while B alone can do it in 8 days. With the help of C, they finish it in 3 days. Find B's share.

- A. 180 B. 290 C. 225 D. 100

Solution: B completes $\frac{1}{8}$ th of work in one day. Since the work totally took 3 days to complete, B's amount of work was $3 \times (\frac{1}{8}) = \frac{3}{8}$. So B's share will be $\frac{3}{8}$ th of 600 = $(\frac{3}{8}) \times 600 = \mathbf{225}$

Q2. Ramesh can dig a well in 16 days and Suresh can dig the same well in 24 days. Ramesh, Suresh and Andrews together dig the well in 8 days. Andrews alone can dig the well in how many days?

- A. 32 days B. 48 days C. 96 days D. 24 days

Solution: Let Andrews take x days to complete the work, working alone.

Ramesh, Suresh and Andrew working together do $[\frac{1}{16} + \frac{1}{24} + \frac{1}{X}]$ work in one day.

in 8 days:- $8 [\frac{1}{16} + \frac{1}{24} + \frac{1}{X}] = 1 \dots (1)$

Solving equation (1) $X = \mathbf{24}$

Q3. A can do a work in 18 days, B in 9 days and C in 6 days. A and B start working together and after 2 days C joins them. In how many days will the job be completed?

- A. 4.33 days B. 4 days C. 4.66 days D. 5 days

Solution: Let it take x days to complete the work from the 3rd day

Work done by A+B in 2 days + Work done by A+B+C in x days = Total Work = 1

$2(\frac{1}{18} + \frac{1}{9}) + x(\frac{1}{18} + \frac{1}{9} + \frac{1}{6}) = 1 \dots (1)$

Solving (1) $x = 2$ and total days to complete the work = $x+2 = \mathbf{4 \text{ days}}$.

Q4. Taps A and B can fill a tank in 12 min and 15 min respectively. If both are opened and A closed after 3 mins, how long will it take for B to fill the tank?

- A. 7 min 45 s B. 7min 33s C. 8 min 15s D. 12m 30s

Solution: Let it take x more minutes for tap B to fill the tank after A is closed.

Work done by A+B in 3 minutes + Work done by B in x minutes = 1

$$3(1/12 + 1/15) + x(1/15) = 1 \dots (1)$$

Solving (1) $x = 8.25 \text{ min} = \mathbf{8 \text{ minutes and } 15 \text{ sec.}}$

Q5. There are two pipes in a tank. Pipe A is filling the tank and Pipe B is emptying the tank. If A can fill the tank in 10 hours and B can empty the tank in 15 hours then find how many hours will it take to completely fill a half empty tank?

- A. 30 B. 15 C. 20 D. 33.33

Solution: Let A and B work together for x hours.

$$x(1/10 - 1/15) = 1/2 \dots (1) \quad [1/2 \text{ represents half tank.}]$$

Solving (1) $x = \mathbf{15 \text{ hours}}$

Q6. A cistern is normally filled in 5 hours. However, it takes 6 hours when there is leak in its bottom. If the cistern is full, in what time shall the leak empty it?

- A. 6 h B. 5 h C. 30 h D. None of these.

Solution: Let the leaking capacity of the leak be $1/x$, where x = time taken by leak to leak the full tank.

$$\text{Given: } (1/5 - 1/x) = 1/6 \dots (1)$$

Solving (1) $x = \mathbf{30 \text{ hours}}$

Type: Sum total of work, One variable Algebra, Inverse relation between Time and Work

Q7. One man or two women or three boys can do a work in 44 days. One man, one women and one boy together can finish the same work in ____ days?

Solution: A man's work in one day = $1/44$

A woman's work in one day = $1/2 * 44 = 1/88$

A boy's work in one day = $1/3 * 44 = 1/132$

Let one man and one woman and one boy working together take x days to complete the work.

$$\Rightarrow x(1/44 + 1/88 + 1/132) = 1 \dots (1)$$

Solving (1) $x = \mathbf{24 \text{ days.}}$

Q8. 15 women or 10 men complete in 55 days. How many days 4 women and 5 men will take to complete the same work?

- A. 68.5 B. 74.1 C. 71.74 D. None of these

Solution: Woman's one day work = $1/15 \times 55 = 1/825$

Man's one day work = $1/550$

Let days needed = x

So $x[4/825 + 5/550] = 1 \dots (1)$

Solving (1) x = **71.74 days**

Type: *Summing over alternate days*

Q9. A can do a work in 8 days, B can do a work in 7 days, C can do a work in 6 days. A works on the first day, B works on the second day and C on the third day respectively. That is they work on alternate days. Which day from the beginning will they finish the work?

Solution: Work done in first 3 days = $(1/8) + (1/7) + (1/6) = 73/168$.

So work done by the end of 6 days = $73/168 + 73/168 = 146/168$

Work done by the end of 7th day = $146/168 + (1/8) = 167/168$.

So work will be completed on **8th day**.

Q10. A can fill a tank in 6 hours and B can fill the tank in 4 hours. If both the pipes are opened alternatively for an hour with A as the first then in how many hours will the tank be filled?

Solution: Work done in 2 hours = $1/6 + 1/4 = 10/24$

Work done in 4 hours = $20/24$

Work done in 5th hour = $20/24 + 1/6 = 1$. So work done in **5 hours**.

Type: Sum total of work. Two/Three variable Algebra

Q11. A and B together can complete a piece of work in 24 days, B & C together in 30 days and C & A together can complete the work in 40 days. How many days C will take to complete the work working alone?

Solution:

Let 'A', 'B' and 'C' take A, B, C days to complete the work working alone.

Equations:-

$$1/A + 1/B = 1/24 \dots (1)$$

$$1/B + 1/C = 1/30 \dots (2)$$

$$1/C + 1/A = 1/40 \dots (3)$$

Solving (1), (2) and (3) to C = **120 days**

Type: Sum total of work. Who told everything should be in reciprocals?

Q12. Roja and Edward were working in a courier company. Roja takes 6 hours to pack 32 parcels while Edward takes 5 hours to pack 40 parcels. How long they will take to pack 330 parcels working together?

A. 24 hours 45 min B. 23 hours C. 25 hours 15 min D. None of these.

Solution:

Roja packs $32/6$ parcels per hour. Edward packs $40/5$ parcels per hour.

So to pack 330 parcels they will need $330/[(32/6) + (40/5)] = 24.75$ hours

= **24 hours 45 min**

Q13. There are 720 boxes, A & B can paint them in 20 days, B&C can paint them in 24 days, A&C in 15 days. If A paints for 4 days, B for 8 days and C for 8 days, how many boxes will be painted?

A. 252 C. 516 C. 348 D. 492

Solution:

Let A paint 'A' boxes per day. B paint 'B' boxes per day. C paint 'C' boxes per day.

Given:

$$A + B = 720/20 = 36$$

$$B + C = 720/24 = 30$$

$$A + C = 720/15 = 48$$

Solving $A = 27$, $B = 9$, $C = 21$

Answer = $4 \times 27 + 8 \times 9 + 8 \times 21 = \mathbf{348 \text{ boxes}}$

Type: *What the Distance!*

Q14. Ramesh can travel from City A to B in 8 hours. Suresh can travel from City B to City A in 24 hours. Ramesh started from City A to B at the same time as Suresh started from City B to A. After how many hours:

- A. Will they be separated by a distance equal to half the distance between A and B?
- B. Will they meet?

Solution:

Ramesh completes $\frac{1}{8}$ th of the journey in one hour. Suresh completes $\frac{1}{24}$ th of the journey in one hour.

A. $x(\frac{1}{8} + \frac{1}{24}) = 0.5 \Rightarrow x = \mathbf{3 \text{ hours}}$

B. $x(\frac{1}{8} + \frac{1}{24}) = 1 \Rightarrow \mathbf{6 \text{ hours}}$

Averages

Q1. The average salary per head of all workers in a company is Rs 95. The average salary of 15 officers is Rs. 525 and the average salary per head of the rest is Rs. 85. Find the total number of workers in the workshop.

- A. 660
- B. 580
- C. 650
- D. 460

Solution: Let there be X non-officers.

$$95 = \frac{15 \times 525 + X \times 85}{15 + X} \Rightarrow X = 645$$

$$\text{Total strength of the company} = X + 15 = \mathbf{660}$$

Q2. A dealer buys 11 kg of wheat at Rs. 275 and mixes it with another quality of wheat in the ratio of 4:5. The price of the resulting mixture is Rs. 30 per kg. The price of the other quality of wheat is?

- A. Rs 24/kg
- B. Rs 19/kg
- C. Rs 18/kg
- D. Rs 34/kg

Solution: Let the cost of other mixture be X Rs/kg

$$30 = \frac{4 \times (275/11) + 5 \times X}{4 + 5} \Rightarrow X = \mathbf{34 \text{ Rs/kg}}$$

Q3. The ratio is which 30% alcohol solution should be mixed with 50% solution in order to get a 42 % solution is:

- A. 2:1 B. 1:3 C. 3:1 D. 2:3

Let 30% solution be mixed with 50% solution in the ratio a:b

$$42 = [30a + 50b]/(a+b)$$

Solving $a/b = a:b = \mathbf{2:3}$

Q4. Average weight of 22 students in a group is 28 kgs. When the teacher's weight is included it becomes 31 kgs. What is the weight of teacher.

- A. 78 B. 97 C. 62 D. 58

Solution: Let W be the weight of the teacher.

$$31 = [22*28 + 1*W]/(22+1)$$

Solving W = **97 Kg**

Q5. The average of 8 men is increased by 2 years when one of them whose age is 24 years is replaced by a woman. What is the age of the woman?

- A. 36 years B. 28 years C. 32 years D. 40 years

Solution: The woman not only compensated for loss of age of the man (24 years) but also she made average age increase by 2 years per 8 men (total increase of $2*8 = 16$ years).

So age of the woman: $24 + 16 = \mathbf{40 \text{ years}}$