

Solved Problems

1. Praveen and Harish can finish a work 30 days if they work together. They worked together for 20 days and then Harish left. Praveen finished the remaining work in another 20 days. In how many days Praveen alone can finish the work?

Answer: 60 days.

Explanation:

Amount of work done by Praveen and Harish in 1 day = $1 / 30$

Amount of work done by Praveen and Harish in 20 days = $20 * (1 / 30)$

= $20 / 30$

= $2 / 3$

Remaining work = $1 - (2 / 3)$

= $1 / 3$

Praveen completes $(1 / 3)$ work in 20 days.

Amount of work Praveen can do in 1 day = $(1 / 3) (1 / 20)$

= $1 / (3 * 20)$

= $1 / 60$

❖ Praveen can complete the work in 60 days.

2. Aswanth is twice as good a workman as Raja and is therefore able to finish a piece of work in 30 days less than Raja. In how many days they can complete the whole work, working together?

Answer: 20 days.

Explanation:

Ratio of times taken by Aswanth and Raja = $1 : 2$.

The time difference is $(2 - 1)$ 1 day while Raja take 2 days and Aswanth takes 1 day.

If difference of time is 1 day, Raja takes 2 days.

If difference of time is 30 days,

Raja takes $2 * 30 = 60$ days.

So, Aswanth takes 30 days to do the work.

Aswanth's 1 day's work = $(1 / 30)$

Raja's 1 day's work = $(1 / 60)$

(Aswanth + Raja)'s 1 day's work is

= $(1 / 30) + (1 / 60)$

= $(2 + 1) / 60$

= $(3 / 60)$

$$= (1 / 20)$$

❖ Aswanth and Raja together can do the work in 20 days.

3. Arjun, Bala and Karthi can do a piece of work in 24 days, 30 days and 40 days respectively. They began the work together but Karthi left 4 days before the completion of the work. In how many days was the work completed?

Answer: 11 days.

Explanation:

One day's work of Arjun, Bala and Karthi is

$$= (1 / 24) + (1 / 30) + (1 / 40)$$

$$= (5 + 4 + 3) / 120$$

$$= 12 / 120$$

$$= (1 / 10)$$

Karthi leaves 4 days before completion of the work, which means only Arjun and Bala work during the last 4 days.

Work done by Arjun and Bala together in the last 4 days is

$$= 4 * (1 / 24 + 1 / 30)$$

$$= 4 * ((5 + 4) / 120)$$

$$= 4 * (9 / 120)$$

$$= (9 / 30)$$

$$= (3 / 10)$$

Remaining Work = $7/10$, which was done by Arjun, Bala and Karthi in the initial number of days.

Required days = Their one-day work / Remaining work

$$= (1 / 10) / (7 / 10)$$

$$= (1 / 10) * (10 / 7)$$

$$= (1 / 7)$$

Number of days required for these initial work = 7 days.

Thus, the total numbers of days required is

$$4 + 7 = 11 \text{ days.}$$

❖ The total numbers of days required is 11 days.

4. X and Y can do a piece of work in 15 days and 12 days respectively. X started the work alone and then after 3 days Y joined him till the completion of the work. How long did the work last?

Answer: 25 / 3 days

Explanation:

Work done by X in 3 days = $(1/15) * 3$

= $1/5$

Remaining work = $1 - 1/5$

= $4/5$

(X + Y)'s 1 day's work = $(1/15) + (1/12)$

= $27 / (15 * 12)$

= $3 / 20$

Now, $3 / 20$ work is done by X and Y in 1 day

So, $4 / 5$ work will be done by X and Y = $(20 / 3) * 4 / 5$

= $16 / 3$ days

Hence, total time taken = $3 + (16 / 3)$ days

= $25 / 3$ days

❖ The total work will last for $25 / 3$ days.

5. A is 20 % more efficient than B. How much time will they, working together, take to complete a job which A alone could have done in 20 days?

Answer: 120 / 11 days

Explanation:

Given data, ratio of time taken by A and B = $100 : (100 + 20)$

= $100 : 120$

= $10 : 12$

Suppose B takes x days to do the work

Then, $10 : 12 :: 20 : x$

$x = 20 * 12 / 10$

= 24

A's 1 day's work = $1 / 20$

B's 1 day's work = $1 / 24$

(A + B)'s 1 day's work = $(1 / 20) + (1 / 24)$

= $11 / 120$ days

❖ A and B together can complete the work in $120 / 11$ days.

6. Ravi and Kumar are working on an assignment. Ravi takes 6 hours to type 30 pages on a computer, while Kumar takes 3 hours to type 36 pages. How much time will they take, working together on two different computers to type an assignment of 136 pages?

Answer: 8 hours

Explanation:

Given data, Number of pages typed by Ravi in 1 hour = $30 / 6$

= 5

Number of pages typed by Kumar in 1 hour = $36 / 3$

= 12

Number of pages typed by both in 1 hour = $5 + 12$

= 17

Time taken by both to type 136 pages = $(136 * 1 / 17)$

= 8 hours

❖ Time taken by both to type 136 pages = 8 hours.

7. If 6 men and 8 boys can do a piece of work in 10 days while 26 men and 48 boys can do the same in 2 days, the time taken by 3 men and 4 boys in doing the same type of work will be?

Answer: 20 days

Explanation:

Let 1 man's 1 day's work = x and 1 boy's 1 day's work = y

Then, $6x + 8y = 1 / 10$

$26x + 48y = 1 / 2$

Solving these two equations

We get, $x = 1 / 100$

$y = 1 / 200$

To find, 3 men and 4 boys work in how many days

$(3 \text{ men} + 4 \text{ boys})\text{'s } 1 \text{ day's work} = [3 * (1 / 100) + 4 * (1 / 200)]$

$= (3 / 100) + (1 / 50)$

$= (3 + 2) / 100$

$= 5 / 100$

$= 1 / 20$

❖ 3 men and 4 boys can do the work in 20 days.

8. A can do a piece of work in 5 hours; B and C together can do it in 4 hours, while A and C together can do it in 3 hours. How long will B alone take to do it?

Answer: 60 / 7 hours

Explanation:

$$\text{A's 1 hour's work} = 1 / 5$$

$$(\text{B} + \text{C})\text{'s 1 hour's work} = 1 / 4$$

$$\begin{aligned} (\text{A} + \text{B} + \text{C})\text{'s 1 hour's work} &= [(1 / 5) + (1 / 4)] = (4 + 5) / 20 \\ &= 9 / 20 \end{aligned}$$

$$(\text{A} + \text{C})\text{'s 1 hour's work} = 1 / 3$$

$$\begin{aligned} \text{B's 1 hour's work} &= [(9 / 20) - (1 / 3)] = (27 - 20) / 60 \\ &= 7 / 60 \end{aligned}$$

❖ B alone will take 60 / 7 hours to do the work.

9. A and B can together finish a work in 20 days. They worked together for 10 days and then B left. After another 10 days, A finished the remaining work. In how many days A alone can finish the work?

Answer: 20 days

Explanation:

$$\begin{aligned} (\text{A} + \text{B})\text{'s 10 day's work} &= (1 / 20) * 10 \\ &= 1 / 2 \end{aligned}$$

$$\begin{aligned} \text{Remaining work} &= 1 - (1 / 2) \\ &= 1 / 2 \end{aligned}$$

Now, 1 / 2 work is done by A in 10 days

Therefore, the whole work will be done by A in $(10 * 2) = 20$ days

❖ A alone can finish the work in 20 days.

10. 10 women can complete a work in 6 days and 10 children take 12 days to complete the work. How many days will 4 women and 8 children take to complete the work?

Answer: 15 / 2 days

Explanation:

$$\begin{aligned} \text{1 Woman's 1 day's work} &= 1 / (10 * 6) \\ &= 1 / 60 \end{aligned}$$

$$1 \text{ Child's 1 day's work} = 1 / (10 * 12)$$

$$= 1 / 120$$

$$(4 \text{ women} + 8 \text{ children})'s \text{ day's work} = [4 (1 / 60) + 8 (1 / 120)]$$

$$= 1 / 15 + 1 / 15$$

$$= 2 / 15$$

❖ 4 women and 8 children will complete the work in $15 / 2$ days.

Problems for practice:

1. A alone can do a piece of job in 6 days and B alone can do the same job in 12 days. If they work together, in how many days can they complete the same job?
2. P, Q, R, and S can do a piece of work in 8, 12, 16 and 24 days respectively. They started working together after 2 days P and Q left. One day before the completion of the work S also left. How many days are required for completing the whole work?
3. A, B and C alone can complete a work in 10, 12 and 20 days respectively. If they worked together for 4 days, what is the fraction of the work that is left?
4. A starts a work and complete one-fourth of the work in 4 days, and B alone completes the remaining work in 3 days. In how many days B alone can complete the entire work?
5. 12 boys and 15 girls can complete a project work in 20 days working 8 hours per day. In how many days 10 boys and 20 girls can complete the same project work working 9 hours per day? (Efficiency of a boy is equal to the efficiency of a girl)

Time and Distance

Formulas

1. Speed, Time and Distance:

$$\text{Speed} = \text{Distance} / \text{Time}$$

$$\text{Time} = \text{Distance} / \text{Speed}$$

$$\text{Distance} = \text{Speed} * \text{Time}$$

2. km/hr to m/sec conversion:

$$x \text{ km/hr} = (x * 5/18) \text{ m/sec.}$$

3. m/sec to km/hr conversion: