



Explore | Expand | Enrich

TIME AND WORK

(WORK WITH DIFFERENT EFFICIENCIES)



Introduction :

Work: Work is the quantity of energy transferred from one system to another. But for question based on this topic, Work is defined as the amount of job assigned or the amount of job done. Work to be done is generally considered as one unit. It may be digging a trench constructing or painting a wall, filling up or emptying a tank, reservoir or a cistern.

Time: Duration required /taken to complete the work.

Efficiency: Amount of work done per unit time [hour or day] The efficiency: $(\text{Work output} / \text{Work input}) \times 100\%$



Concept :

Work from Days:

If A can do a piece of work in n days, then A's 1 day's work = $1/n$.

Days from Work:

If A's 1 day's work = $1/n$, then A can finish the work in n days

Ratio:

If A is thrice as good a workman as B, then:

Ratio of work done by A and B = 3 : 1.

Ratio of times taken by A and B to finish a work = 1 : 3.



Concept :

Approach 1: Using Fractions

Ram can finish the work in 10 days i.e. in one day he will do $\frac{1}{10}$ th of the work.

Rahim can finish the work in 40 days i.e. in one day he will do $\frac{1}{40}$ th of the work.

So, in one day, both working together can finish = $(\frac{1}{10}) + (\frac{1}{40}) = \frac{5}{40} = \frac{1}{8}$ th of the work. So, to complete the work they will take 8 days.

Approach 2: LCM Method

If A does a work in 10 days and B does the same work individually in 12 days, in how many days will the work be completed if they work simultaneously?



Concept :

Let the amount of work be 60 units (LCM of 10 and 12). Since A does 60 units in 10 days, he does 6 units every day. Since B does 60 units in 12 days, he does 5 units every day. Working simultaneously, they do $6 + 5 = 11$ units each day.

Thus to complete 60 units of work, they will take $60/11$ days.

The two approaches are absolutely identical, it is just that in the earlier approach the work was assumed as 1 unit instead of 60 units.



Techniques :

If M1 persons can do W1 work in D1 days and M2 persons can do W2 works in D2 days then we can say $M1D1W2 = M2D2W1$

If the persons work T1 and T2 hours per day respectively then the equation gets modified to $M1D1T1W2 = M2D2T2W1$

If the persons has efficiency of E1 and E2 respectively then, $M1D1T1E1W2 = M2D2T2E2W1$



Question: 01

Reema can complete a piece of work in 12 days while Seema can the same work in 18 days. If they both work together, then how many days will be required to finish the work?

- A. 6 days
- B. 7.2 days
- C. 9.5 days
- D. 12 days

Answer:B



Explanation:

A's one day work = $1/12$

B's one day work = $1/18$

$$\begin{aligned}(A + B)\text{'s one day work} &= 1/12 + 1/18 = (18 + 12)/(12 \cdot 18) = 30/216 \\ &= 1/7.2\end{aligned}$$

Together, A & B will finish the work in 7.2 days.



Question: 02

If 'A' completes a piece of work in 3 days, which 'B' completes it in 5 days and 'C' takes 10 days to complete the same work. How long will they take to complete the work , if they work together?

- A. 1.5 days
- B. 4.5 days
- C. 7 days
- D. 9.8 days

Answer:A



Explanation:

A's one day work = $\frac{1}{3}$

B's one day work = $\frac{1}{5}$

C's one day work = $\frac{1}{10}$

(A+ B+ C)'s one day work = $\frac{1}{3} + \frac{1}{5} + \frac{1}{10} = \frac{1}{1.5}$.

Hence, A ,B & C together will take 1.5 days to complete the work.



Question: 03

Two painters ' P_1 ' & ' P_2 ' paint the bungalow in 3 days. If P_1 alone can paint the bungalow in 12 days, in how many days can ' P_2 ' alone complete the same paint work?

- A. 4 days
- B. 6 days
- C. 9 days
- D. 12 days

Answer:A



Explanation:

If a person can do a part of work in 'n' days, then person's work in 1 day $=1/n$

As painters P_1 & P_2 paint the bungalows in 3 days, then work done by both painters $=1/3$

As P_1 paint it alone in 12 days, then work done by painter $P_1 = 1/12$

Work done by painter $P_2 = 1/3 - 1/12 = 4 - 1/12 = 3/12 = 1/4$.

Therefore, same work will be completed by painter P_2 in 4 days.



Question: 04

A & B can make paintings in 6 days, B & C can make those paintings in 10 days. If A, B & C together can finish the work in 4 days, then A & C together will do it in _____ days.

- A. 4 $(2/7)$ days
- B. $1/8$ days
- C. 2 $(2/5)$ days
- D. 6 $(3/8)$ days

Answer:A



Explanation:

We are given that, A,B, & C together complete the work in 4 days.

We can write, (A+B+C) 's 1 day work = $\frac{1}{4}$

Similarly, (A+B) 's 1 day work = $\frac{1}{6}$ days & (B+C)'s 1 day work = $\frac{1}{10}$

Since the work is divided in combination and we are asked to find out the combined work of (A + C), so we can find out,

$$\begin{aligned}(A + C)\text{'s 1 day work} &= [2 (A+B+C)\text{'s 1 day work}] - [(A+ B) \text{'s 1 day work} + (B+C)\text{'s 1 day work}] \\ &= (2 \cdot \frac{1}{4}) - (\frac{1}{6} + \frac{1}{10}) \\ &= \frac{1}{2} - \frac{16}{60} = \frac{1}{2} - \frac{4}{15} = \frac{7}{30}\end{aligned}$$

Hence, A & C together can complete the work in $\frac{30}{7}$ days = $4 \frac{2}{7}$ days



Question: 05

Pooja is twice as efficient as Aarti and takes 90 days less than Aarti to complete the job. Find the time in which they can finish the job together.

- A. 30 days
- B. 45 days
- C. 60 days
- D. 90 days

Answer:C



Explanation:

Since 'A' is 'm' times as efficient as 'B' & takes 'D' days less than 'B', then the time required to complete the job together is given by,

$$T = m \times D / (m^2 - 1)$$

$$T = 2 \times 90 / [(2)^2 - 1] = 180 / 3 = 60 \text{ days.}$$



Question: 06

Monika is twice as good as Sonika and together they complete a piece of work in 20 days. In how many days will Monika alone will finish the work?

- A. 22 days
- B. 30 days
- C. 37 days
- D. 52 days

Answer:B



Explanation:

If 'A' is 'x' times as good a workman as 'B', then ratio of work done by A & B = x: 1

Monika's 1 day work : Sonika's 1 day work = 2:1

(Monika's + Sonika's) 1 day work = $1/20$

Divide $1/20$ in the ratio 2:1 -----(To divide the number 'a' into ratio x & y , we have first part
= $ax / x + y$)

Therefore, Monika's 1 day work = $(1/20 \cdot 2/2 + 1) = 1/30$.

Hence, Monika will alone finish the work in 30 days.



Question: 07

6 men can pack 12 boxes in 7 days by working for 7 hours a day. In how many days can 14 men pack 18 boxes if they work for 9 hours a day?

- A. 3.5 days
- B. 5 days
- C. 7.5 days
- D. 12 days

Answer:A



Explanation: 07

If ' w_1 ' work is done by ' m_1 ' men by working for ' h_1 ' hours per day in ' d_1 ' days & ' w_2 ' is work done by men ' m_2 ' working for ' h_2 ' hours per day in ' d_2 ' days, then

$$m_1 d_1 h_1 / w_1 = m_2 d_2 h_2 / w_2$$

Since we need to find ' d_2 ', we can re-arrange the formula as,

$$\begin{aligned} d_2 &= m_1 d_1 h_1 w_1 / m_2 h_2 w_1 \\ &= 3.5 \text{ days} \end{aligned}$$



Question: 08

4 men and 5 boys can do a piece of work in 20 days while 5 men and 4 boys can do the same work in 16 days. In how many days can 4 men and 3 boys do the same work?

- A. 10 days
- B. 15 days
- C. 20 days
- D. 25 days

Answer:C



Explanation: 08

Assume 1 man's 1 day work = x & 1 boy's 1 day work = y

From the given data, we can generate the equations as : $4x + 5y = 1/20$ ---(1) & $5x + 4y = 1/16$ ---(2)

By solving the simultaneous equations (1) & (2),

$x = 1/80$ & $y = 0$

Therefore, (4 men + 3 boys) 1 day work = $4 \times 1/80 + 3 \times 0 = 1/20$

Thus, 4 men and 3 boys can finish the work in 20 days.



Question: 09

A can do a piece of work in 10 days, B in 15 days. They work together for 5 days, the rest of the work is finished by C in two more days. If they get Rs. 3000 as wages for the whole work, what are the daily wages of A, B and C respectively (in Rs):

- A. 200, 250, 300
- B. 300, 200, 250
- C. 200, 300, 400
- D. None of these

Answer:B



Explanation:09

A's 5 days work = 50%

B's 5 days work = 33.33%

C's 2 days work = 16.66% $[100 - (50 + 33.33)]$

Ratio of contribution of work of A, B and C =

50 : 33 1/3 : 16 2/3 = 3:2:1

A's total share = Rs. 1500

B's total share = Rs. 1000

C's total share = Rs. 500

A's one day's earning = Rs.300

B's one day's earning = Rs.200

C's one day's earning = Rs.250



Question: 10

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

- A. 11 days
- B. 12 days
- C. 13 days
- D. 14 days

Answer:A



Explanation:10

One day's work of A, B and C = $(1/24 + 1/30 + 1/40) = 1/10$.

C leaves 4 days before completion of the work, which means only A and B work during the last 4 days.

Work done by A and B together in the last 4 days = $4 (1/24 + 1/30) = 3/10$.

Remaining Work = $7/10$, which was done by A,B and C in the initial number of days.

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

Thus, the total numbers of days required = $4 + 7 = 11$ days.



Question: 11

12 men can complete a work in 8 days. 16 women can complete the same work in 12 days. 8 men and 8 women started working and worked for 6 days. How many more men are to be added to complete the remaining work in 1 day?

- A. 8
- B. 12
- C. 16
- D. 24

Answer: B



Explanation: 11

1 man's 1 day work = $\frac{1}{96}$; 1 woman's 1 day work = $\frac{1}{192}$

Work done in 6 days = $6(\frac{8}{96} + \frac{8}{192}) = 6 \cdot \frac{1}{8} = \frac{3}{4}$

Remaining work = $\frac{1}{4}$

(8 men + 8 women)'s 1 day work = $1(\frac{8}{96} + \frac{8}{192}) = \frac{1}{8}$

Remaining work = $\frac{1}{4} - \frac{1}{8} = \frac{1}{8}$

$\frac{1}{96}$ work is done in 1 day by 1 man

Therefore, $\frac{1}{8}$ work will be done in 1 day by $96 \times (\frac{1}{8}) = 12$ men



Question: 12

A and B can do a piece of work in 30 days, while B and C can do the same work in 24 days and C and A in 20 days. They all work together for 10 days when B and C leave. How many days more will A take to finish the work?

- A. 18 days
- B. 24 days
- C. 30 days
- D. 36 days

Answer:A



Explanation:12

$2(A+B+C)$'s 1 day work = $\frac{1}{30} + \frac{1}{24} + \frac{1}{20} = \frac{1}{8}$

$\Rightarrow (A+B+C)$'s 1 day's work = $\frac{1}{16}$

work done by A, B and C in 10 days = $\frac{10}{16} = \frac{5}{8}$

Remaining work = $\frac{3}{8}$

A's 1 day's work = $(\frac{1}{16} - \frac{1}{24}) = \frac{1}{48}$

Now, $\frac{1}{48}$ work is done by A in 1 day.

So, $\frac{3}{8}$ work will be done by A in $= 48 \times (\frac{3}{8}) = 18$ days



Question: 13

A,B,C together can do a piece of work in 10 days. All the three started working at it together and after 4 days, A left. Then, B and C together completed the work in 10 more days. In how many days can A complete a work alone ?

- A. 25
- B. 24
- C. 23
- D. 21

Answer: A



Explanation:13

(A+B+C) do 1 work in 10 days.

So (A+B+C)'s 1 day work= $\frac{1}{10}$ and as they work together for 4 days so workdone by them in 4 days= $\frac{4}{10}=\frac{2}{5}$

Remaining work= $1-\frac{2}{5}=\frac{3}{5}$

(B+C) take 10 more days to complete $\frac{3}{5}$ work. So (B+C)'s 1 day work= $\frac{3}{50}$

Now A'S 1 day work=(A+B+C)'s 1 day work - (B+C)'s 1 day work= $\frac{1}{10}-\frac{3}{50}=\frac{1}{25}$

A does $\frac{1}{25}$ work in in 1 day

Therefore 1 work in 25 days.



Question: 14

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 15 men and 20 boys in doing the same type of work will be:

- A. 4 days
- B. 5 days
- C. 6 days
- D. 7 days

Answer:A

Explanation:14

Let 1 man's 1 day's work = x

1 boy's 1 day's work = y .

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

$26x + 48y = 1/2$

Solving these two equations, we get : $x = 1/100$ and $y = 1/200$

(15 men + 20 boy)'s 1 day's work

$$= 15/100 + 20/200 = 1/4$$

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



Question: 15

Ravi and Kumar are working on an assignment. Ravi takes 6 hours to type 32 pages on a computer, while Kumar takes 5 hours to type 40 pages. How much time will they take, working together on two different computers to type an assignment of 110 pages?

- A. 7 hours 30 minutes
- B. 8 hours
- C. 8 hours 15 minutes
- D. 8 hours 25 minutes

Answer:C



Explanation:15

Number of pages typed by Ravi in 1 hour = $32/6=16/3$

Number of pages typed by Kumar in 1 hour = $40/5= 8$

Number of pages typed by both in 1 hour= $(16/3+8)=40/3$

Therefore Time taken by both to type 110 pages = $(110 \times 3/40)$ hours

= $1 (8/4)$ hours (or) 8 hours 15 minutes.



THANK YOU

