Time and work

Tips and Tricks

Man - Work - Hour Formula:

1. More men can do more work.
2. More work means more time required to do work.
3. More men can do more work in less time.
4. M men can do a piece of work in T hours,
   then **Total effort or work =M*T man hours ,Total effort or work =M*T man hours**.
5. Rate of work * Time = Work Done
6. If A can do a piece of work in D days, then A's 1 day's work = 1/D.

Part of work done by A for t days = t/D.

- **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

Remember that $\frac{M\ D\ H}{W}$ = Constant

where,

M: Number of Men

D: Number of Days

H: Number of Hours

W: Amount of Work done

If men are fixed, work is proportional to time. If work is fixed , time is inversely proportional to men. Thus,

$$\frac{M1 \times T1}{W1} = \frac{M2 \times T2}{W2}$$

- A and B can do a piece of work in $'a'$ days and $'b'$ days respectively, then working together:
  - They will complete the work in $\frac{ab}{a+b}$ days
  - In one day, they will finish $\left(\frac{a+b}{ab}\right)^{th}$ part of work.
- If A can do a piece of work in a days, B can do in b days and C can do in c days then,

> $\mathrm{A, B\ and\ C\ together\ can\ finish\ the\ same\ work\ in} \frac{abc}{ab+bc+ca}\ \mathrm{days}$

- If A can do a work in x days and A and B together can do the same work in y days then,

> $\mathrm{Number\ of\ days\ required\ to\ complete\ the\ work\ if\ B\ works\ alone} = \frac{xy}{x-y} days$

- 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

Correct answer : (b)

Hint:

$$\text{A's one day work} = \frac{1}{12}$$

$$\text{B's one day work} = \frac{1}{18}$$

$$\text{(A + B)'s one day work} = \frac{1}{12} + \frac{1}{18} = \frac{(18 + 12)}{(12 \times 18)} = \frac{30}{216} = \frac{1}{7.2}$$

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

A can do a work in 15 days and B in 20 days. If they work on it together for 4 days, then the fraction of the work that is left is :

A. $\frac{1}{4}$

B. $\frac{1}{10}$

C. $\frac{7}{15}$

D. $\frac{8}{15}$

Answer: Option **D**

Explanation:

A's 1 day's work = $\frac{1}{15}$;

B's 1 day's work = $\frac{1}{20}$;

(A + B)'s 1 day's work = $\left(\frac{1}{15} + \frac{1}{20}\right) = \frac{7}{60}$.

(A + B)'s 4 day's work = $\left(\frac{7}{60} \text{ x } 4\right) = \frac{7}{15}$.

Therefore, Remaining work = $\left(1 - \frac{7}{15}\right) = \frac{8}{15}$.

- 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

Correct answer: (a)

Hint:

If a person can do a part of work in 'n' days, then person's work in 1 day = $\frac{1}{n}$

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

As P_1 paint it alone in 12 days, then work done by painter P_1 = $\frac{1}{12}$

Work done by painter P_2 = $\frac{1}{3} - \frac{1}{12} = \frac{4-1}{12} = \frac{3}{12} = \frac{1}{4}$

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

2. A can lay railway track between two given stations in 16 days and B can do the same job in 12 days. With help of C, they did the job in 4 days only. Then, C alone can do the job in:

A. $9\frac{1}{5}$ days

B. $9\frac{2}{5}$ days

C. $9\frac{3}{5}$ days

D. 10

Answer: Option **C**

Explanation:

$(A + B + C)$'s 1 day's work $= \frac{1}{4}$.

A's 1 day's work $= \frac{1}{16}$.

B's 1 day's work $= \frac{1}{12}$.

$\therefore$ C's 1 day's work $= \frac{1}{4} - \left(\frac{1}{16} + \frac{1}{12}\right) = \left(\frac{1}{4} - \frac{7}{48}\right) = \frac{5}{48}$.

So, C alone can do the work in $\frac{48}{5} = 9\frac{3}{5}$ days.

A alone can do a piece of work in 6 days and B alone in 8 days. A and B undertook to do it for Rs. 3200. With the help of C, they completed the work in 3 days. How much is to be paid to C?

A. Rs. 375

B. Rs. 400

C. Rs. 600

D. Rs. 800

Answer: Option **B**

Explanation:

$$\text{C's 1 day's work} = \frac{1}{3} - \left(\frac{1}{6} + \frac{1}{8}\right) = \frac{1}{3} - \frac{7}{24} = \frac{1}{24}.$$

$$\text{A's wages : B's wages : C's wages} = \frac{1}{6} : \frac{1}{8} : \frac{1}{24} = 4 : 3 : 1.$$

$$\therefore \text{C's share (for 3 days)} = \text{Rs.} \left(3 \times \frac{1}{24} \times 3200\right) = \text{Rs. } 400.$$

- 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

Correct answer :(a)

Hint: 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

$$\frac{m_1 d_1 h_1}{w_1} = \frac{m_2 d_2 h_2}{w_2}$$

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

$$d_2 = \frac{m_1 d_1 h_1 w_1}{m_{12} h_2 w_1}$$

$$= \frac{6 \times 7 \times 7 \times 18}{14 \times 9 \times 12}$$

= 3.5 days