Based on chain Rule

Formula 1:
$$\frac{P_1 H_1 D_1}{P_2 H_2 D_2} = \frac{W_1}{W_2}$$

P - No. of person
H - No of hour
D - No of days.
W - Work

Work given

formula 2 : If work did give use

$$P_1 H_1 D_1 = P_2 H_2 D_2$$

1) 15 Men can type 3240 pages in 6 days working 2 hours per day. How many men would be required to type 5400 pages working 4 hours per day for 3 days?

$P_1 = 15 Men$ $W_1 = 3240 Pages$ $D = 6 days$ $h = 2 hour$

$P_2 = ?$ $W_2 = 5400 Pages$ $D = 3 day$ $h = 4 hours$

$$\frac{15 \times 6 \times 2}{P_2 \times 3 \times 4} = \frac{3240}{5400}$$

$$P_2 = \frac{\overset{5}{15} \times \overset{60 5}{5400}}{\underset{\underset{108 \ 121}{3240}}{3240}} = 25$$

$$\boxed{P_2 = 25 \ Men}$$

2) If 72 Men can build a wall of 280 m length in 21 days. How many men could take 18 days to build a similar type of wall of length 100m?

$$\frac{\overset{4}{72} \times 21}{P_2 \times 18} = \frac{280}{100}$$

$$P_2 = \frac{4 \times \overset{3}{21} \times 10}{\underset{28 \ 4}{28 \ 4}} = 30 \ men$$

3) 39 Person can repair a road in 12 days working 5 a day. In how many days will 30 Person working 12 a day complete the work.

$$\frac{\overset{13}{39} \times \overset{2}{12} \times 5^1}{} = 30 \times 6 \times d$$

$$\boxed{d = 13}$$

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4) 15 labours complete a work in 10 days working 6 hours per d. If 18 labours are employed on that work and the work is to be completed in 5 days, then how many hours per day should the work be continued?

$$\overset{3}{\underset{15}{}} \times 10 \times 6^1 = \overset{}{18} \times 5 \times h_1$$

$$\boxed{h = 10 \text{ hours}}$$

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5) If 80 person can finish a work within 16 days working 6 hours a day, the numbers of hours a day 64 persons work to finish that job within 15 days?

$$\overset{8}{\underset{80}{}} \times \overset{2}{16} \times \overset{2}{6} = 64 \times 15 \times h_1$$

$$h_1 = \frac{40}{3} \text{ hours (or) } 13.6 \text{ hours}$$

$$\boxed{h_1 = 8 \text{ hours}}$$

Time Based on efficiency (x)

i) A is two times efficient than B

$$A = 2B \qquad \boxed{x = 2x}$$

B = 10 day

$$10 = 20 \text{ days}$$

2) most efficient = fast worker

less efficient = slow worker

ii) A is 50% more efficient than B

$$\begin{array}{|c|} \hline A \quad = \quad B \\ \hline 100\% = \quad 150\% \\ \hline \end{array}$$

$$\begin{array}{cc} 40\% & \\ A & = B \\ 100\% & 140\% \end{array}$$

iii) A takes 50% more time than B

$$\begin{array}{cc} A & B \\ x & x \end{array}$$

A takes 50% more time B

$$\begin{array}{cc} A & B \\ (50\% + x) & x \end{array}$$

1) A is twice as good as workman as B & B is twice as good as workman as C. If A & B can together finish a piece of work in 4 days, then c can do it by himself in.

$$
\begin{array}{ccc}
A & B & C \\
x & 2x & 4x
\end{array}
$$

$$A + B = \frac{1}{4}$$

$$\frac{A + B}{A B}$$

$$\frac{1}{x} \cdot \frac{x + 2x}{2x} = \frac{1}{4}$$

$$\frac{3x}{2x} = \frac{1}{4}$$

$$\frac{3}{2x} = \frac{1}{4}$$

$$\frac{3 \times 4^2}{2 \times 1} = x$$

$$\boxed{6 = x}$$

$$4 \times 6 = 24 \text{ days}$$

2) A & B together can do a work in 12 days. B & C together do it in 15 days. If A's efficiency is twice that of C, then the days required for B alone finish the work is

$$A + B = \frac{1}{12} \quad \& \quad B + C = \frac{1}{15}$$

$$
\begin{array}{cc}
A & C \\
x & 2x
\end{array}
$$

$$B = \frac{1}{12} - A$$

$$\frac{1}{12} - A + C = \frac{1}{15}$$

$$-A + C = \frac{1}{15} - \frac{1}{12}$$

$$= \frac{12 - 15}{15 \times 12} = \frac{-3}{15 \times 3}$$

$$A - C = \frac{3^1}{12 \times 15 \, 5}$$

$$\frac{1}{x} - \frac{1}{2x}$$

$$\left(\frac{2x - x 1}{2}\right) \circ \frac{1}{x} = \frac{1}{12 \times 5}$$

$$\frac{\overset{6}{12} \times 5}{x} = x$$

$$\boxed{30 = x}$$

$$\begin{array}{cc} A & C \\ 30 & 60 \end{array}$$

$$B \cdot 60 = \cancel{} 15$$

$$\boxed{B = 45}$$

$$B + \frac{1}{60} = \frac{1}{15}$$

$$B = \frac{1}{15} - \frac{1}{60}$$

$$B = \frac{60 - 15}{60 \times 15}$$

$$B = \frac{\cancel{45}^{3}}{\underset{4}{60 \times 15}}$$

$$B = \frac{1}{20}$$

So, $\boxed{B = 20 \text{ days}}$

3) Asha & Babu can do a job together in 7 days. Asha is $1(3/4)$ times as efficient as babu. the same job can be done by asha alone in,

$$\frac{1}{A} + \frac{1}{B} = \frac{1}{7}$$

A   B ↗ fraction

$x \curvearrowright \frac{7}{4}x$ $4x$ $7x$

$$\frac{1}{\frac{7}{4}} + \frac{b}{\frac{7}{4}}$$

$$\frac{1}{x}\left(\frac{7}{8} + \frac{4}{7}\right) = \frac{1}{7}$$

$$\boxed{11} = x$$

Asha = n days.

$\frac{7}{4}$ (11)

$\frac{77}{4} = 19\frac{1}{4}$

$$\frac{1}{4x} + \frac{1}{7x}$$

$$\frac{1}{x}\left(\frac{4+7}{4\times7}\right) = \frac{1}{7}$$

$$\boxed{\frac{11}{4} = x}$$

$A = 4\left(\frac{11}{4}\right)$

$\boxed{A = 11}$

$B = 7x$
$= \frac{11\times7}{4}$
$= \frac{77}{4}$

4) A can do a piece of work in 70 days & B is 40% more efficient than A. the number of days taken by B to do the same work is.

A   B

70 day   40%. 100%.   29 → 42 days → $\frac{9}{40} \times 70$

100 days $\frac{x}{60 \text{ days}}$ $\frac{35 \ 28}{7}$ → 40%.

70                  $\frac{14}{5}$

140%   100%.   70

$70 \times \frac{50}{100} = 140 \times x$

$$\boxed{x = 50}$$

5) To complete a work - A takes 50% more time than B. If together they take 18 days to complete the work, how much time shall B take to do it?

$$B = \text{take } 30 \text{ days}$$

A   B

150%   100%. $\frac{250}{100} \times \frac{5}{4\,\varkappa} = 20$

$x + 50\%.x$ x

$A + B = \dfrac{1}{18}$ 100%.

                     250%.   18

$x + 50\%.$ of x

$x + \dfrac{\frac{1}{500}}{\frac{100}{2}} \times x$ $18 \times \frac{2}{10} = \frac{5}{250} \times x$

$= x + \dfrac{1}{2} x$ $A + B = \dfrac{1}{18}$

                              $\dfrac{1}{3x} + \dfrac{1}{2x} = \dfrac{1}{18}$

$= \dfrac{2x + 1}{2} x$

                         $\dfrac{1}{x}\left(\dfrac{2+3}{3 \times 2}\right) = \dfrac{1}{18 \times 3}$

$A = \dfrac{3x}{2}$

                         $5 \times 3 = x$

$A \ \dfrac{3x}{\frac{2}{3x}} \to \dfrac{x}{2x}$ $\boxed{x = 15}$