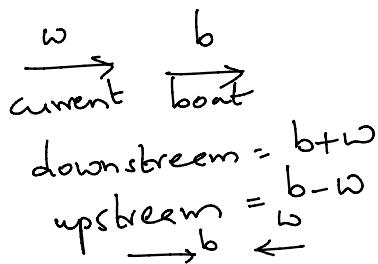


Speed =  $\frac{\text{distance}}{\text{Time}}$

Rate =  $\frac{\text{work}}{\text{Time}}$

working together = Add their rates

Boats and streams



1. 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.**  $\frac{8}{15}$

$$R_A = \frac{1}{15} \quad R_B = \frac{1}{20}$$

$$R_A + R_B = \frac{1}{15} + \frac{1}{20} = \frac{4+3}{60} = \frac{7}{60}$$

4 days:- work done:  $\frac{7}{60} \times 4 = \frac{7}{15}$

$$\text{Work left} = 1 - \frac{7}{15} = \frac{8}{15}$$

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. 9.2 days  
B. 9.4 days  
**C.** 9.6 days

$$R_A = \frac{1}{16} \quad R_B = \frac{1}{12}$$

B. 9.4 days

C. 9.6 days

D. 10 days

$$R_A = \frac{1}{16} \quad R_B = \frac{1}{12}$$

$$R_A + R_B + R_C = \frac{1}{4}$$

$$\frac{1}{16} + \frac{1}{12} + R_C = \frac{1}{4} \Rightarrow R_C = \frac{1}{4} - \frac{1}{12} - \frac{1}{16} = \frac{12 - 4 - 3}{48} = \frac{5}{48}$$

$$\text{Time: } \frac{\text{work}}{\text{Rate}} = \frac{1}{\frac{5}{48}} = \frac{48}{5} = 9.6$$

A, B and C can do a piece of work in 20, 30 and 60 days respectively. In how many days can A do the work if he is assisted by B and C on every third day?

A. 12 days

B. 15 days

C. 16 days

D. 18 days

A is thrice as good as workman as B and therefore is able to finish a job in 60 days less than B.

Working together, they can do it in:

A. 20 days

B. 22.5 days

C. 25 days

D. 30 days

$$R_A = 3 \times R_B$$

$$R_B = x \Rightarrow R_A = 3x$$

$$\frac{1}{3x} = \frac{1}{x} - 60$$

$$\frac{1}{x} - \frac{1}{3x} = 60$$

$$\frac{2}{3x} = 60 \Rightarrow x = \frac{2}{3} \times \frac{1}{60} = \frac{1}{90}$$

$$R_B = \frac{1}{90} \quad R_A = 3 \times \frac{1}{90} = \frac{1}{30}$$

$$R_B = \frac{1}{90} \quad R_A = 3 \times \frac{1}{90} = \frac{1}{30}$$

$$R_A + R_B = \frac{1}{30} + \frac{1}{90} = \frac{3+1}{90} = \frac{4}{90} = \frac{2}{45}$$

$$T = \frac{\frac{1}{2}}{\frac{2}{45}} = \frac{45}{2} = 22.5 \text{ days}$$

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

$$R_A = \frac{1}{6} \quad R_B = \frac{1}{8}$$

$$R_A + R_B + R_C = \frac{1}{3}$$

$$\frac{1}{6} + \frac{1}{8} + R_C = \frac{1}{3}$$

$$\Rightarrow R_C = \frac{1}{3} - \frac{1}{6} - \frac{1}{8}$$

$$= \frac{8-4-3}{24} = \frac{1}{24}$$

$$A:B:C = R_A : R_B : R_C = \frac{1}{6} : \frac{1}{8} : \frac{1}{24} = 4:3:1$$

$$C = \frac{1}{8} \times 3200 = 400$$

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

$$6x + 8y = \frac{1}{10} \Rightarrow 3x + 4y = \frac{1}{20}$$

$$26x + 48y = \frac{1}{2} \Rightarrow 13x + 24y = \frac{1}{4}$$

$$15x + 20y = \frac{1}{T} \Rightarrow T = \frac{2}{4} = \underline{\underline{y}}$$

1. Three pipes A, B and C can fill a tank from empty to full in 30 minutes, 20 minutes, and 10 minutes respectively. When the tank is empty, all the three pipes are opened. A, B and C discharge chemical solutions P, Q and R respectively. What is the proportion of the solution R in the liquid in the tank after 3 minutes?

A.  $\frac{5}{11}$

$$R_A = \frac{1}{30}$$

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

$$R_C = \frac{1}{10}$$

after 3 minutes:

A.  $\frac{5}{11}$

$$R_A = \frac{1}{30}$$

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

$$R_C = \frac{1}{10}$$

B.  $\frac{6}{11}$

C.  $\frac{7}{11}$

D.  $\frac{8}{11}$

$$R_A + R_B + R_C = \frac{1}{30} + \frac{1}{20} + \frac{1}{10} = \frac{2+3+6}{60} = \frac{11}{60}$$

$$\frac{R_C}{R_A + R_B + R_C} = \frac{\frac{1}{10}}{\frac{1}{60}} = \frac{6}{11}$$

capacity by C  
capacity by all 3

$$\frac{\frac{1}{10} \times 3}{\frac{11}{60} \times 3} = \frac{6}{11}$$

2. Pipes A and B can fill a tank in 5 and 6 hours respectively. Pipe C can empty it in 12 hours. If all the three pipes are opened together, then the tank will be filled in:

A.  $1\frac{13}{7}$  hours     $\text{comb} = R_A + R_B - R_C$

B.  $2\frac{8}{11}$  hours

C.  $3\frac{9}{17}$  hours

D.  $4\frac{1}{2}$  hours

A pump can fill a tank with water in 2 hours. Because of a leak, it took  $2\frac{1}{3}$  hours to fill the tank. The leak can drain all the water of the tank in:

A.  $4\frac{1}{3}$  hours

B. 7 hours

C. 8 hours

D. 14 hours

Two pipes A and B can fill a cistern in 37.5 minutes and 45 minutes respectively. Both pipes are opened. The cistern will be filled in just half an hour, if the B is turned off after:

A. 5 minutes

B. 9 minutes

C. 10 minutes

D. 15 minutes