

Pipes and Cistern

1. A pipe can fill a tank in 4 hours. But due to a leak in the tank, it is filled in 5 hours. If the tank is full. How much time will the leak to empty the tank completely ?

- A. 10 hours
- B. 15 hours
- C. 20 hours
- D. 12 hours

Answer & Explanation

Answer :

20 hours

Explanation :

In 1 hour., water filled = $\frac{1}{4}$ th of the tank. $\frac{1}{4}$ th is emptied by leakage in 5 hours Full tank would be emptied in 20 hours (or) [using formula, $t = (5 \times 4) / (5-4) = 20$ hours]

2. 13 buckets of water fill a tank when the capacity of each bucket is 51 liters. How many buckets will be needed to fill the same tank, if the capacity of each bucket is 17 liters?

- A. 33
- B. 29
- C. 39
- D. 42

Answer & Explanation

Answer :

39

Explanation :

Capacity of the tank = (13×51) liter. Number of buckets required when capacity of each bucket is 17 liter = $13 \times 51 / 17 = 13 \times 3 = 39$

3. The volume of water flowing through a pipe is directly proportional to square of its radius. A tank has four inlet pipes with diameters as 2 cm, 4 cm, 6 cm and 8 cm. if the smallest pipe, alone, can fill a tank in 30 hours, then how much time would all the four pipes, when working together would take ?

- A. 1 hours
- B. 4 hours
- C. 6 hours
- D. None of these

Answer & Explanation

Answer :

1 hours

Explanation :

We are given that $V = k (r^2)$ where V is volume of water and ' r ' is radius of pipe and k is a constant. The smallest pipe takes 30 hours to fill the tank alone, hence work done in 1 hour = $1/30$ Radius = diameter / 2 = $2/2 = 1$ $1/30 = k (1^2)$, so $k = 1/30$ Work done in 1 hour by pipe 2 = $1/30 (4/2)^2 = 4/30$ Work done in 1 hour by pipe 3 = $1/30 (6/2)^2 = 9/30$ Work done in 1 hour by pipe 4 = $1/30 (8/2)^2 = 16/30$ In 1 hour, work done by all the four pipes = $(1/30) + (4/30) + (9/30) + (16/30) = 30 / 30 = 1$ Hence, the whole tank gets filled in 1 hour.

4. A cistern has two taps which fill it in 12 minutes and 15 minutes respectively. There is also a waste pipe in the cistern. when all the three are opened, The empty cistern is full in 20 minutes. How long will the waste pipe take to empty the full cistern?

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

Answer & Explanation

Answer :

10 minutes

Explanation :

Work done by the waste pipe in 1 minute = $1/20 - (1/12 + 1/15) = -1/10$ (- negative sign means emptying) waste pipe will empty the full cistern in 10 minutes

5. Two the pipes fill the tank in 12 minutes and 15 minutes. There is also a waste pipe in the tank. When all the three are opened, the empty tank is full in 20 minutes. How long will the waste pipe take to empty the tank?

- A. 10 minutes
- B. 20 minutes
- C. 30 minutes
- D. 35 minutes

Answer & Explanation

Answer :

10 minutes

Explanation :

$(1/20) - ((1/12) + (1/15)) = (1/20) - ((5+4)/60) = (3-9)/60 = -6/60 = -1/10 = 10$ minutes.

6. 2 pipes A & B can separately fill a cistern in 60 mins and 75 mins respectively. There is a 3rd pipe in the bottom of the cistern to empty it. If all the 3 pipes are simultaneously then the cistern is full in 50 mins. In how much time the 3rd pipe alone can empty the cistern?

- A. 90 mins
- B. 100 mins
- C. 110 mins
- D. 120 mins

Answer & Explanation

Answer :

100 mins

Explanation :

Work done by the 3rd pipe in 1 minute $\frac{1}{50} - (\frac{1}{60} + \frac{1}{75}) = (\frac{1}{50} - \frac{3}{100}) = (-\frac{1}{100})$ (-negative means emptying) 3rd pipe alone can empty the cistern in 100 mins

7. 2 pipes A & B can fill a tank in 15 hrs and 20 hrs respectively while a 3rd pipe C can empty the full tank in 25 hrs. All the 3 pipes are opened in the beginning. After 10 hrs C is closed. In how much time will the tank be full?

- A. 12 hrs
- B. 13 hrs
- C. 16 hrs
- D. 18 hrs

Answer & Explanation

Answer :

12 hrs

Explanation :

Part filled in 10 hrs = $10 (\frac{1}{15} + \frac{1}{20} - \frac{1}{25}) = \frac{23}{30}$ Remaining part = $(1 - \frac{23}{30}) = \frac{7}{30}$
(A+B)'s 1 hrs work = $(\frac{1}{15} + \frac{1}{20}) = \frac{7}{60}$ $x = (\frac{7}{30} * 1 * \frac{60}{7}) = 2$ hrs Hence the tank will be full in $(10+2)$ hrs = 12 hrs.

8. Two pipes A & B can fill a tank in 20 and 30 minutes respectively. If the both pipes are used together, then how long will it take to fill the tank?

- A. 12 mins
- B. 15 mins
- C. 25 mins
- D. 50 mins

Answer & Explanation

Answer :

12 mins

Explanation :

Part filled by A in 1 minute = $\frac{1}{20}$; Part filled by B in 1 minute = $\frac{1}{30}$. Part filled by (A+B) in 1 minute. $(A+B) = (\frac{1}{20} + \frac{1}{30}) = \frac{1}{12}$. Hence both the pipes can fill the tank in 12 minutes

9. 2 pipes can fill a tank in 20 and 24 mins respectively. And a waste pipe can empty 3 gallons per minute. All the 3 pipes working together can fill the tank in 15 minutes. The capacity of the tank is ?

- A. 60 gallons
- B. 100 gallons
- C. 120 gallons
- D. 180 gallons

Answer & Explanation

Answer :

120 gallons

Explanation :

Work done by the waste pipe in 1 minute = $\frac{1}{15} - (\frac{1}{20} + \frac{1}{24}) = (\frac{1}{15} - \frac{11}{120}) = (-\frac{1}{40})$ (negative sign means emptying) Therefore volume of $\frac{1}{40}$ part = 3 gallons. Volume of whole = (3×40) gallons = 120 gallons.

10. 3 pipes A, B & C can fill a tank in 6 hours. After working at it together for 2 hours, C is closed and A and B can fill the remaining part in 7 hours. The number of hours taken by C alone to fill the tank is?

- A. 10
- B. 12
- C. 14
- D. 16

Answer & Explanation

Answer :

14

Explanation :

Part filled in 2 hours = $\frac{2}{6} = \frac{1}{3}$, Remaining part = $(1 - \frac{1}{3}) = \frac{2}{3}$. Therefore (A+B)'s 7 hours work = $\frac{2}{3}$: (A+B)'s 1 hour's work = $\frac{2}{21}$. Therefore C's 1 hour's work = $\{(A+B+C)'s\ 1\ hour's\ work - (A+B)'s\ 1\ hour's\ work\} = (\frac{1}{6} - \frac{2}{21}) = \frac{1}{14}$ Therefore C alone can fill the tank in 14 hours. t

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

- A. $4\frac{1}{3}$ hrs
- B. 7 hrs
- C. 8 hrs
- D. 14 hrs

Answer & Explanation

Answer :

14 hrs

Explanation :

Work done by the leak in 1 hr = $(\frac{1}{2} - \frac{3}{7}) = \frac{1}{14}$ therefore leak will empty the tank in 14 hrs.

12. A pump can fill that tank in 4 hrs because of a leak in the tank it took $5\frac{1}{2}$ hours to fill the tank. If the tank is full how much time will the leak take to empty it?

- A. 13 hrs
- B. 12 hrs 50 mins
- C. 14 hrs 40 mins
- D. 14 hrs

Answer & Explanation

Answer :

14 hrs 40 mins

Explanation :

Time taken by leak to empty the tank = $\frac{1}{4} - \frac{1}{11\frac{1}{2}} = \frac{1}{4} - \frac{2}{11} = \frac{11-8}{44} = \frac{3}{44}$
 $\frac{44}{3} = 14\frac{2}{3} = 14$ hrs 40 mins

13. 2 pipes A & B can fill a tank in 15 minutes and 20 minutes respectively. Both the pipes are opened together but after 4 minutes pipe A is turned off. What is the total time required to fill the tank?

- A. 10 mins 20 sec
- B. 11 mins 45 sec
- C. 12 mins 30 sec
- D. 14 mins 40 sec

Answer & Explanation

Answer :

14 mins 40 sec

Explanation :

Part filled in 4 mins = $4(1/15 + 1/20) = 7/15$ Remaining part = $(1 - 7/15) = 8/15$ Part filled by B in 1 minute = $1/20 \times (8/15 \times 1 \times 20) = 10 \frac{2}{3}$ min. = 10 min 40 sec. The tank will be full in (4 min + 10 min 40 sec) = 14 min.40 sec.

14. A tank is filled by 3 pipes with uniform flow. The first 2 pipes operating simultaneously fill the tank in the same time during which the tank is filled by the 3rd pipe alone. The 2nd pipe fills the tank 5 hrs faster than the 1st pipe and 4 hrs slower than the 3rd pipe. The time required by the first pipe is?

- A. 6 hrs
- B. 10 hrs
- C. 15 HRS
- D. 30 HRS

Answer & Explanation

Answer :

15 HRS

Explanation :

SUPPOSE 1st pipe alone takes x hrs. To fill the tank than 2nd & 3rd pipes will take (x-5) & (x-9) hrs respectively to fill the tank. therefore $\frac{1}{x} + \frac{1}{(x-5)} = \frac{1}{(x-9)}$ $\Rightarrow x-5 + x = x(x-5)$ $\Rightarrow \frac{1}{(x-9)}(2x-5)(x-9) = x(x-5) = x^2 - 18x + 45 = 0$ $(x-15)(x-3) = 0 \Rightarrow x=15$

15. One pipe can fill a tank 6 times as fast as another pipe. If together the two pipes can fill the tank in 22 minutes, then the slower pipe alone will be able to fill the tank in:

- A. 164 min
- B. 154 min
- C. 134 min
- D. 144 min

Answer & Explanation

Answer :

154 min

Explanation :

Let faster pipe alone can fill the tank in x minutes. Then, slower pipe alone can fill the tank in 6x minutes. $x \times 6x + 6x = 22 \times 6x = 22x = 22 \times 7 = 154$ Time required for the slower pipe to fill the tank = $6x = 154$ minute.

16. Two pipes x and y can fill a tank in 24 and 30 minutes respectively. Both the pipes are opened for 6 minutes, after which pipe x is turned off. How much more time will pipe y take to fill the tank ?

- A. 16.5 minutes
- B. 22.5 minutes
- C. 24 minutes
- D. Cannot be determined

Answer & Explanation

Answer :

16.5 minutes

Explanation :

When pipe x is turned off (after 6 minutes) Work done by x and y in 6 minutes = $[(1/24) + (1/30)] \times 6 = 9/20$ Remaining work = $1 - (9/20) = 11/20$ which would be done by pipe y alone. 1 work is done by pipe y (alone) in 30 minutes $11/20$ work is done by pipe y (alone) in $30 \times (11/20) = 33/2$ minutes = 16.5 minutes

17. A pipe can fill a tank in 5 hours, but due to a leakage it took 7 hours to fill the tank. If the tank is full, in what time will tank become empty due to leakage?

- A. 15.30 hrs
- B. 17.50 hrs
- C. 16 hrs
- D. 12.30 hrs

Answer & Explanation

Answer :

17.50 hrs

Explanation :

$1/5 - 1/7 = 7 - 5/35 = 2/35 = 1/17.5 = 17.50$ hours

18. A leak in the bottom of a tank can empty the full tank in 6 hours. An inlet pipe fills water at the rate of 4 liters a minute. When the tank is full, the inlet is opened and due to the leak, the tank is empty in 24 hours. How many liters does the tank hold?

- A. 4010 litre
- B. 2220 litre
- C. 1920 litre
- D. 2020 litre

Answer & Explanation

Answer :

1920 litre

Explanation :

water filled by the inlet pipe in 24 hours = water emptied by the leak in $24 - 6 = 18$ hours. Therefore, water emptied by the leak in 6 hours = water filled by the inlet pipe in 8 hours

i.e., capacity of the tank = water filled by the inlet pipe in 8 hours = $8 \times 60 \times 4 = 1920$ litre.

19. Two pipes A and B can fill a tank in 36 hours and 45 hours respectively. If both the pipes are opened simultaneously, how much time will be taken to fill the tank?

- A. 20 hrs
- B. 10 hrs
- C. 16 hrs
- D. 12 hrs

Answer & Explanation

Answer :

20 hrs

Explanation :

Part filled by A in 1 hour = $\frac{1}{36}$; part filled by B in 1 hour = $\frac{1}{45}$. part filled by (A+B) in 1 hour = $(\frac{1}{36} + \frac{1}{45}) = \frac{9}{180} = \frac{1}{20}$. Hence, both the pipes together will fill the tank in 20 hours.

20. An electric pump can fill a tank in 3 hours. Because of a leak in the tank, it took $3 \frac{1}{2}$ hours to fill the tank. If the tank is full, how much time will the leak take to empty it?

- A. 20 hrs
- B. 21 hrs
- C. 10 hours
- D. 30 hrs

Answer & Explanation

Answer :

21 hrs

Explanation :

Work done by the leak in 1 hour = $(\frac{1}{3} - \frac{1}{7/2}) = (\frac{1}{3} - \frac{2}{7}) = \frac{1}{21}$ Therefore the leak will empty the tank in 21 hours.

21. 10 buckets of water fill a tank when the capacity of each tank is 11.5 liters. How many buckets will be needed to fill the same tank, if the capacity of each bucket is 5 liters?

- A. 21
- B. 32
- C. 23
- D. 22

Answer & Explanation

Answer :

23

Explanation :

Capacity of the tank = $10 \times 11.5 = 115$ capacity of bucket = 5 liters Number of bucket needed = $115/5 = 23$.

22. Pipes A and B can fill a tank in 5 & 6 hrs respectively. Pipe C can empty it in 12 hrs. If all the 3 pipes are opened together, then the tank will be filled in?

- A. $1 \frac{13}{17}$ hrs
- B. $2 \frac{8}{11}$ hrs
- C. $3 \frac{9}{17}$ hrs
- D. $4 \frac{1}{2}$ hrs

Answer & Explanation

Answer :

$3 \frac{9}{17}$ hrs

Explanation :

Net part filled in 1 hr = $(\frac{1}{5} + \frac{1}{6} - \frac{1}{12}) = \frac{17}{60}$. Therefore the tank will be full in $\frac{60}{17}$ hrs i.e. $3 \frac{9}{17}$ hrs.

23. Pipe A can fill a tank in 5 hrs, Pipe B in 10 hrs and Pipe C in 30 hrs. If all the pipes are open in how many hours will the tank be filled?

- A. 2 hrs
- B. 2.5 hrs
- C. 3 hrs
- D. 3.5 hrs

Answer & Explanation

Answer :

3 hrs

Explanation :

Part filled by (A+B+C) in 1 hr = $(\frac{1}{5} + \frac{1}{10} + \frac{1}{30}) = \frac{1}{3}$ therefore all the 3 pipes together will fill the tank in 3 hrs

24. Two pipes can fill a tank in 4 hours and 12 hours. If two pipes are operated simultaneously, in how much time will the tank be filled?

- A. 3 hrs 10 min

- B. 13 hrs
- C. 3 hrs
- D. None of these

Answer & Explanation

Answer :

3 hrs

Explanation :

$(A+B) = 1/4 + 1/12 = (3+1)/12 = 4/12 = 1/3$ 3 hours to filled the tank.

25. A tap can fill a tank in 6 hrs. After half the tank is filled 3 more similar taps are opened. What is the total time taken to fill the tank completely?

- A. 3 hrs
- B. 3 hrs 30 mins
- C. 3 hrs 45 min
- D. 4 hrs

Answer & Explanation

Answer :

3 hrs 45 min

Explanation :

Time taken to fill the half time = $6/2 = 3$ hrs (1/2 part is filled) Remaining time = 1/2 Time taken to fill the remaining part = $(1/(4*1/6))*(1/2) = (3*1)/(2*2) = 3/4$ hrs = 45 mins Total time 3 hrs + 45 mins = 3hrs 45 minutes

26. A large tanker can be filled by 2 pipes A & B in 60 minutes and 40 minutes respectively. How many minutes will it take to fill the tanker from empty state. If B is used for half the time and A & B fill it together for the half ?

- A. 15 minutes
- B. 20 minutes
- C. 27.5 minutes
- D. 30 minutes

Answer & Explanation

Answer :

30 minutes

Explanation :

Part filled by (A+B) in 1 minute = $(1/60 + 1/40) = 1/24$ suppose the tank is filled in x minutes Then $x/2 (1/24 + 1/40) = 1 = x/2 * 1/15 = 1 = x = 30$ minutes

27. A tank is filled in 5 hours by three pipes A,B and C. The pipe C is twice as fast as B and B is twice as fast as A. How much time will pipe A alone take to fill the tank ?

- A. 20 hrs
- B. 25 hrs
- C. 35 hrs
- D. None of these

Answer & Explanation

Answer :

35 hrs

Explanation :

Suppose pipe A alone takes x hrs to fill the tank then Pipes B and C will take $x/2$ and $x/4$ hrs respectively to fill the tank $1/x + 2/x + 4/x = 1/5 = 7/x = 1/5 = 35$ hrs

28. 2 tapes A & B can fill a tank in 5 hours and 20 hrs respectively.If both the tapes are open then due to take leakage it took 30 mins more to fill the tank.If the tank is full. How long will it take for the leakage alone to empty the tank?

- A. 4 1/2 hrs
- B. 9 hrs
- C. 18 hrs
- D. 36 hrs

Answer & Explanation

Answer :

36 hrs

Explanation :

Part filled by (A+B) in 1 hr = $(1/5 + 1/20) = 1/4$ so A and B together can fill the tank in 4 hrs work done by the leak in 1 hr = $(1/4 - 2/9) = 1/36$ hence leak will empty the tank in 36 hrs

29. One pipe can fill a tank twice as fast as another pipe.If together the two pipes can fill the tank in 12 minutes, then the slower pipe alone will able to fill the tank in?

- A. 30 minutes
- B. 33 minutes
- C. 36 minutes
- D. 35 minutes

Answer & Explanation

Answer :

36 minutes

Explanation :

$(1/x) + (1/2x) = (1/12) (3/x) = (1/12) \Rightarrow (x/3) = 12 \Rightarrow x = 36$ minutes.

30. A tape can fill a tank in 6hrs. After half the tank is filled 3 more similar tapes are opened. What is total time taken to fill the tank completely?

- A. 3hrs 15 minutes
- B. 3hrs 45 mins
- C. 4 hrs 15 mins
- D. 4 hrs

Answer & Explanation

Answer :

3hrs 45 mins

Explanation :

Time taken by 1 tape to fill half the tank = 3hrs. Part filled by the 4 tapes in 1 hr = $(4 \times 1/6) = 2/3$. Remaining part = $(1 - 1/2) = 1/2$. $2/3 : 1/2 :: 1 : x$ or $x = (1/2 \times 3/2) = 3/4$ hrs i.e. 45 minutes so total time taken 3 hrs 45 mins.

31. 2 pipes can fill a tank in 8 hrs and 10 hrs. If 2 pipes are operated simultaneously in how much time will the tank be filled?

- A. 4 hrs 18 min
- B. 10 min
- C. 4 hrs
- D. 12 min

Answer & Explanation

Answer :

4 hrs 18 min

Explanation :

$1/(A+B) = 1/8 + 1/10 = (10+8) / 80 = 18/80 = 9/40$. $40/9 = 4$ hrs 18 minutes to fill the tank.

32. Two pipes can fill a tank in 6 hrs and 8 hrs while a 3rd pipe empties the full tank in 12 hrs. If all 3 pipes are operated simultaneously in how much time will the tank be filled?

- A. 4 hrs
- B. 4 hrs 28 mins
- C. 5 hrs

D. 5 hrs 35 mins

Answer & Explanation

Answer :

4 hrs 28 mins

Explanation :

$\frac{1}{6} + \frac{1}{8} - \frac{1}{12} = \frac{(4+3-2)}{24} = \frac{5}{24}$ Time taken to fill the tank = $\frac{24}{5}$ therefore total time taken is 4 hrs and 28 minutes

33. A tap can fill a tank completely in 6 hours. After half the tank is filled, one more similar tap is opened. What is the total time taken to fill the tank completely?

A. 4 hrs 20 min

B. 3 hrs 30 min

C. 3 hrs 10 min

D. 4 hrs 30 min

Answer & Explanation

Answer :

4 hrs 30 min

Explanation :

Tap fill the half tank in 3 hrs. Now another similar tap opened. $\frac{1}{6} + \frac{1}{6} = \frac{2}{6} = \frac{1}{3}$. Remaining half tank filled in 1.5 hrs. Total time = $3 + 1.5 = 4$ hour 30 minute.

34. Two pipes A and B can fill a tank in 4 hours and 5 hours respectively. if they are opened an alternate hours and if pipe B is opened first, in how many hours, the tank fill in

A. 4.30 hours

B. 5 houre

C. 7 hours

D. 6 hours

Answer & Explanation

Answer :

4.30 hours

Explanation :

$A+B = \frac{1}{4} + \frac{1}{5} = \frac{9}{20}$2 hours $A+B = \frac{18}{20}$4 hours = $\frac{9}{10}$
Remaining = $1 - \frac{9}{10} = \frac{1}{10}$it take $\frac{1}{2}$ hour \Rightarrow B Already 4+ Remaining 2(B) = $4 + \frac{1}{2} = 4.30$ hours.

35. 2 pipes A & B can fill a cistern in 12 mins and 15 mins respectively while a 3'rd pipe

C can empty the full tank in 6 mins. A & B are kept open for 5 mins in the beginning then C is also opened. In what time is the cistern emptied?

- A. 30 mins
- B. 33 mins
- C. 37 1/2 mins
- D. 45 mins

Answer & Explanation

Answer :

45 mins

Explanation :

Part filled in 5 minute = $5 \left(\frac{1}{12} + \frac{1}{15} \right) = \left(\frac{5 \cdot 9}{60} \right) = \frac{3}{4}$ Part emptied in 1 minute when all the pipes are opened = $\frac{1}{6} - \left(\frac{1}{12} + \frac{1}{15} \right) = \left(\frac{1}{6} - \frac{3}{20} \right) = \frac{1}{60}$ now $\frac{1}{60}$ part is emptied in 1 minute Therefore $\frac{3}{4}$ part will be emptied in $(60 \cdot \frac{3}{4}) = 45$ mins

36. Two pipes A and B can separately fill a tank in 10 and 15 minutes respectively. A third pipe C can drain off 30 liters of water per minute. If all the pipes are opened, the tank can be filled in 10 minutes. What is the capacity of the tank?

- A. 500 liters
- B. 370 liters
- C. 450 liters
- D. 320 liters

Answer & Explanation

Answer :

450 liters

Explanation :

$\frac{1}{10} + \frac{1}{15} - \frac{1}{x} = \frac{1}{10}$ $X = 15$ $15 \cdot 30 = 450$ liters

37. Two pipes A and B can fill a tank in 6 hours and 4 hours respectively. If they are opened on alternate hours and if pipe A is opened first, in how many hours, the tank shall be full?

- A. 4
- B. 4 1/2
- C. 5
- D. 5 1/2

Answer & Explanation

Answer :

5

Explanation :

A's work in 1 hour = $\frac{1}{6}$, B's work in 1 hour = $\frac{1}{4}$. (A+B)'s 2 hour's work when opened alternately = $(\frac{1}{6}+\frac{1}{4}) = \frac{5}{12}$. (A+B)'s 4 hour's work when opened alternately = $\frac{10}{12} = \frac{5}{6}$. Remaining part = $(1 - \frac{5}{6}) = \frac{1}{6}$. Now, it is A's turn and $\frac{1}{6}$ part is filled by A in 1 hour. Therefore total time taken to fill the tank = $(4+1)$ hrs = 5 hrs.

38. A booster pump can be used for filling as well as for emptying a tank. The capacity of the tank is 2400 m³. The emptying of the tank is 10 m³ per minute higher than its filling capacity and the pump needs 8 minutes lesser to empty the tank than it needs to fill it. What is the filling capacity of the pump?

- A. 20 m³ / min.
- B. 40 m³ / min.
- C. 50 m³ / min.
- D. 60 m³ / min.

Answer & Explanation

Answer :

50 m³ / min.

Explanation :

Let the filling capacity of the pump = x m³/min. Then the emptying capacity of the pump = $(x+10)$ m³/min. Time required for filling the tank = $\frac{2400}{x}$ minutes. Time required for emptying the tank = $\frac{2400}{x+10}$ minutes. Pump needs 8 minutes lesser to empty the tank than it needs to fill it.

$\Rightarrow \frac{2400}{x} - \frac{2400}{x+10} = 8 \Rightarrow 300x - 300x + 10 = 1 \Rightarrow 300(x+10) - 300x = x(x+10) \Rightarrow 3000 = x^2 + 10x \Rightarrow x^2 + 10x - 3000 = 0 \Rightarrow (x+60)(x-50) = 0 \Rightarrow x = 50$ or -60 Since x can not be negative, $x = 50$ i.e., filling capacity of the pump = 50 m³/min.

39. A water tank is $\frac{2}{5}$ th full. Pipe A can fill a tank in 10 mins and pipe B can empty it in 6 mins. If both the pipes are open, how long will it take to empty or fill the tank completely?

- A. 6 mins to empty
- B. 6 mins to fill
- C. 9 mins to empty
- D. None of these

Answer & Explanation

Answer :

6 mins to empty

Explanation :

clearly pipe B is faster than Pipe A and so the tank will be emptied. Part to be emptied = $\frac{2}{5}$ Part emptied by (A+B) in 1 minute = $(\frac{1}{6} - \frac{1}{10}) = \frac{1}{15}$ hence $\frac{1}{15} : \frac{2}{5} :: 1 : x$ or $x = (\frac{2}{5} * 1 * 15) = 6$ mins so the tank will be emptied in 6 mins

40. 3 pipes A,B & C can fill a tank from empty to full in 30 mins,20mins & 10mins respectively.when the tank is empty,all the 3 pipes are opened.A & B & C discharge chemical solutions P & Q & R respectively. what is the proportion of solution are int liquid in the tank after 3 mins?

- A. 5/11
- B. 6/11
- C. 7/11
- D. 8/11

Answer & Explanation

Answer :
6/11

Explanation :

Part filled by(A+B+C) in 3 mins = $3(1/30+1/20+1/10) = (3*11/60) = 11/20$ Part filled by C in 3 mins = $3/10$ Required ratio = $(3/10*20/11) = 6/11$

41. Bucket P has thrice the capacity as bucket Q. It takes 80 turns for bucket P to fill the empty drum. How many turns it will take for both the buckets P and Q, having each turn together to fill the empty drum?

- A. 30
- B. 45
- C. 60
- D. 80

Answer & Explanation

Answer :
60

Explanation :

Let capacity of Q =1 liter. Then, capacity of P =3 liter. Given that it takes 80 turns for bucket P to fill the empty drum. => capacity of the drum = $80 \times 3=240$ liter. Number of turns required if both P and Q are used having each turn together= $240/3+1=60$

42. 3 tapes A,B & C can fill a tank in 12,15 and 20 hrs respectively.If A is open all the time and B and C are open for 1 hr each alternately ,the tank shall be full in?

- A. 6 hrs
- B. $6 \frac{2}{3}$ hrs
- C. 5 hrs
- D. 7 hrs

Answer & Explanation

Answer :

7 hrs

Explanation :

(A+B)'s 1 hour work = $(\frac{1}{12} + \frac{1}{15}) = \frac{9}{60} = \frac{3}{20}$ (A+C)'s 1 hour work = $(\frac{1}{12} + \frac{1}{20}) = \frac{8}{60} = \frac{2}{15}$ Part filled in 2 hrs = $(\frac{3}{20} + \frac{2}{15}) = \frac{17}{60}$: part filled in 6 hrs = $(3 * \frac{17}{60}) = \frac{17}{20}$ Remaining part = $(1 - \frac{17}{20}) = \frac{3}{20}$ Now it is the turn off A and B and $\frac{3}{20}$ part is filled by A & B in 1 hr therefore total time taken to fill the tank = $(6+1)$ hrs = 7 hrs.

43. 3 taps P, Q and R can fill a tank in 10, 20 and 30 minutes respectively. If A is open all the time and Q and R are open for 1 hour each alternatively the tank will be filled in?

- A. 7 hrs
- B. 7 hrs 30 mins
- C. 8 hrs
- D. 7 hrs 50 mins

Answer & Explanation

Answer :

7 hrs

Explanation :

A+B in 1 hour = $(\frac{1}{10} + \frac{1}{20}) = \frac{3}{20}$ A+C in 1 hour = $(\frac{1}{10} + \frac{1}{30}) = \frac{4}{30}$ In 2 hour => $(\frac{3}{20}) + (\frac{4}{30}) = \frac{9+8}{60} = \frac{17}{60}$ part filled in 6 hours = $3 * (\frac{17}{60}) = \frac{17}{20}$ Remaining part = $1 - (\frac{17}{20}) = \frac{3}{20}$ (filled by A and B) 1 hour total time taken to fill the tank = $6+1 = 7$ hours.

44. A cistern can be filled by a tap in 4 hrs while it can be emptied by another tap in 9 hrs. If both the taps are opened simultaneously then after how much time will the cistern get filled?

- A. 4.5 hrs
- B. 5 hrs
- C. 6.5 hrs
- D. 7.2 hrs

Answer & Explanation

Answer :

7.2 hrs

Explanation :

Net part filled in 1 hr = $(\frac{1}{4} - \frac{1}{9}) = \frac{5}{36}$. The cistern will be filled in $\frac{36}{5}$ hrs i.e. 7.2 hrs

45. A tank is usually filled in 18 hours. But because of a leak in its bottom, it takes another 6 hours to fill. How much time will be taken by the leak to empty the full tank ?

- A. 30 hours
- B. 72 hours
- C. 42 hours
- D. 55 hours

Answer & Explanation

Answer :

72 hours

Explanation :

Consider the case when there is no leak . Then in one hour, work done = $1/18$, and in 6 hours = $6/18 = 1/3$. This means $1/3$ rd of the tank is emptied because of the leakage in $18 + 6 = 24$ hours So, $1/3$ rd is emptied in 24 hours, full tank would be emptied in $24 \times 3 = 72$ hours.

46. Two pipes A & B can fill a tank in 12 mins and 15 mins respectively.If both the taps are opened simultaneously and the tap A is closed after 3 minutes than how much more time will it take to fill the tank by tap B?

- A. 7 mins 15 sec
- B. 7 mins 45 sec
- C. 8 min 5 sec
- D. 8 min 15 sec

Answer & Explanation

Answer :

8 min 15 sec

Explanation :

Part filled in 3 mins = $3 (1/12 + 1/15) = (3 \times 9/16) = 9/20$. Remaining part = $(1 - 9/20) = 11/20$ Part filled by B in 1 minute = $1/15 \times = (11/20 * 1 * 15) = 8 \frac{1}{4}$ minute = 8 min 15 sec Remaining part is filled by B in 8 mins 15 sec

47. Pipes 1 and 2 can fill a tank in 18 and 24 hours respectively. Both pipes work simultaneously for sometime after which pipe 1 is turned off. It takes 12 hours in all to fill the tank completely. Find the time for which pipe 1 remained turned on.

- A. 9 hours
- B. 10 hours
- C. 11 hours
- D. 12 hours

Answer & Explanation

Answer :

9 hours

Explanation :

Let the time for which pipe 1 remained turned on be 'x' hours. Hence pipe 1 has worked for 'x' hours and pipe 2 has worked for 12 hours. $\frac{1}{18}(x) + \frac{1}{24}(12) = 1$ $\frac{x}{18} + \frac{1}{2} = 1$ $\frac{x}{18} = \frac{1}{2}$ $x = 9$ Pipe 1 remained turned on for 9 hours.

48. 2 pipes A & B can fill a cistern in $37\frac{1}{2}$ minutes and 45 minutes respectively. Both pipes are opened. The cistern will be filled in just half an hour. If the pipe B is turned off after?

- A. 5 mins
- B. 9 mins
- C. 10 mins
- D. 15 mins

Answer & Explanation

Answer :

9 mins

Explanation :

Let B be turned off after x mins. Then part filled by (A+B) - in x minute. + part filled by A in (30 - x) minutes = 1. Therefore $X \left(\frac{2}{75} + \frac{1}{45} \right) + (30-x) \frac{2}{75} = 1$ $\frac{11x}{225} + \frac{60-2x}{75} = 1$ $11x + 180 - 6x = 225$ $x = 9$

49. A cistern can be filled by a tap in 4 hours while it can be emptied another tap in 7 hours. If both the taps are opened simultaneously, then after how much time will the cistern get filled?

- A. 9 hrs
- B. 9.20 hrs
- C. 9.30 hrs
- D. 9.33 hrs

Answer & Explanation

Answer :

9.33 hrs

Explanation :

$\frac{1}{4} - \frac{1}{7} = \frac{7-4}{28}$ cistern filled in = $\frac{28}{3} = 9.33$ hrs.

50. Two pipes A & B can fill a tank in 20 minutes. If both pipes are opened simultaneously

after how much time should B be closed so that the tank is full in 18 minutes?

- A. 10 mins
- B. 9 mins
- C. 8 mins
- D. None of these

Answer & Explanation

Answer :

None of these

Explanation :

A fill the tank in 1 minute = $(20 \times 20 = 40) = 2$ units B fill the tank in 1 minute = $(40 \times 1 = 40) = 1$ unit For 18 minutes (A) = $18 \times 2 = 36$ units Remaining = $40 - 36 = 4$ units Time for B be closed so that the tank is full in 18 minutes = $4/1 = 4$ minutes
