1. 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. $3\frac{9}{17}$ hours

B. $1\frac{13}{17}$ hours

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

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

Hide Answer | Notebook | Discuss

Here is the answer and explanation

Answer : Option A

Explanation :

Pipes A and B can fill a tank in 5 and 6 hours respectively

=>Part filled by pipe A in hour = $^1/_5$

and Part filled by pipe B in hour = $^1/_6$

Pipe C can empty it in 12 hours

=> Part emptied by pipe C in 1 hour = $^1/_{12}$

Net part filled by Pipes A,B and C together in 1 hour = $\frac{1}{5}+\frac{1}{6}-\frac{1}{12}=\frac{17}{60}$

i.e, the pipe can be filled in $\frac{60}{17}=3\frac{9}{17}$ hours

2. Two pipes A and B can fill a cistern in $37^1/_2$ minutes and 45 minutes respectively. Both pipes are opened. The cistern will be filled in just half an hour, if pipe B is turned off after:

A. 5 min

B. 9 min

C. 10 min

D. 15 min

Hide Answer | Notebook | Discuss

Here is the answer and explanation

Answer : Option B

Explanation :

Pipe A can fill a tank in $37^1/_2$ minutes = $^{75}/_2$ minutes

=>Part filled by pipe A in 1 minute = $^2/_{75}$

Pipe B can fill a tank in 45 minutes

=> Part filled by pipe B in 1 minute = $^1/_{45}$

=> Part filled by Pipe A and B in 1 minute = $=\frac{2}{75}+\frac{1}{45}=\frac{6+5}{225}=\frac{11}{225}$

Assume that B is turned off after x minutes. i.e., for x minutes, both pipe A and B were open.

Part filled in x minutes by Pipe A and B $= x \times \frac{11}{225} = \frac{11x}{225}$

Now, the cistern must be filled in (30-x) minutes by pipe A alone

Part filled in (30-x) minutes by pipe A $= (30 - x) \times \frac{2}{75} = \frac{2(30 - x)}{75}$

$$\frac{11x}{225} + \frac{2(30 - x)}{75} = 1$$

$$\frac{11x}{225} + \frac{2(30 - x)}{75} = 1$$

$$\Rightarrow 11x + 6(30 - x) = 225$$

$$\Rightarrow 11x + 180 - 6x = 225$$

$$\Rightarrow 5x = 45$$

$$x = 9$$

3. A pump can fill a tank with water in 2 hours. Because of a leak, it took $2^2/_3$ hours to fill the tank. The leak can drain all the water of the tank in:

A. 6 hours
B. 8 hours
C. 9 hours
D. 10 hours

Hide Answer | Notebook | Discuss

Here is the answer and explanation

Answer : Option B

Explanation :

Let the leak can drain all the water of the tank in y hours

Part of the tank filled by the pipe in 1 hr = 1/2

Part of the tank emptied by the leak in 1 hr = 1/y

$$\frac{1}{2} - \frac{1}{y} = \frac{3}{8}$$

$$\Rightarrow \frac{1}{y} = \frac{1}{2} - \frac{3}{8} = \frac{1}{8}$$

$$\Rightarrow y = 8$$

i.e., the leak can drain all the water of the tank in 8 hours

4. 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. $\frac{6}{11}$ B. $\frac{5}{11}$

C. $\frac{7}{11}$ D. $\frac{8}{11}$

Hide Answer | Notebook | Discuss

Here is the answer and explanation

Answer : Option A

Explanation :

Part of the tank filled by pipe A in 1 minute = $^1/_{30}$

Part of the tank filled by pipe B in 1 minute = $^1/_{20}$

Part of the tank filled by pipe C in 1 minute = $^1/_{10}$

Here we have to find the proportion of the solution R.

Pipe C discharges chemical solution R

$$\text{Part of the tank filled by pipe C in 3 minutes} = 3 \times \frac{1}{10} = \frac{3}{10}$$

$$\text{Part of the tank filled by pipe A,B and C together in 1 minute} = \frac{1}{30} + \frac{1}{20} + \frac{1}{10} = \frac{11}{60}$$

$$\text{Part of the tank filled by pipe A,B and C together in 3 minute} = 3 \times \frac{11}{60} = \frac{11}{20}$$

$$\text{Required proportion} = \frac{(\frac{3}{10})}{(\frac{11}{20})} = \frac{(3 \times 20)}{(10 \times 11)} = \frac{6}{11}$$

5. A tank is filled by three pipes with uniform flow. The first two pipes operating simultaneously fill the tank in the same time during which the tank is filled by the third pipe alone. The second pipe fills the tank 5 hours faster than the first pipe and 4 hours slower than the third pipe. The time required by the first pipe is:

A. 30 hours B. 15 hours

C. 10 hours D. 6 hours

Hide Answer | Notebook | Discuss

Here is the answer and explanation

Answer : Option B

Explanation :

Let the first pipe alone can fill the tank in x hours

Then the second pipe can fill the tank in (x-5) hours

and the third pipe can fill the tank in (x-5)-4 = (x-9) hours

part filled by first pipe and second pipe together in 1 hr = part filled by third pipe in 1 hr

$$\frac{1}{x} + \frac{1}{x-5} = \frac{1}{x-9}$$

(From here, better to find the value of x from the choices

which will be easier. Or we can solve it as given below)

$$(x-5)(x-9) + x(x-9) = x(x-5)$$

$$x^2 - 14x + 45 + x^2 - 9x = x^2 - 5x$$

$$-14x + 45 + x^2 - 9x = -5x$$

$$x^2 - 18x + 45 = 0$$

$$(x-15)(x-3) = 0$$

$$x = 15 \text{ or } 3$$

We can not take the value of x = 3 because, (x-9) becomes negative which is not possible

because the third pipe can fill the tank in (x-9) hours

Hence, x = 15

6. Two pipes A and B together can fill a cistern in 4 hours. Had they been opened separately, then B would have taken 6 hours more than A to fill the cistern. How much time will be taken by A to fill the cistern separately?

A. 6 hours

B. 2 hours

C. 4 hours

D. 3 hours

Hide Answer | Notebook | Discuss

Here is the answer and explanation

Answer : Option A

Explanation :

Let pipe A alone can fill the tank in x hours

Then pipe B can fill the tank in (x+6) hours

$$\text{Part filled by pipe A in 1 hr} = \frac{1}{x}$$

$$\text{Part filled by pipe B in 1 hr} = \frac{1}{x+6}$$

$$\text{Part filled by pipe A and pipe B in 1 hr} = \frac{1}{x} + \frac{1}{x+6}$$

It is given that pipes A and B together can fill the cistern in 4 hours.

i.e., Part filled by pipes A and B in 1 hr = 1/4

$$\frac{1}{x} + \frac{1}{x+6} = \frac{1}{4}$$

(From here, better to find the value of x from the choices

which will be easier. Or we can solve it as given below)

$$4(x+6) + 4x = x(x+6)$$
$$4x + 24 + 4x = x^2 + 6x$$
$$x^2 - 2x - 24 = 0$$
$$(x-6)(x+4) = 0$$
$$x = 6 \text{ or } -4$$

Since x can not be negative, x = 6

i.e.,pipe A alone can fill the tank in 6 hours

7. Two pipes A and B can fill a tank in 12 and 24 minutes respectively. If both the pipes are used together, then how long will it take to fill the tank?

A. 9 min

B. 8 min

C. 6 min

D. 4 min

Hide Answer | Notebook | Discuss

Here is the answer and explanation

Answer : Option B

Explanation :

Part filled by pipe A in 1 minute= $\frac{1}{12}$

Part filled by pipe B in 1 minute= $\frac{1}{24}$

Part filled by pipe A and pipe B in 1 minute= $\frac{1}{12} + \frac{1}{24} = \frac{1}{8}$

i.e., both the pipe together can fill the tank in 8 minutes

8. Two pipes A and B can fill a tank in 15 minutes and 40 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 min 10 sec

B. 25 min 20 sec

C. 14 min 40 sec

D. 20 min 10 sec

Hide Answer | Notebook | Discuss

Here is the answer and explanation

Answer : Option B

Explanation :

Part filled by pipe A in 1 minute= $\frac{1}{15}$

Part filled by pipe B in 1 minute= $\frac{1}{40}$

Part filled by pipe A and pipe B in 1 minute= $\frac{1}{15} + \frac{1}{40} = \frac{11}{120}$

pipe A and pipe B were open for 4 minutes.

Part filled by pipe A and pipe B in these 4 minutes $= 4 \times \frac{11}{120} = \frac{11}{30}$

Remaining part to be filled $= 1 - \frac{11}{30} = \frac{19}{30}$

Time taken by pipe B to fill this remaining part $= \frac{(\frac{19}{30})}{(\frac{1}{40})}$

$= \frac{19 \times 40}{30} = \frac{19 \times 4}{3} = \frac{76}{3} = 25\frac{1}{3}$ minutes $= 25$ minutes 20 seconds

9. Two pipes can fill a tank in 25 and 30 minutes respectively and a waste pipe can empty 3 gallons per minute. All the three pipes working together can fill the tank in 15 minutes. The capacity of the tank is:

A. 250 gallons

B. 450 gallons

C. 120 gallons

D. 150 gallons

Hide Answer | Notebook | Discuss

Here is the answer and explanation

Answer : Option B

Explanation :

Part filled by first pipe in 1 minute= $\frac{1}{25}$

Part filled by second pipe in 1 minute= $\frac{1}{30}$

Let the waste pipe can empty the full tank in x minutes

Then, part emptied by waste pipe in 1 minute= $\frac{1}{x}$

All the three pipes can fill the tank in 15 minutes

i.e., part filled by all the three pipes in 1 minute= $\frac{1}{15}$

$$\Rightarrow \frac{1}{25}+\frac{1}{30}-\frac{1}{x}=\frac{1}{15}$$

$$\Rightarrow \frac{1}{x}=\frac{1}{25}+\frac{1}{30}-\frac{1}{15}=\frac{6+5-10}{150}=\frac{1}{150}$$

$$\Rightarrow x = 150$$

i.e, the waste pipe can empty the full tank in 150 minutes

Given that waste pipe can empty 3 gallons per minute

ie, in 150 minutes, it can empty 150 × 3 = 450 gallons

Hence, the volume of the tank = 450 gallons

10. A tank is filled in 10 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. 70 hours
B. 30 hours
C. 35 hours
D. 50 hours

Hide Answer | Notebook | Discuss

Here is the answer and explanation

Answer : Option A

Explanation :

Let the pipe A can fill the tank in x hours

Then pipe B can fill the tank in $\frac{x}{2}$ hours and pipe C can fill the tank in $\frac{x}{4}$ hours

Part filled by pipe A in 1 hour = $\frac{1}{x}$

Part filled by pipe B in 1 hour = $\frac{2}{x}$

Part filled by pipe C in 1 hour = $\frac{4}{x}$

Part filled by pipe A, pipe B and pipe C in 1 hour = $\frac{1}{x} + \frac{2}{x} + \frac{4}{x} = \frac{7}{x}$

i.e., pipe A, pipe B and pipe C can fill the tank in $\frac{x}{7}$ hours

Given that pipe A, pipe B and pipe C can fill the tank in 10 hours

$\Rightarrow \frac{x}{7} = 10$

$\Rightarrow x = 10 \times 7 = 70$ hours

11. One pipe can fill a tank four times as fast as another pipe. If together the two pipes can fill the tank in 36 minutes, then the slower pipe alone will be able to fill the tank in:

A. 180 min

B. 144 min.

C. 126 min

D. 114 min

Hide Answer | Notebook | Discuss

Here is the answer and explanation

Answer : Option A

Explanation :

Let the slower pipe alone can fill the tank in x minutes

Then the faster pipe can fill the tank in $\frac{x}{4}$ minutes

Part filled by the slower pipe in 1 minute = $\frac{1}{x}$

Part filled by the faster pipe in 1 minute = $\frac{4}{x}$

Part filled by both the pipes in 1 minute = $\frac{1}{x} + \frac{4}{x}$

It is given that both the pipes together can fill the tank in 36 minutes

$\Rightarrow$ Part filled by both the pipes in 1 minute = $\frac{1}{36}$

$\frac{1}{x} + \frac{4}{x} = \frac{1}{36}$

$\frac{5}{x} = \frac{1}{36}$

$x = 5 \times 36 = 180$

i.e.,the slower pipe alone fill the tank in 180 minutes

12. A tap can fill a tank in 4 hours. After half the tank is filled, three more similar taps are opened. What is the total time taken to fill the tank completely?

A. 3 hr

B. 1 hr 30 min

C. 2 hr 30 min

D. 2 hr

Hide Answer | Notebook | Discuss

Here is the answer and explanation

Answer : Option C

Explanation :

A tap can fill a tank in 4 hours

=> The tap can fill half the tank in 2 hours

$$\text{Remaining part} = \frac{1}{2}$$

After half the tank is filled, three more similar taps are opened.

Hence, total number of taps becomes 4.

$$\text{Part filled by one tap in 1 hour} = \frac{1}{4}$$

$$\text{Part filled by four taps in 1 hour} = 4 \times \frac{1}{4} = 1$$

i.e., 4 taps can fill remaining half in 30 minutes

Total time taken = 2 hour + 30 minute = 2 hour 30 minutes

13. A tap can fill a tank in 4 hours. After half the tank is filled, two more similar taps are opened. What is the total time taken to fill the tank completely?

A. 1 hr 20 min

B. 4 hr

C. 3 hr

D. 2 hr 40 min

Hide Answer | Notebook | Discuss

Here is the answer and explanation

Answer : Option D

Explanation :

A tap can fill a tank in 4 hours

=> The tap can fill half the tank in 2 hours

$$\text{Remaining part} = \frac{1}{2}$$

After half the tank is filled, two more similar taps are opened.

Hence, total number of pipes becomes 3.

Part filled by one tap in 1 hour = $\frac{1}{4}$

Part filled by three taps in 1 hour = $3 \times \frac{1}{4} = \frac{3}{4}$

Time taken to fill $\frac{1}{2}$ the tank by 3 pipes = $\frac{(\frac{1}{2})}{(\frac{3}{4})} = \frac{4}{6} == \frac{2}{3}$ hour = 40 minutes

Total time taken = 2 hour + 40 minute = 2 hour 40 minutes

14. Three pipes A, B and 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

Hide Answer | Notebook | Discuss

Here is the answer and explanation

Answer : Option C

Explanation :

A, B and C can fill a tank in 6 hours.

$\Rightarrow$ Part filled by pipes A,B and C in 1 hr = $\frac{1}{6}$

All these pipes are open for only 2 hours and then C is closed.

Part filled by pipes A,B and C in these 2 hours = $\frac{2}{6} = \frac{1}{3}$

Remaining part = $1 - \frac{1}{3} = \frac{2}{3}$

This remaining part of $\frac{2}{3}$ is filled by pipes A and B in 7 hours

$\Rightarrow$ Part filled by pipes A and B in 1 hr = $\frac{(\frac{2}{3})}{7} - \frac{2}{21}$

Part filled by pipe C in 1 hr = $(\frac{1}{6} - \frac{2}{21}) = \frac{7-4}{42} = \frac{3}{42} = \frac{1}{14}$

i.e., C alone can fill the tank in 14 hours

15. A large tanker can be filled by two pipes A and 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 and B fill it together for the other half?

A. 15 min

B. 20 min

C. 27.5 min

D. 30 min

Hide Answer | Notebook | Discuss

Here is the answer and explanation

Answer : Option D

Explanation :

$$\text{Part filled by pipe A in 1 minute} = \frac{1}{60}$$

$$\text{Part filled by pipe B in 1 minute} = \frac{1}{40}$$

$$\text{Part filled by both pipes A and pipe B in 1 minute} = \frac{1}{60} + \frac{1}{40} = \frac{2+3}{120} = \frac{5}{120} = \frac{1}{24}$$

Suppose the tank is filled in x minutes

Then, To fill the tanker from empty state, B is used for x/2 minutes and

A and B is used for the rest x/2 minutes

$$\frac{x}{2} \times \frac{1}{40} + \frac{x}{2} \times \frac{1}{24} = 1$$

$$\Rightarrow \frac{x}{2}\left[\frac{1}{40} + \frac{1}{24}\right] = 1$$

$$\Rightarrow \frac{x}{2} \times \frac{8}{120} = 1$$

$$\Rightarrow \frac{x}{2} \times \frac{1}{15} = 1$$

$$x = 15 \times 2 = 30 \text{ minutes}$$

16. Three taps A, B and C can fill a tank in 12, 15 and 20 hours respectively. If A is open all the time and B and C are open for one hour each alternately, the tank will be full in:

A. $6\frac{2}{3}$ hours

B. 6 hours

C. $7\frac{1}{2}$ hours

D. 7 hours

Hide Answer | Notebook | Discuss

Here is the answer and explanation

Answer : Option D

Explanation :

Part filled by pipe A in 1 hour = $\frac{1}{12}$

Part filled by pipe B in 1 hour = $\frac{1}{15}$

Part filled by pipe C in 1 hour = $\frac{1}{20}$

In first hour, A and B is open

In second hour, A and C is open

then this pattern goes on till the tank fills

Part filled by pipe A and pipe B in 1 hour = $\frac{1}{12} + \frac{1}{15} = \frac{9}{60} = \frac{3}{20}$

Part filled by pipe A and pipe C in 1 hour = $\frac{1}{12} + \frac{1}{20} = \frac{8}{60} = \frac{2}{15}$

Part filled in 2 hour = $\frac{3}{20} + \frac{2}{15} = \frac{17}{60}$

Part filled in 6 hour = $\frac{17}{60} \times 3 = \frac{17}{20}$

Remaining part = $(1 - \frac{17}{20}) = \frac{3}{20}$

Now, 6 hours are over and only $\frac{3}{20}$ part needed to be filled. At this 7th hour, A and B is open

Time taken by pipe A and B to fill this $\frac{3}{20}$ part = $\frac{(\frac{3}{20})}{(\frac{3}{20})} = 1$ hour

Total time taken = 6 hour + 1 hour = 7 hour

17. 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 cistern hold?

A. 4010 litre

B. 2220 litre

C. 1920 litre

D. 2020 litre

Hide Answer | Notebook | Discuss

Here is the answer and explanation

Answer : Option C

Explanation :

Part emptied by the leak in 1 hour = $\frac{1}{6}$

Net part emptied by the leak and the inlet pipe in 1 hour = $\frac{1}{24}$

Part filled by the inlet pipe in 1 hour = $\frac{1}{6} - \frac{1}{24} = \frac{1}{8}$

i.e., inlet pipe fills the tank in 8 hours = (8 × 60) minutes = 480 minutes

Given that the inlet pipe fills water at the rate of 4 liters a minute

Hence, water filled in 480 minutes = 480 × 4 = 1920 litre

i.e., The cistern can hold 1920 litre

18. A cistern can be filled by a tap in 3 hours while it can be emptied by another tap in 8 hours. If both the taps are opened simultaneously, then after how much time will the cistern get filled?

A. 4.8 hr
B. 2.4 hr
C. 3.6 hr
D. 1.8 hr

Hide Answer | Notebook | Discuss

Here is the answer and explanation

Answer : Option A

Explanation :

Part filled by the first tap in 1 hour = $\frac{1}{3}$

Part emptied by the second tap 1 hour = $\frac{1}{8}$

Net part filled by both these taps in 1 hour = $\frac{1}{3} - \frac{1}{8} = \frac{5}{24}$

i.e, the cistern gets filled in $\frac{24}{5}$ hours = 4.8 hours

19. Two taps A and B can fill a tank in 5 hours and 20 hours respectively. If both the taps are open then due to a leakage, it took 40 minutes more to fill the tank. If the tank is full, how long will it take for the leakage alone to empty the tank?

A. 28 hr
B. 16 hr
C. 22 hr
D. 32 hr

Hide Answer | Notebook | Discuss

Here is the answer and explanation

Answer : Option A

Explanation :

Part filled by pipe A in 1 hour = $\frac{1}{5}$

Part filled by pipe B in 1 hour = $\frac{1}{20}$

Part filled by pipe A and B in 1 hour = $\frac{1}{5} + \frac{1}{20} = \frac{1}{4}$

i.e., A and B together can fill the tank in 4 hours

Given that due to the leakage, it took 40 minutes more to fill the tank.

i.e., due to the leakage, the tank got filled in $4\frac{40}{60}$ hour = $4\frac{2}{3}$ hour = $\frac{14}{3}$ hour

$\Rightarrow$ Net part filled by pipe A and B and the leak in 1 hour = $\frac{3}{14}$

$\Rightarrow$ Part emptied by the leak in 1 hour = $\frac{1}{4} - \frac{3}{14} = \frac{1}{28}$

i.e., the leak can empty the tank in 28 hours

20. 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

Hide Answer | Notebook | Discuss

Here is the answer and explanation

Answer : Option C

Explanation :

Let capacity of bucket P = x

Then capacity of bucket Q = $\frac{x}{3}$

Given that it takes 80 turns for bucket P to fill the empty drum

=> capacity of the drum = 80x

Number of turns required if both P and Q are used = $\frac{80x}{x + \frac{x}{3}} = \frac{240x}{3x + x} = \frac{240}{4} = 60$

21. A booster pump can be used for filling as well as for emptying a tank. The capacity of the tank is 2400 m^3. The emptying of the tank is 10 m^3 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 m^3 / min.

B. 40 m^3 / min.

C. 50 m^3 / min.

D. 60 m^3 / min.

Hide Answer | Notebook | Discuss

Here is the answer and explanation

Answer : Option C

Explanation :

Let the filling capacity of the pump = x m^3 / min.

Then the emptying capacity of the pump = (x + 10) m^3 / min.

$$\text{Time required for filling the tank} = \frac{2400}{x} \text{ minutes}$$

$$\text{Time required for emptying the tank} = \frac{2400}{x+10} \text{ minutes}$$

Pump needs 8 minutes lesser to empty the tank than it needs to fill it

$$\Rightarrow \frac{2400}{x} - \frac{2400}{x+10} = 8$$

$$\Rightarrow \frac{300}{x} - \frac{300}{x+10} = 1$$

$$\Rightarrow 300(x+10) - 300x = x(x+10)$$

$$\Rightarrow 3000 = x^2 + 10x$$

$$\Rightarrow x^2 + 10x - 3000 = 0$$

$$(x+60)(x-50) = 0$$

$$x = 50 \text{ or } -60$$

Since x can not be negative, x=50

i.e.,filling capacity of the pump = 50 m^3 / min.

22. Two pipes A and B can separately fill a cistern in 40 minutes and 30 minutes respectively. There is a third pipe in the bottom of the cistern to empty it. If all the three pipes are simultaneously opened, then the cistern is full in 20 minutes. In how much time, the third pipe alone can empty the cistern?

A. 120 min

B. 100 min

C. 140 min

D. 80 min

Hide Answer | Notebook | Discuss

Here is the answer and explanation

Answer : Option A

Explanation :

Part filled by pipe A in 1 minute = $\frac{1}{40}$

Part filled by pipe B in 1 minute = $\frac{1}{30}$

Net part filled by pipe A, pipe B and the third pipe in 1 hour = $\frac{1}{20}$

$\Rightarrow$ Part emptied by the third pipe in 1 hour = $\frac{1}{40} + \frac{1}{30} - \frac{1}{20} = \frac{3+4-6}{120} = \frac{1}{120}$

i.e., third pipe alone can empty the cistern in 120 minutes

23. Two pipes A and B can fill a tank in 9 hours and 3 hours respectively. If they are opened on alternate hours and if pipe A is opened first, how many hours, the tank shall be full?

A. 4 hr

B. 5 hr

C. 2 hr

D. 6 hr

Hide Answer | Notebook | Discuss

Here is the answer and explanation

Answer : Option B

Explanation :

Part filled by pipe A in 1 hour = $\frac{1}{9}$

Part filled by pipe B in 1 hour = $\frac{1}{3}$

Pipe A and B are opened alternatively.

Part filled in every 2 hour = $\frac{1}{9} + \frac{1}{3} = \frac{1+3}{9} = \frac{4}{9}$

Part filled in 4 hour = $2 \times \frac{4}{9} = \frac{8}{9}$

remaining part = $1 - \frac{8}{9} = \frac{1}{9}$

Now it is pipe A's turn.

Time taken by pipe A to fill the remaining $\frac{1}{9}$ part = $\frac{(\frac{1}{9})}{(\frac{1}{9})}$ = 1 hour

Total time taken = 4 hour + 1 hour = 5 hour

24. 13 buckets of water fill a tank when the capacity of each bucket is 51 litres. How many buckets will be needed to fill the same tank, if the capacity of each bucket is 17 litres?

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

Hide Answer | Notebook | Discuss

Here is the answer and explanation

Answer : Option C

Explanation :

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solution 1

Capacity of the tank = (13 × 51) litre

Number of buckets required of capacity of each bucket is 17 litre = $\frac{13 \times 51}{17} = 13 \times 3 = 39$

---

solution 2 (using principles of chain rule)

Let x be the number of buckets needed if the capacity of each bucket is 17 litres

More capacity, less buckets (Indirect proportion)

Capacity 51 : 17 :: x : 13

=> 51 × 13 = 17 × x

=> 3 × 13 = x

=> x = 39

25. Pipe A can fill a tank in 8 hours, pipe B in 4 hours and pipe C in 24 hours. If all the pipes are open, in how many hours will the tank be filled?

A. 2.4 hr
B. 3 hr
C. 4 hr
D. 4.2 hr

Hide Answer | Notebook | Discuss

Here is the answer and explanation

Answer : Option A

Explanation :

Part filled by pipe A in 1 hour = $\frac{1}{8}$

Part filled by pipe B in 1 hour = $\frac{1}{4}$

Part filled by pipe C in 1 hour = $\frac{1}{24}$

Part filled by pipe A, pipe B and pipe C in 1 hour = $\frac{1}{8} + \frac{1}{4} + \frac{1}{24} = \frac{10}{24}$

i.e, pipe A, pipe B and pipe C together can fill the tank in $\frac{24}{10}$ hours = 2.4 hours

26. Two pipes A and B can fill a tank is 8 minutes and 14 minutes respectively. If both the taps are opened simultaneously, and the tap A is closed after 3 minutes, then how much more time will it take to fill the tank by tap B?

A. 6 min 15 sec

B. 5 min 45 sec

C. 5 min 15 sec

D. 6 min 30 sec

Hide Answer | Notebook | Discuss

Here is the answer and explanation

Answer : Option B

Explanation :

Part filled by pipe A in 1 minute = $\frac{1}{8}$

Part filled by pipe B in 1 minute = $\frac{1}{14}$

Part filled by pipe A and pipe B in 1 minute = $\frac{1}{8} + \frac{1}{14} = \frac{11}{56}$

Pipe A and pipe B were open for 3 minutes

Part filled by pipe A and pipe B in 3 minutes = $3 \times \frac{11}{56} = \frac{33}{56}$

Remaining part = $1 - \frac{33}{56} = \frac{23}{56}$

Time taken by pipe B to fill this remaining part = $\frac{(\frac{23}{56})}{(\frac{1}{14})}$

$= \frac{23 \times 14}{56} = \frac{23}{4}$ minutes $= 5\frac{3}{4}$ minutes = 5 minutes 45 seconds

27. A water tank is two-fifth full. Pipe A can fill a tank in 12 minutes and pipe B can empty it in 6 minutes. If both the pipes are open, how long will it take to empty or fill the tank completely?

A. 2.8 min
B. 4.2 min
C. 4.8 min
D. 5.6 min

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Here is the answer and explanation

Answer : Option C

Explanation :

Since pipe B is faster than pipe A, the tank will be emptied.

$$\text{Part filled by pipe A in 1 minute} = \frac{1}{12}$$

$$\text{Part emptied by pipe B in 1 minute} = \frac{1}{6}$$

$$\text{Net part emptied by pipe A and pipe B in 1 minute} = \frac{1}{6} - \frac{1}{12} = \frac{1}{12}$$

$$\text{Time taken to empty } \frac{2}{5} \text{ of the tank} = \frac{(\frac{2}{5})}{(\frac{1}{12})} = \frac{2 \times 12}{5} = 4.8 \text{ min}$$

28. Pipes A and B can fill a tank in 8 and 24 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. 18 hr
B. 6 hr
C. 24 hr
D. 12 hr

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Here is the answer and explanation

Answer : Option D

Explanation :

$$\text{Part filled by pipe A in 1 minute} = \frac{1}{8}$$

$$\text{Part filled by pipe B in 1 minute} = \frac{1}{24}$$

$$\text{Part emptied by pipe C in 1 minute} = \frac{1}{12}$$

$$\text{Net part filled by pipe A, pipe B and pipe C in 1 minute} = \frac{1}{8} + \frac{1}{24} - \frac{1}{12} = \frac{2}{24} = \frac{1}{12}$$

i.e, the tank will be filled in 12minutes

29. 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

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Here is the answer and explanation

Answer : Option B

Explanation :

Let the slower pipe alone can fill the tank in x minutes

Then the faster pipe can fill the tank in $\frac{x}{6}$ minutes

Part filled by the slower pipe in 1 minute = $\frac{1}{x}$

Part filled by the faster pipe in 1 minute = $\frac{6}{x}$

Part filled by both the pipes in 1 minute = $\frac{1}{x} + \frac{6}{x}$

It is given that both the pipes together can fill the tank in 22 minutes

$\Rightarrow$ Part filled by both the pipes in 1 minute = $\frac{1}{22}$

$$\frac{1}{x} + \frac{6}{x} = \frac{1}{22}$$

$$\frac{7}{x} = \frac{1}{22}$$

$x = 22 \times 7 = 154$

i.e.,the slower pipe alone fill the tank in 154 minutes

30. Two pipes A and B can fill a tank in 2 and 6 minutes respectively. If both the pipes are used together, then how long will it take to fill the tank?

A. 3 min

B. 2.5 min

C. 2 min

D. 1.5 min

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Here is the answer and explanation

Answer : Option D

Explanation :

Part filled by the first pipe in 1 minute = $\frac{1}{2}$

Part filled by the second pipe in 1 minute = $\frac{1}{6}$

Net part filled by pipe A and pipe B in 1 minute = $\frac{1}{2} + \frac{1}{6} = \frac{2}{3}$

i.e, pipe A and B together can fill the tank in 3/2 minutes = 1.5 minutes