Problem: 1
8 machines can produce 4800 identical pens in 6 hours. How many pens can one machine produce in 1 hour?

Solution:
Given that 8 machines can produce 4800 identical pens in 6 hours.
We know that,
Work = Efficiency * Time

Let E be the efficiency of one machine.
4800 = 8E * (6)
In one hour, 8 machines can produce
800 = 8E
In one hour, 1 machine can produce
E = 100 identical pens.

Problem: 2
If 8 men needed to dig a well 12m deep in 3 days, how many days would 5 men take to dig the same well but 15 m deep?

Solution:
Work = Efficiency * Time

Let E be the efficiency of 8 men.
From the given information, we can say
12 = 8E * 3

In one day, one men can dig E = 12/8 * 3 = 1/2 m deep well.

Let it take x days for one men to dig 15 m deep well. Then by direct proportion,

1 day 1/2
x days 15

x/2 = 15
x = 30 days

It takes 30 days for 1 men to dig 15 m deep well. Then by inverse proportion,

1 men ⟶ 30 days
5 men ⟶ y days

30 = 5y
y = 6 days
Therefore, it will take 6 days for 5 men to take the dig well 15 m deep.

Problem: 3
If 300 men could complete a construction in 16 days, how many men would be required to complete half the work in 12 days ?

Solution:
Work = Efficiency * Time
W = E (300 * 16)
Then for half of the work,
W/2 = E (150 * 16)
It is given in the question that worker will work for 12 days.
To convert 16 into 12 let us multiply and divide the number by 3/4
W/2 = E (150 * 16 * ¾ * 4/3)
W/2 = E (200 *12)

Hence, number of men needed to complete half of the same work in 12 days is 200

Problem: 4
If it takes 3 hours for machine A to produce N identical computer parts, and it takes machine B only 2 hours to do the same job, how long would it take to do the job if both machines worked simultaneously?

Solution:
A can produce N identical computer parts in 3 hours.
B can produce N identical computer parts in 2 hours.
We are asked to find, how long it will take to complete the job if both machines worked simultaneously.
We know that,
Overall efficiency = Efficiency of A + Efficiency of B.
Efficiency of A = Work done/Time taken = N/3
Efficiency of B = Work done/Time taken = N/2
Overall efficiency E = N/3 + N/2 = 5N/6

Time = Work /Efficiency
Time = N/(5N/6)
= 6/5 hr = 1.2 hr

Problem: 5
A and B, working separately, can do a piece of work in 10 and 15 days respectively. If they work on alternate days beginning with A, then in how many days will the work be completed?

Solution:
A can do a piece of work in 10 days.
In a day, A can do 1/10 work.
In a day, B can do 1/15 work.

A and B are working in alternate days. Consider the work completed in two consecutive days beginning with A. Now the work done by A and B in two days (one pair) = (1/10 + 1/15) = 5/30 = 1/6

Remaining work = 1- 1/6 = 5/6

This remaining work can complete in 5 such pairs days. Since 5 * 1/6 = 5/6
So, working on alternate days A and B takes 2 + 5 * 2 = 12 days.

Problem: 6
Johnny can mow the lawn in 30 minutes and with the help of his brother, Bobby, they can mow the lawn in 20 minutes, how long would it take Bobby working alone to mow the lawn?
(A)1/2hour (B)3/4hour (C) 1 hour (D) 3/2 hours (E) 2 hours

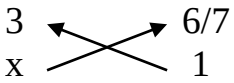
Solution:
Let 1/t be Bobby's work done in one unit of time. Now, the rate at which they work together is merely the sum of their rates:
Total work done = Johnny's Rate + Bobby's Rate
1/20 = 1/30 + 1/t
1/20 - 1/30 = 1/t
(30 - 20)/(30)(20) = 1/t
1/60 = 1/t
t = 60 minutes
Hence, working alone, Bobby can complete the job in 1 hour.

Problem: 7

A tank is being drained at a constant rate. If it takes 3 hours to drain 6/7 of its capacity, how much longer will it take to drain the tank completely?
(A)1 / 2 hour (B) 3 / 4 hour (C) 1 hour (D) 3 / 2 hours (E) 2 hours

Solution:

Given, it takes 3 hours to drain 6/7th of the tank.
Let it take x hours to drain the tank completely.



6x/7 = 3
x = 21/6 = 7/2 = 3.5 hours = 3 hours + 0.5 hours

Therefore it will take 1/2 hour more to drain the remaining part of the tank.

Problem: 8

If two workers can assemble a car in 8 hours and a third worker can assemble the same car in 12 hours, then how long would it take the three workers together to assemble the car?
(A)5/12 hrs (B)2 2/5 hrs (C)2 4/5 hrs (D)3 1/2hrs (E)4 4/5 hrs

Solution:

Work done = Time taken * Efficiency

Let E be the efficiency of one worker.
Assemble one car = 8 hours * (2E)
2E = 1/8
So in 1 hr both the workers complete 1/8th of the work.

Third worker complete the same job in12 hours.
So in 1 hr he completes 1/12th of the work.

In 1hr three workers together can complete 1/8 +1/12 = 5/24th of the work.
The three workers take 24/5 hours to complete the entire work working together.

24/5 = **4 4/5 hrs** = 4 hr 48 min.