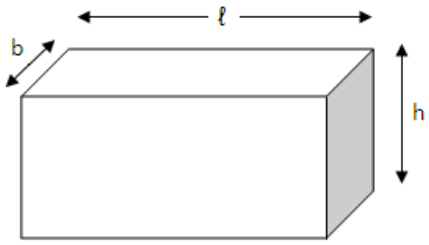
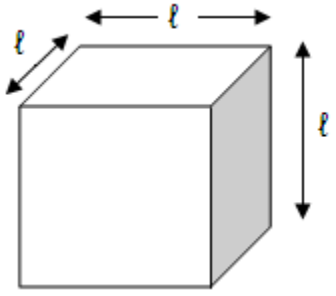
LESSON 2 Problems Involving Taps

Formula

1) Volume of cuboid = ℓ x b x h



2) Volume of cube = ℓ^3



GUIDED EXAMPLE 1 Work Together

Tap A can fill a tank in 6 minutes.
Tap B can fill a similar tank in 3 minutes.
Tap C can fill the tank in 2 minutes.
If all the three taps are opened at the same,
how long will it take to fill up the tank completely?

GUIDED EXAMPLE 2 Working Alone

Tap A, Tap B, Tap C and Tap D together can fill up a tank in 4 minutes.
Tap A and Tap B together can fill up the similar tank in 14 minutes.
Tap C alone can fill up the tank in 28 minutes.
How long will Tap D take to fill up the similar tank alone?

GUIDED EXAMPLE 3

Tap X and Tap Y can fill a tank in 6 minutes.
Tap Y and Tap Z can fill the tank in 12 minutes.
Tap Z and Tap X can fill the tank in 20 minutes.
How long will it take to fill the tank if all three taps are turned on?

GUIDED EXAMPLE 4 **Inlet + Outlet pipe**

An inlet tap can fill a tank in 40 minutes.
An outlet tap can drain it in 60 minutes.
The tank is empty and both taps are fully opened at the same time.
How long will it take to fill up the tank completely?

GUIDED EXAMPLE 5

Two taps fill a water tank with a capacity of 250 ℓ.
Tap A alone can fill the tank in 5 minutes.
Tap B alone can fill the tank in 7 minutes.
Tap C alone can completely drain the tank in 3 minutes.

a) How long will it take to fill $\frac{3}{7}$ of the tank when all three taps are turned on together?

b) How many litres of water will have flowed out through Tap C when the tank is $\frac{3}{7}$ filled with water?

GUIDED EXAMPLE 6

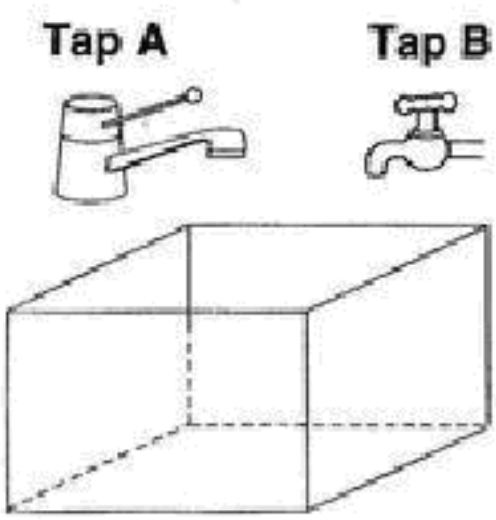
A container measuring 45 cm by 30 cm by 15 cm is being filled with water by Tap A and Tap B at a rate of 3.25 ℓ per min and 1.25 ℓ per min respectively.
The water is drained from a container by Tap C at a rate of 1.5 ℓ per min.
If Tap A and Tap B is turned on to fill the empty container 2 min before Tap C is turned on, how long will it take for the container to be filled completely after Tap C is turned on?

BUILD YOUR UNDERSTANDING

1. Jerry wants to fill a bathtub by running water from both the hot and cold taps. The hot tap takes 6 minutes to fill up the tub alone and the cold tap takes 4 minutes to fill it up a alone. When Jerry turns on both the taps at the same time, he notices that there is a crack at the bottom of the bathtub.
The crack empties the bathtub in 12 minutes. How long will it take to fill up the tub?

(Red Swastika School/P6 Prelim/Q45)

2. The figure below shows Tap A, Tap B and an empty tank with a capacity of 48.4 ℓ. Water flows from Tap A at 3.2 ℓ /min and from Tap B at 2.8 ℓ / min. Tap A was turned on first. Tap B was turned on 2 minutes later. The taps were turned off at the same time when the tank was completely filled without overflowing. How much water flowed form Tap B?



3. A water tank of capacity 9.6 ℓ.
It is filled by Tap A at the rate of 650 mℓ per minute
and out of the tank by Tap B at the rate of 130 m ℓ.
If there is 1.8 ℓ of water in the tank and both taps are then turned on,
how long will it take to fill the tank completely?

(Anglo Chinese School (Junior)/P5 SA2/Q44)

4. Water flows from Tap A at a rate of 250 mℓ per minute and from Tap B at a rate of 350 mℓ per minute. When both taps are turned on for 9 minutes, the water from both taps fill a container with a square base of side 25 cm. What is the height of the water level?

5. Wei En is filling two similar pails with water.
Each pail is placed under a tap and he turned on both taps at the same time.
Water from the first tap flows at a rate of 200 ml every 5 seconds while water from the second tap flows at a rate of 275 ml every 5 seconds.
How long will it take for the second tap to fill up 600 ml more water than the first tap?

6. Tank Y and Tank Z have a capacity of 1800 ℓ each.
Tap A and Tap B fill Tank Y at a rate of 80 ℓ/min and 100 ℓ/min respectively.
When Tank Y is half full, Tap C is opened to drain the water into Tank Z at a rate of 75 ℓ/min. However, there is a crack in Tank Z,
which leaks at a rate of 45 ℓ/min.
How long does it take to fill Tank Z from the time Tap A and Tap B is turned on?

7. Tank Y have a capacity of 315 litres.
Water from Tap A and Tap B is being poured into the Tank is being poured into the tank at a rate of 60 litres/min and 45 litres/min respectively.
When Tank Y is $\frac{2}{3}$ full, Tap C is opened,
draining water from Tank Y into the empty Tank Z at the rate of 60 litres/min.
Tank Z has a capacity of 120 litres, and it leaks at 20 litres/min.
How long does it take to fill Tank Z, from the time Tap A and Tap B started?