Higher Order Thinking Skills

Primary 5

Lesson 7:
Volume (II)

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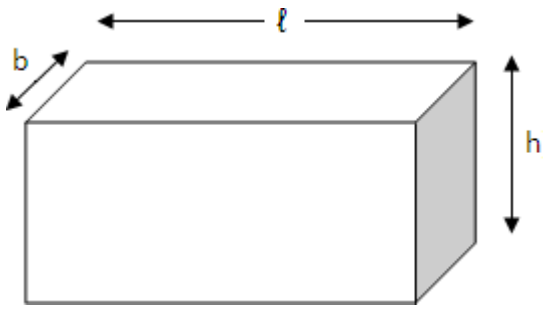
LESSON 7 Volume of Liquids

Formula:

Volume of cuboid = ℓ x b x h

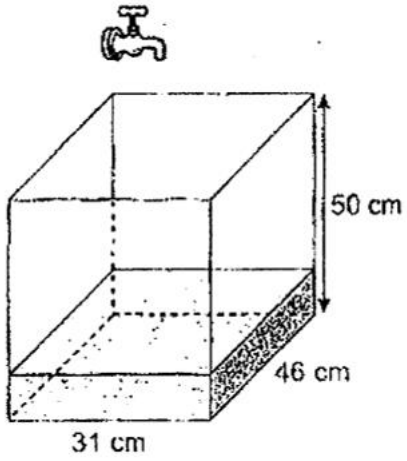
Base area = ℓ x b

Height = V ÷ (ℓ x b)
or
V ÷ (Base area)



GUIDED EXAMPLE 1

A rectangular tank 31 cm long, 46 cm wide and 50 cm high contained 6.8 ℓ of water at first.

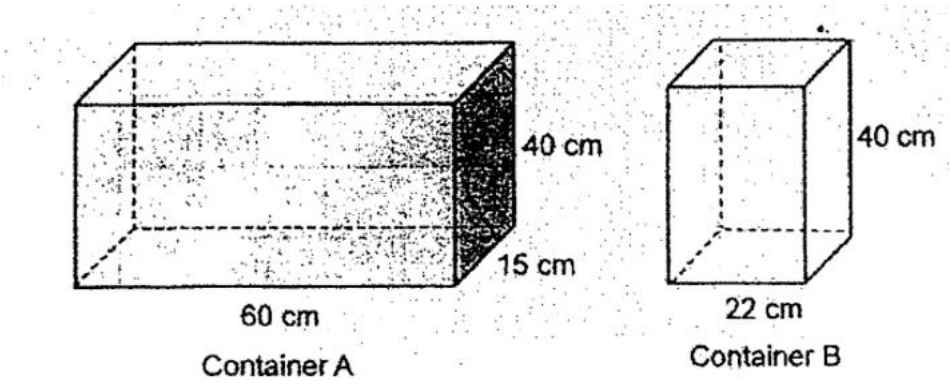


a) What is the capacity of the rectangular tank?

b) The tap is turned on.
Water flowed from the tap into the tank at a rate of 3 ℓ per minute.
At this rate, how long did it take to fill the tank?

GUIDED EXAMPLE 2

Container A measures 60 cm by 15 cm by 40 cm.
It is filled with water to the brim as shown below.
The base of the container B is a square of side 22 cm. Its height is 40 cm.
Container B is empty at first.
Water in container A is then poured into container B, without spilling.
After container B is filled to the brim,
there is still some water left in container A.



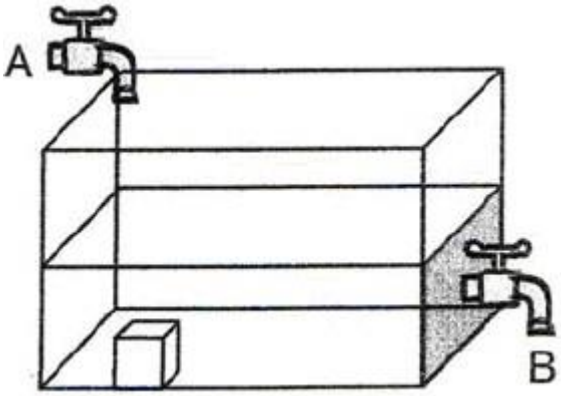
a) What is the capacity of container B?
Leave your answer in cm^3.

b) How much water is left in container A after container B is filled to the brim?
Leave your answer in litres.

GUIDED EXAMPLE 3

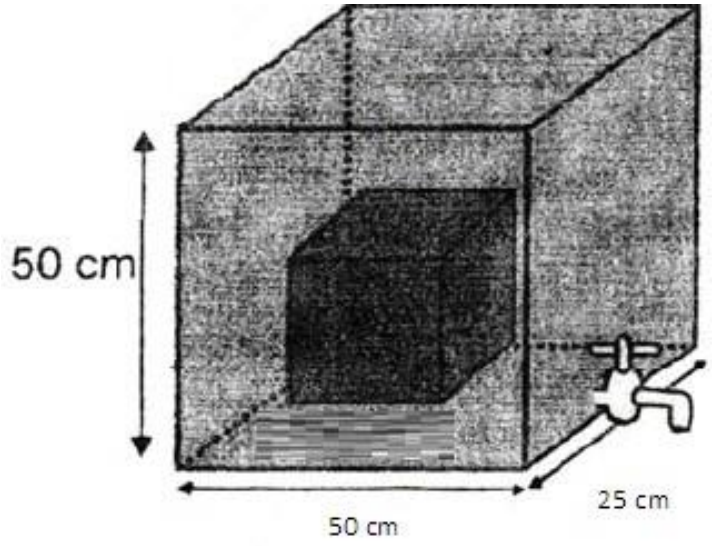
Tap A can fill an empty tank completely in 6 hours
while Tap B can empty the same tank completelyin 4 hours.
Bobby placed a cube of side 20cm into the empty tank
before filling half of the tank with water.
The volume of the cube is $\frac{1}{12}$ of the capacity of the tank.
Bobby then turned on both taps at the same time.
How long will it take to empty the tank?

(Fengshan Pri / Prelim/Q43)



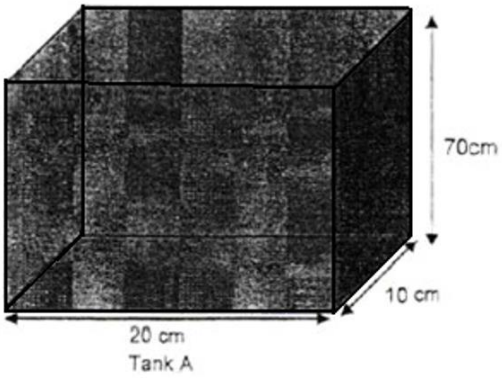
GUIDED EXAMPLE 4

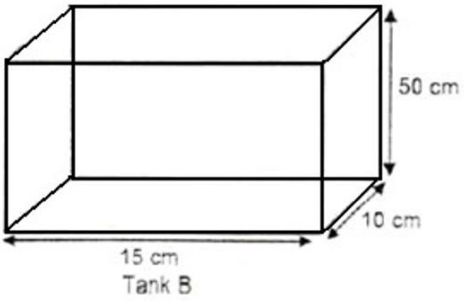
A tank measuring 70 cm by 25 cm by 50 cm contains some water a a cube.
Water is allowed to escape from a tap at the side of the tank at a rate of 500 cm³ per minute.
It took 70 min for the height of water level to drop to the top of the cube.
Find the volume of the cube.



GUIDED EXAMPLE 5

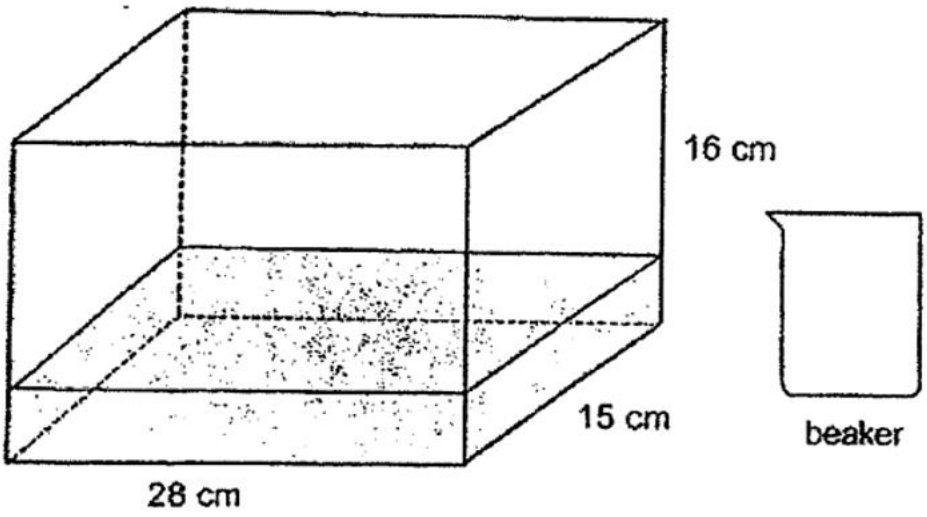
Tank A is filled with water to its brim and Tank B is empty.
Without spilling any water, water is poured from Tank A to Tank B
until the water levels in both tanks are the same.
What is the height of the water level?





BUILD YOUR UNDERSTANDING

Mr Tan wanted to fill the tank with water to the brim.
He used 6 beakers of water to fill $\frac{1}{7}$ of the tank.



a) How many more beakers of water would he need to fill the tank to the brim?

b) Find the volume of 1 beaker.

2. 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?

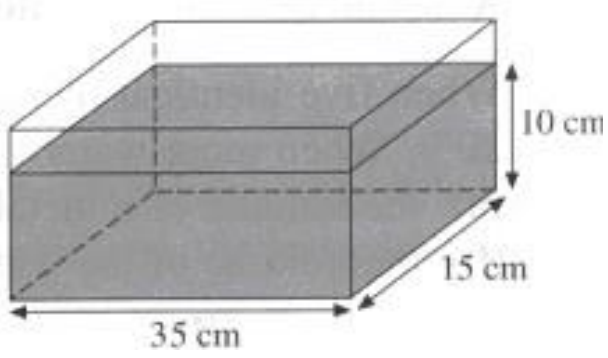
3. The tank shown below is $\frac{6}{7}$ filled with water.

(a) What is the volume of the tank?

(b) Some identical metals, each of volume 75 cm³ was put one at a time into the tank untilthe water just overflows.

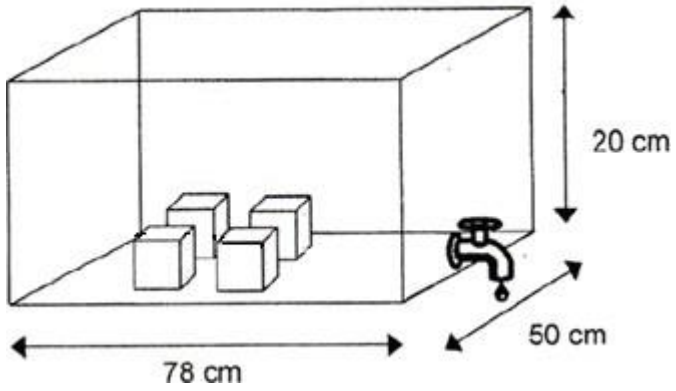
(i) How many metal balls had been put into the tank?

(ii) What is the volume of water that overflows from the tank?



4. A rectangular tank with 4 solid metal cubes inside was filled with water to its brim.
When thetap was turned on, water flowed out of the tank at a rate of 1.8 litres per minute. It took 39 minutes for the height of the water to drop to the top of the solid metal cube. Find the volume of **all** the metal cubes.

(Raffles Girls' Pri / P6/ Prelim /Q45)



5. A container measuring 40 cm by 25 cm by 12 cm is being filled with water by Tap A at a rate of 3.25ℓ per min. The water is drained from a container by Tap B at a rate of 1.25 ℓ per min. If Tap A is turned on to fill the empty container 2 min before Tap B is turned on, how long will it take for the container to be filled completely after Tap B is turned on?

(Ngee Ann Pri / P6/ Prelim/Q46)

6. A 20-litre tank was completely filled with water at the time shown on the clock in the afternoon in Figure 1.
The tap was then turned on to drain the water out of the tank.
The amount of water left in the tank after some time was shown in Figure 2.

(a) What time was it when the tank was half full?

(b) How long did it take to drain the 20 litres of water from the tank completely?

(Maris Stella High School/Prelim/Q43)

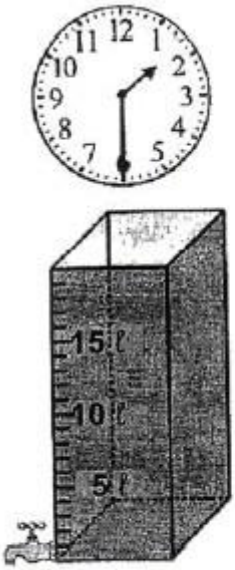


Figure 1

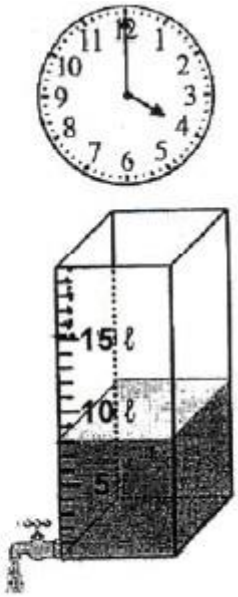


Figure 2

7. Tank X measuring 40 cm by 30 cm by 15 cm is filled with water to the brim. Tank Y is an empty rectangular container with base area of 80 cm by 30 cm. Find the volume of water that must be poured into Tank X to Tank Y such that they both have the same height in the end.