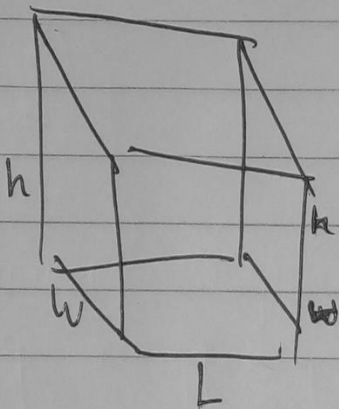


Mathematics Grade 9

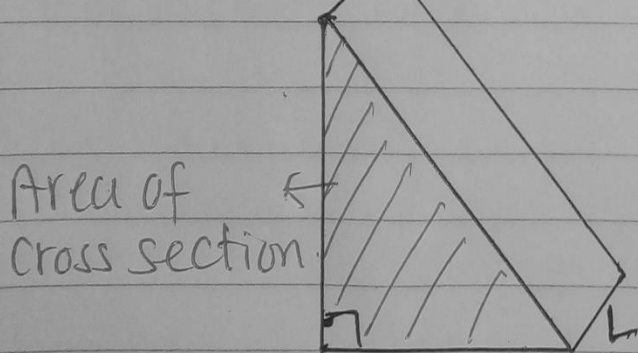
Grade 9

Volume and Capacity.

Volume of cube and cuboid = length \times width \times height
= (area of base \times height.)



Volume of a right prism.



Volume of a prism = Area of cross section \times length
= $A \times L$

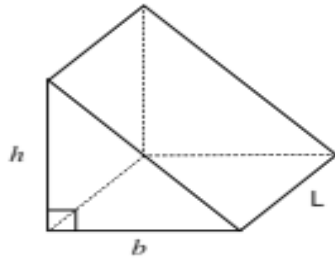
Volume of a triangular prism

Volume of triangular prism of Length L

$$= \text{Area of cross section} \times \text{Length}$$

$$= \left(\frac{1}{2} \times \text{base} \times \text{height of triangle}\right) \times \text{Length}$$

$$= \left(\frac{1}{2} \times b \times h\right) \times L$$

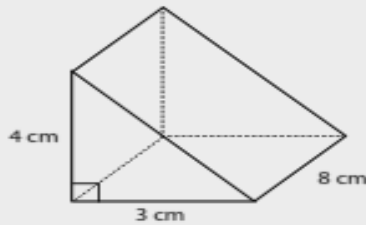


Note: The cross section is a right-angled triangle.

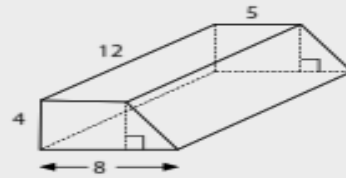
Example 1

Calculate the volume of the prism given below.

(a)

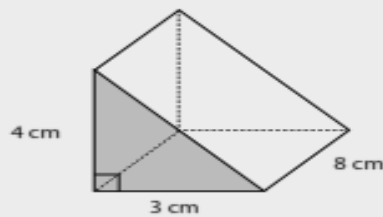


(b)



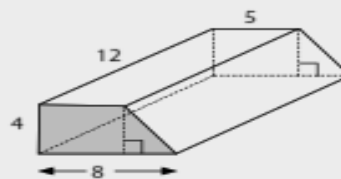
Solution (a)

$$\begin{aligned} \text{Volume of prism} &= \frac{1}{2} \times b \times h \times L \\ &= \frac{1}{2} \times 3 \times 4 \times 8 \\ &= 48 \text{ cm}^3 \end{aligned}$$



Solution (b)

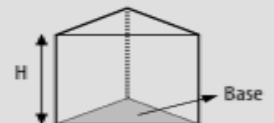
$$\begin{aligned} \text{Area of trapezium} &= \frac{1}{2} (\text{sum of parallel sides}) \times \text{height} \\ &= \frac{1}{2} (5 + 8) \times 4 \\ &= \frac{1}{2} \times 13 \times 4 \\ &= 13 \times 2 \\ &= 26 \text{ cm}^2 \end{aligned}$$



$$\begin{aligned} \text{Volume of prism} &= \text{area of trapezium} \times \text{length} \\ &= 26 \times 12 \\ &= 312 \text{ cm}^3 \end{aligned}$$

Note: Generally, the base of a prism can also be considered as its cross section and height, H.

So we can write
Volume of prism
= area of cross section \times height



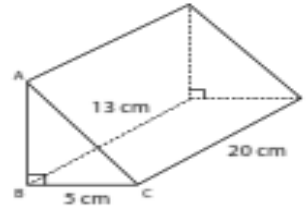
Workout Exercise: 1,2,5,6,7



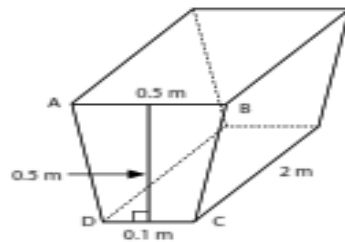
EXERCISES 10.2

RECALL
 $1\text{ m} = 100\text{ cm}$
 $1\text{ m}^3 = 1000000\text{ cm}^3$

- A right prism has a square base of side 5 cm and a height of 12 cm. Calculate its volume.
- The diagram shows a right prism whose cross section is a right-angled triangle ABC where angle $B = 90^\circ$, $BC = 5\text{ cm}$ and $AC = 13\text{ cm}$.
 - Find the length of AB .
 - Find area of triangle ABC .
 - Given that the length of prism is 20 cm, calculate its volume.

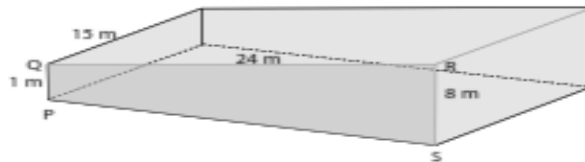


- The diagram shows a container with uniform cross section in the form of a trapezium $ABCD$. AB is parallel to DC and dimensions shown are in metres. Given that its length is 2 m, calculate its volume in (a) m^3 (b) cm^3 .

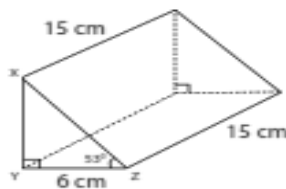


HINT
 Area of trapezium = $\frac{1}{2}(\text{sum of parallel sides}) \times \text{height}$

- A swimming pool in the form of a prism is 24 m long, 15 m wide, 1 m deep at the shallow end and 8 m at the deep end. $PQRS$ is in form of a trapezium with PQ parallel to SR .
 - Calculate the length of PS .
 - Calculate the volume of the pool.



- The diagram shows a right prism with a triangular cross-section XYZ with angle $XYZ = 90^\circ$, angle $XZY = 53^\circ$ and $YZ = 6\text{ m}$.
 [Given $\sin 53^\circ = 0.8$, $\cos 53^\circ = 0.6$, $\tan 53^\circ = 1.3$]



- Calculate the length of XY .
- Given that the length of the prism is 15 m, calculate its volume.