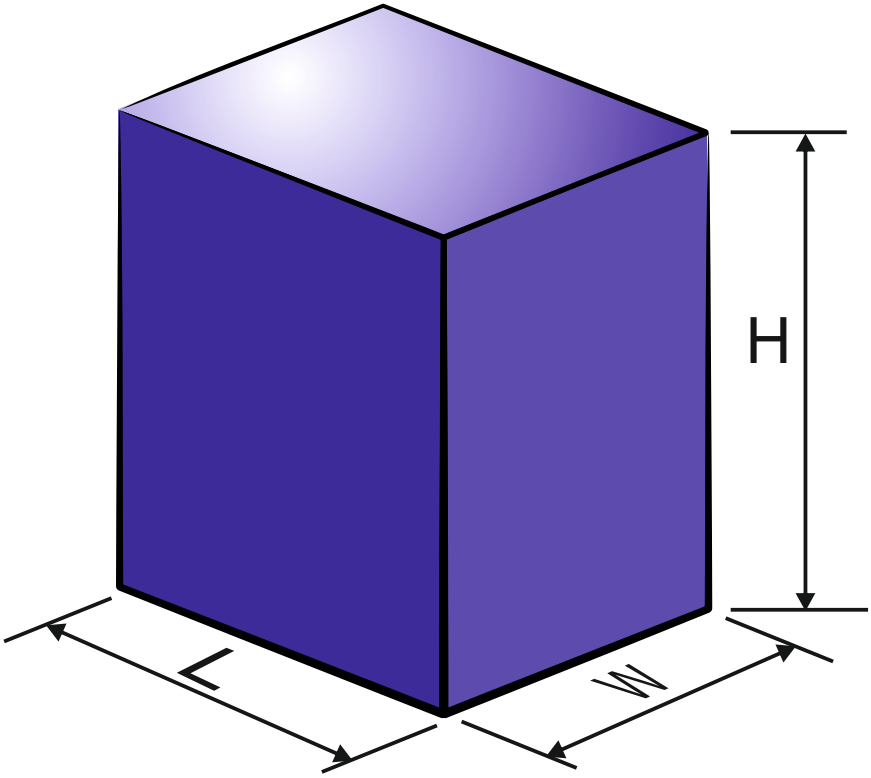
MATHEMATICAL SKILLS

VOLUME OF A RECTANGULAR PRISM AND ASSOCIATED GEOMETRICAL SHAPES

DESIGN AND TECHNOLOGY

HOW TO CALCULATE THE VOLUME OF A RECTANGULAR PRISM

DEFINITION: A rectangular prism is a solid object, composed of six rectangles, with a 90 degree angle between adjacent sides. Opposite sides of a rectangular prism are equal and parallel to each other.



Unlike a cube, the area of the sides of a rectangular prism / cuboid are not the same, consequently the formula for calculating the volume is as follows:

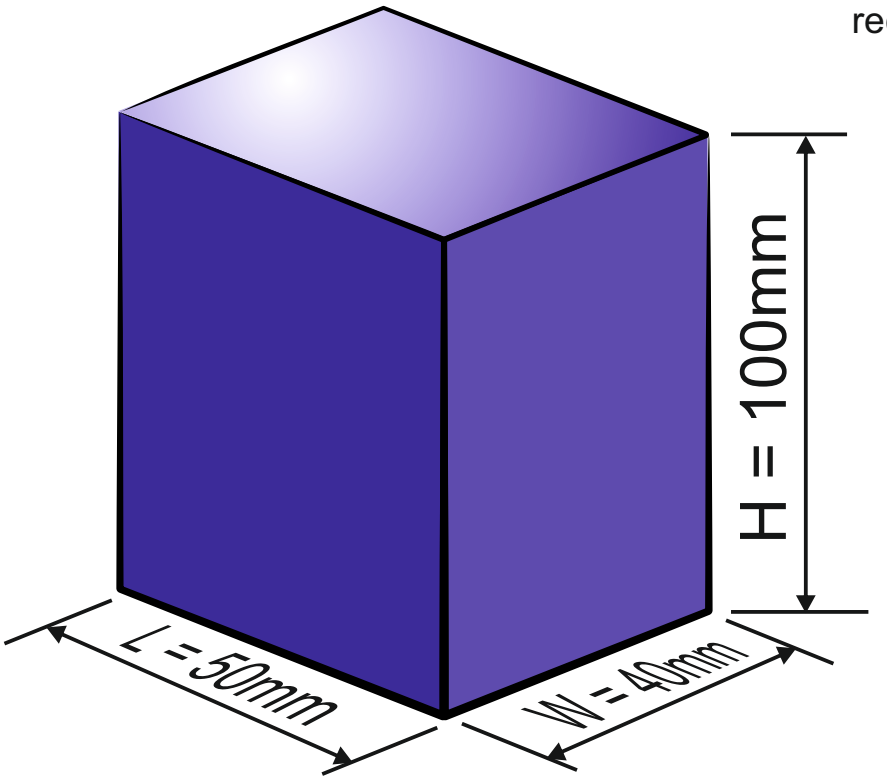
FORMULA

$V=L \times W \times H$

VOLUME = LENGTH X WIDTH X HEIGHT

$V=L \times W \times H$

EXAMPLE: What is the volume of the rectangular prism shown opposite?



$V=L \times W \times H$

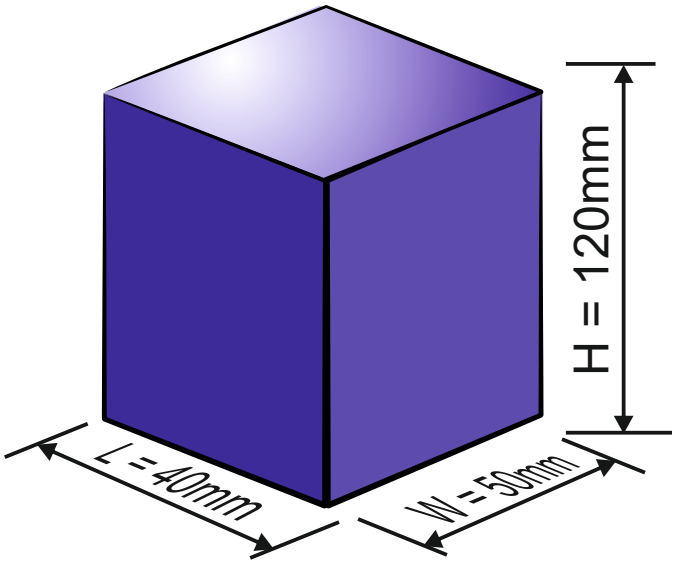
$V=50 \times 40 \times 100$

$V=200000mm^3$

or

$V=200cm^3$

EXAM QUESTION - RECTANGULAR PRISM



What is the volume of the rectangular prism shown opposite?

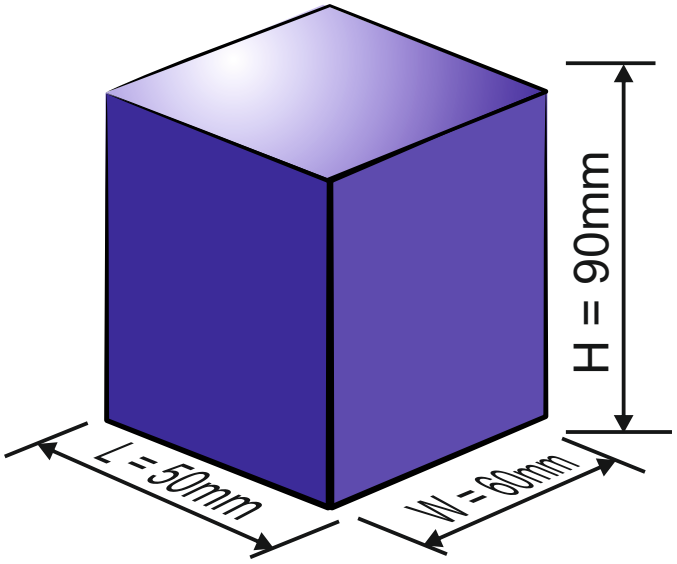
$V=L \times W \times H$

$V=40 \times 50 \times 120$

$V=240000mm^3$

or

$V=240cm^3$



What is the volume of the rectangular prism shown opposite?

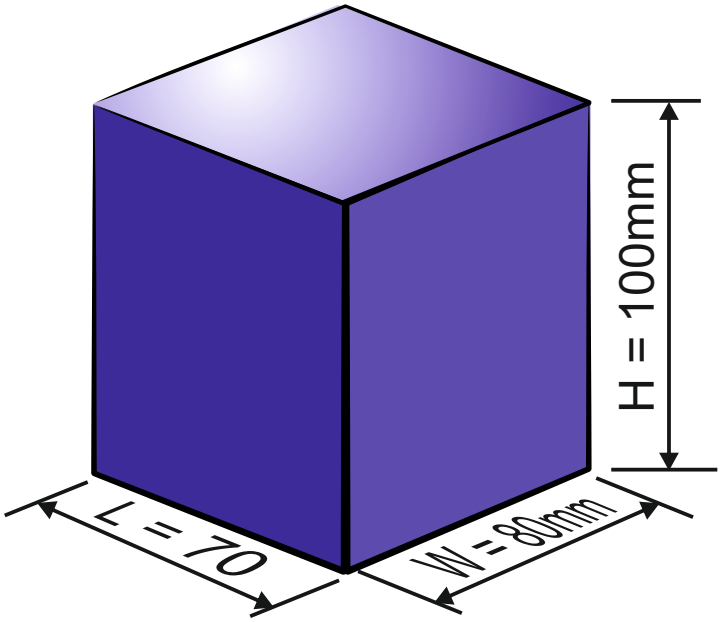
$V=L \times W \times H$

$V=50 \times 60 \times 90$

$V=270000mm^3$

or

$V=270cm^3$



What is the volume of the rectangular prism shown opposite?

$V=L \times W \times H$

$V=70 \times 80 \times 100$

$V=560000mm^3$

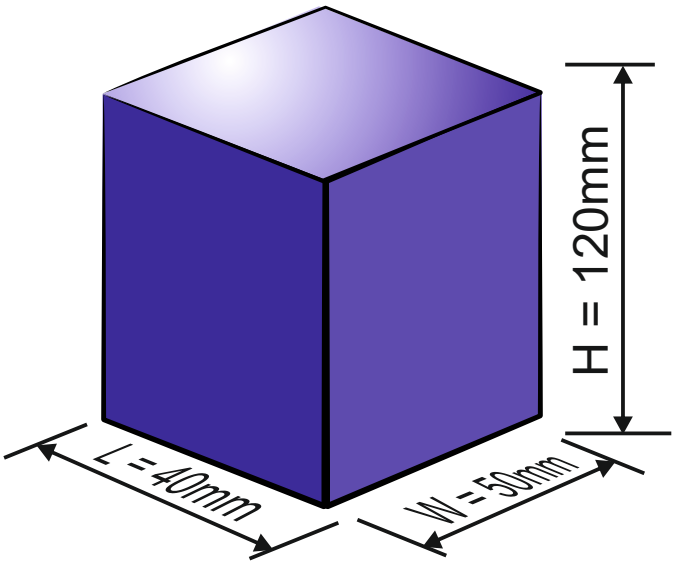
or

$V=560cm^3$

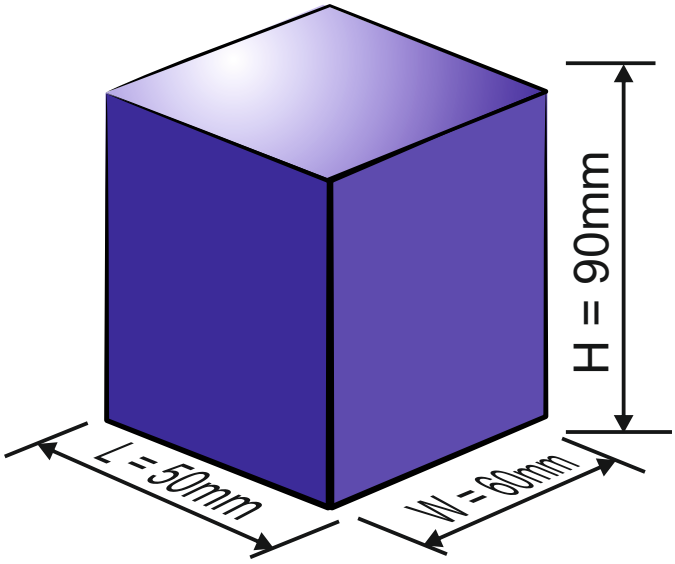
EXAM QUESTION - RECTANGULAR PRISM

Calculate the volume of each rectangular prism, shown below.

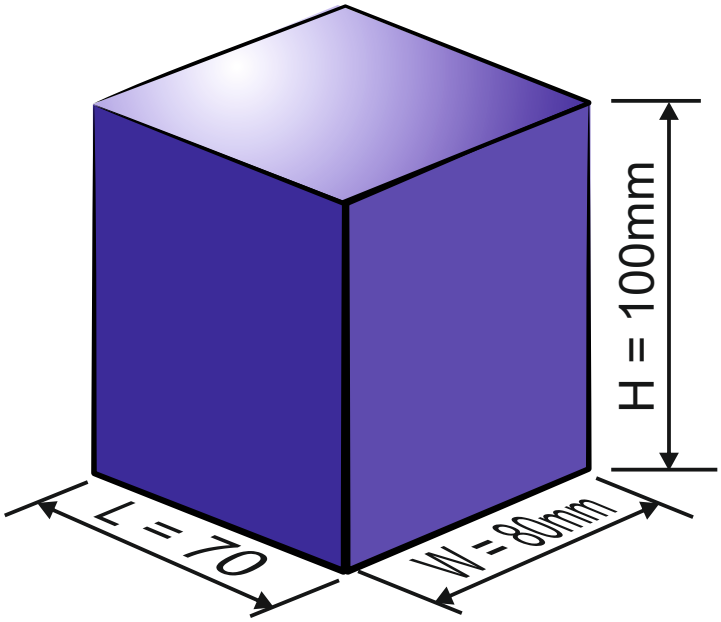
V=L x W x H



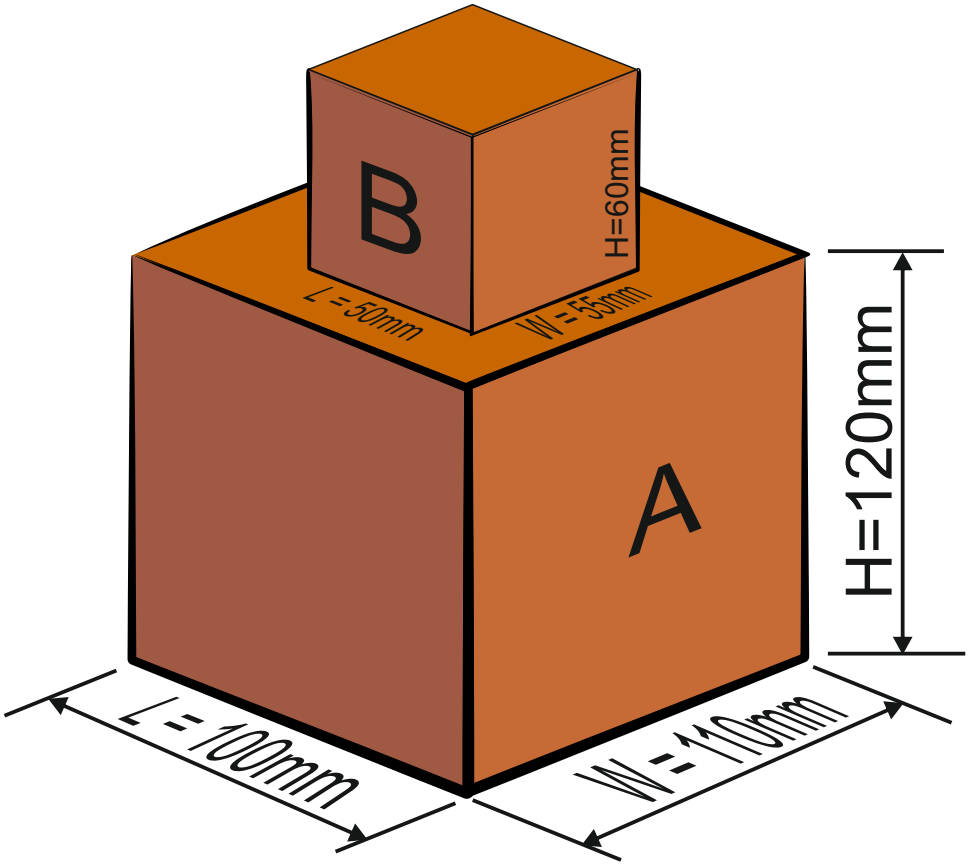
V=L x W x H



V=L x W x H



EXAM QUESTION - RECTANGULAR PRISM



The solid geometrical shape shown opposite can be treated as two rectangular prisms.

Calculate the entire volume of the shape/form .

Explain your working out.

First, treat the shape / form as two separate rectangular prisms, Prism A and Prism B

Work out the volume of rectangular prism A and B

VOLUME OF 'A'
V=L x W x H

VOLUME =100mm x 110mm x 120mm
VOLUME = 1320000mm³ or 1320cm³

VOLUME OF 'B'
V=L x W x H

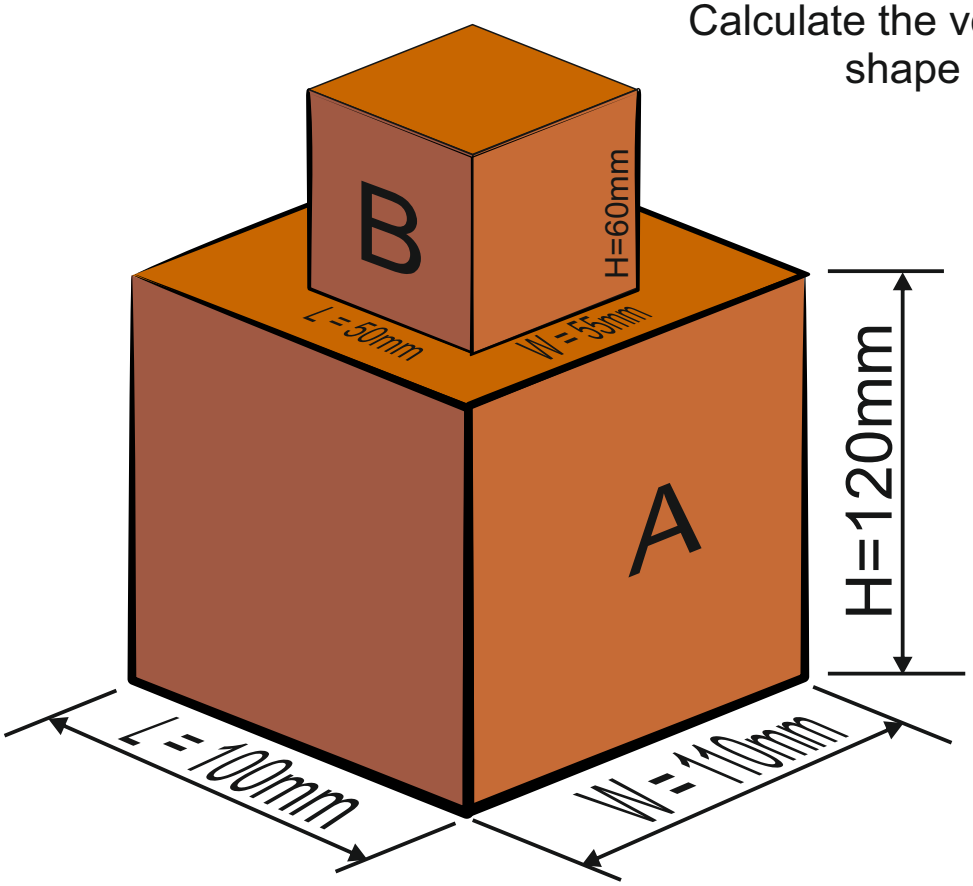
VOLUME =50mm x 55mm x 60mm
VOLUME = 165000mm³ or 165cm³

Then, add the volume of rectangular prism A and the volume of rectangular prism B, to find the final overall volume.

FINAL VOLUME = A + B
FINAL VOLUME = 1320000mm³ + 165000mm³
FINAL VOLUME = 1485000mm³ or 1485cm³

EXAM QUESTION - RECTANGULAR CUBE

Calculate the volume of the geometrical shape shown opposite.



The unusual solid geometrical shape shown opposite can be treated as two rectangular prisms.

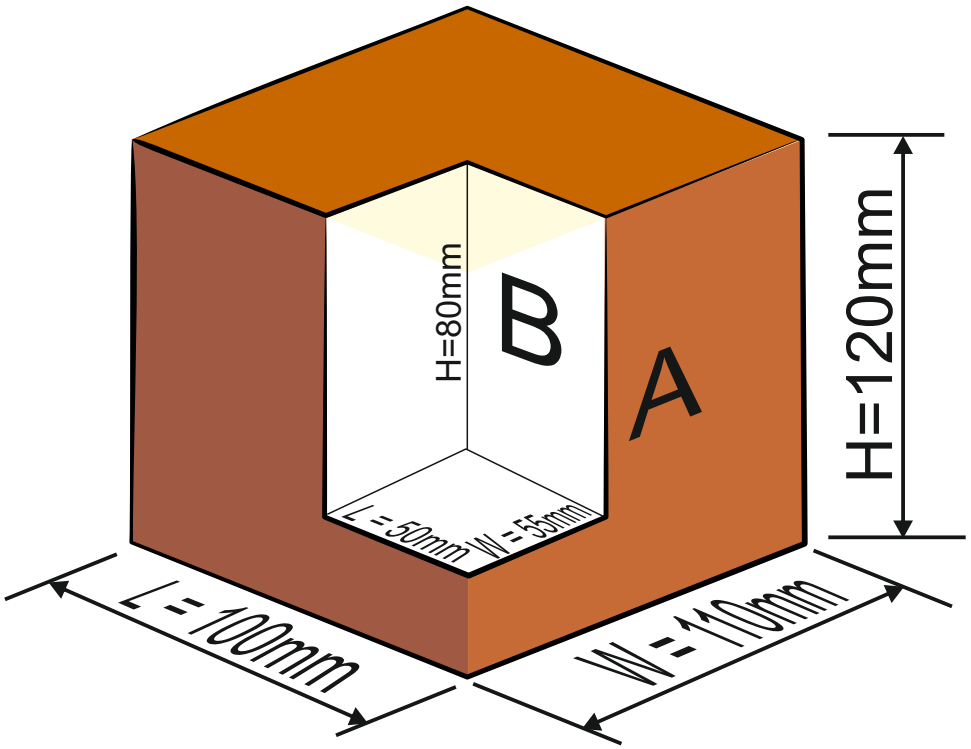
Calculate the entire volume of the shape/form .

Explain your working out.

EXAM QUESTION - RECTANGULAR PRISMS

The ususal geometrical shape below, was a single aluminium rectangular prism. A section (section B) was then machined away to produce the shape we now see.

What is the volume of the finished 3D shape? Explain your working out.



To answer this question, the best approach is to treat the rectangular prism as two separate rectangular prisms, A and B. The length, width and height of each of the prisms can be clearly seen on the diagram above.

How to work out the answer:

Start by treating both A and B as solid rectangular prisms.
Work out the volume of each rectangular A and B

'A'

V=L x W x H

VOLUME = 100mm x 110mm x 120mm
VOLUME = 1320000mm³ or 1320cm³

'B'

V=L x W x H

VOLUME = 50mm x 55mm x 80mm
VOLUME = 220000mm³ or 220cm³

Then, subtract the volume of B from the volume of A, to find the final overall volume of the geometrical shape.

FINAL VOLUME = A - B

FINAL VOLUME = 1320000mm³ - 220000mm³

FINAL VOLUME = 1100000mm³ or 1100cm³

EXAM QUESTION - RECTANGULAR PRISMS

The ususal geometrical shape below, was a single aluminium rectangular prism. A section (section B) was then machined away to produce the shape we now see.

What is the volume of the finished 3D shape? Explain your working out.