MATHEMATICAL SKILLS

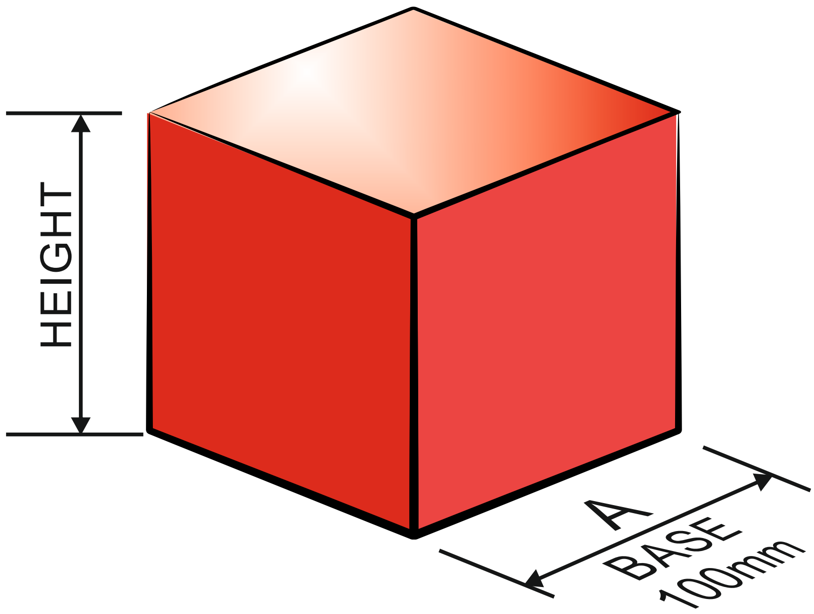
VOLUME OF A CUBE AND ASSOCIATED GEOMETRICAL SHAPES

DESIGN AND TECHNOLOGY

WORLD ASSOCIATION OF TECHNOLOGY TEACHERS https://www.facebook.com/groups/254963448192823/ www.technologystudent.com © 2017 V.Ryan © 2017

HOW TO CALCULATE THE VOLUME OF A CUBE

DEFINITION: A cube is a solid object, composed of six equal squares, with a 90 degree angle between adjacent sides.



All the sides of a cube are the same measurement. There are two similar formulas for calculating a cube’s volume.

$$\text{VOLUME (V)} = A \times A \times A$$

$$\text{OR } A^3$$

EXAMPLE 1

If the measurement of one side is 100mm:

$$\text{VOLUME} = 100\text{mm} \times 100\text{mm} \times 100\text{mm}$$

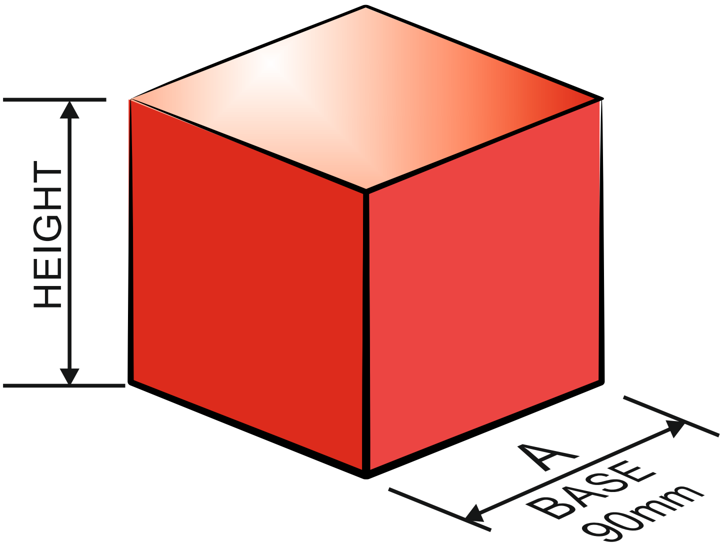
$$\text{VOLUME} = 1000000\text{mm}^3 \text{ or } 1000\text{cm}^3$$

EXAMPLE 2

If the measurement of one side is 320mm:

$$\text{VOLUME} = 320\text{mm} \times 320\text{mm} \times 320\text{mm}$$

$$\text{VOLUME} = 32768000\text{mm}^3 \text{ or } 32768\text{cm}^3$$



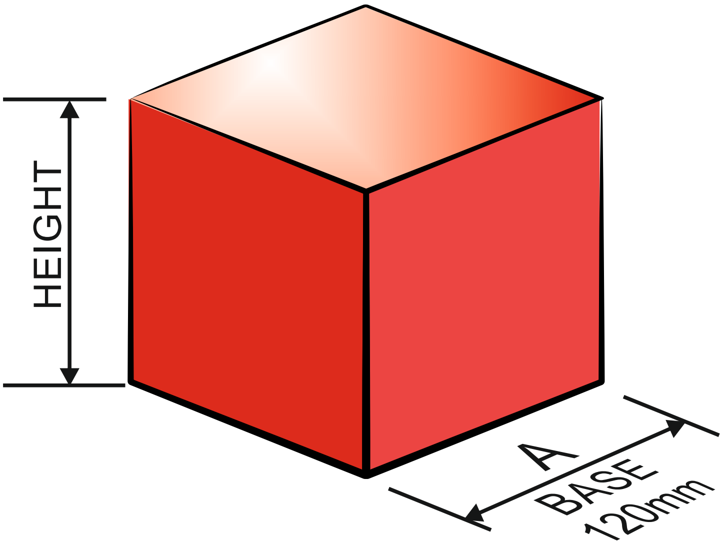
QUESTION 1

What is the volume of the cube shown opposite?

VOLUME (V) = A x A x A
OR A^3

If the measurement of one side is 90mm:

VOLUME = 90mm x 90mm x 90mm
VOLUME = 729000mm³ or 729cm³



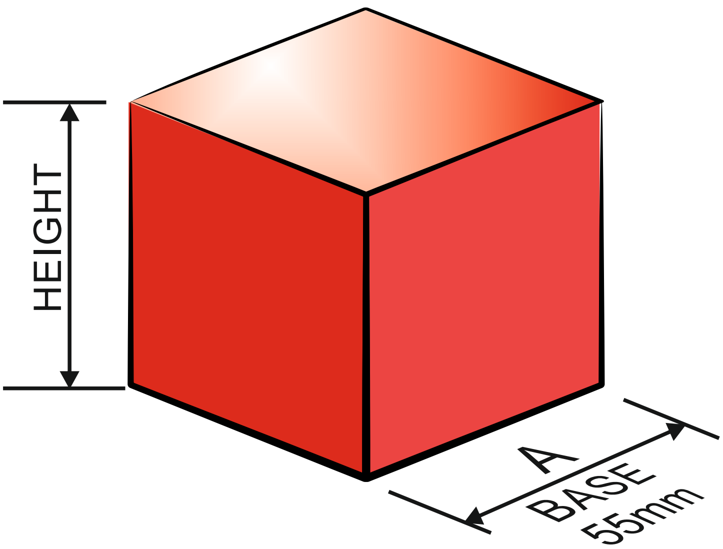
QUESTION 2

What is the volume of the cube shown opposite?

VOLUME (V) = A x A x A
OR A^3

If the measurement of one side is 120mm:

VOLUME = 120mm x 120mm x 120mm
VOLUME = 1728000mm³ or 1728cm³



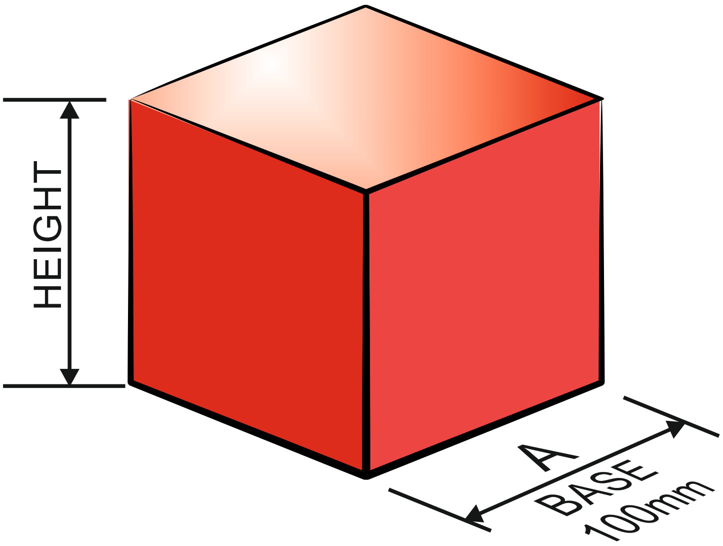
QUESTION 3

What is the volume of the cube shown opposite?

VOLUME (V) = A x A x A
OR A^3

If the measurement of one side is 55mm:

VOLUME = 55mm x 55mm x 55mm
VOLUME = 166375mm³ or 166.375cm³



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What is the volume of the cube shown opposite?

VOLUME (V) = A x A x A
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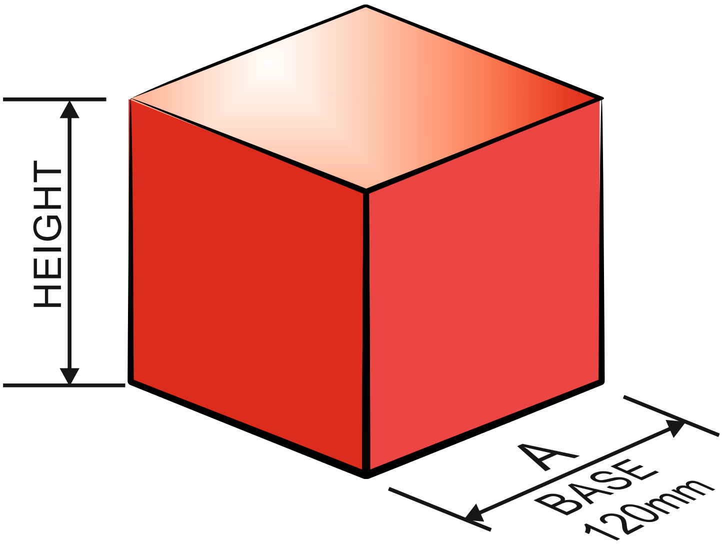

QUESTION 2

What is the volume of the cube shown opposite?

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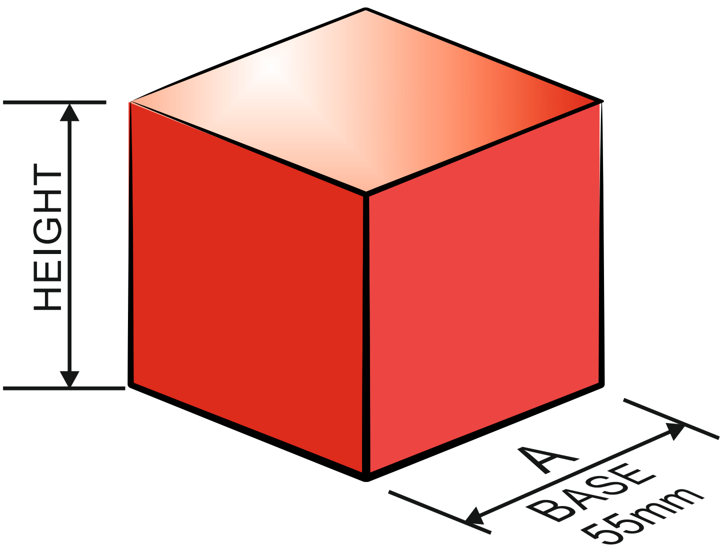
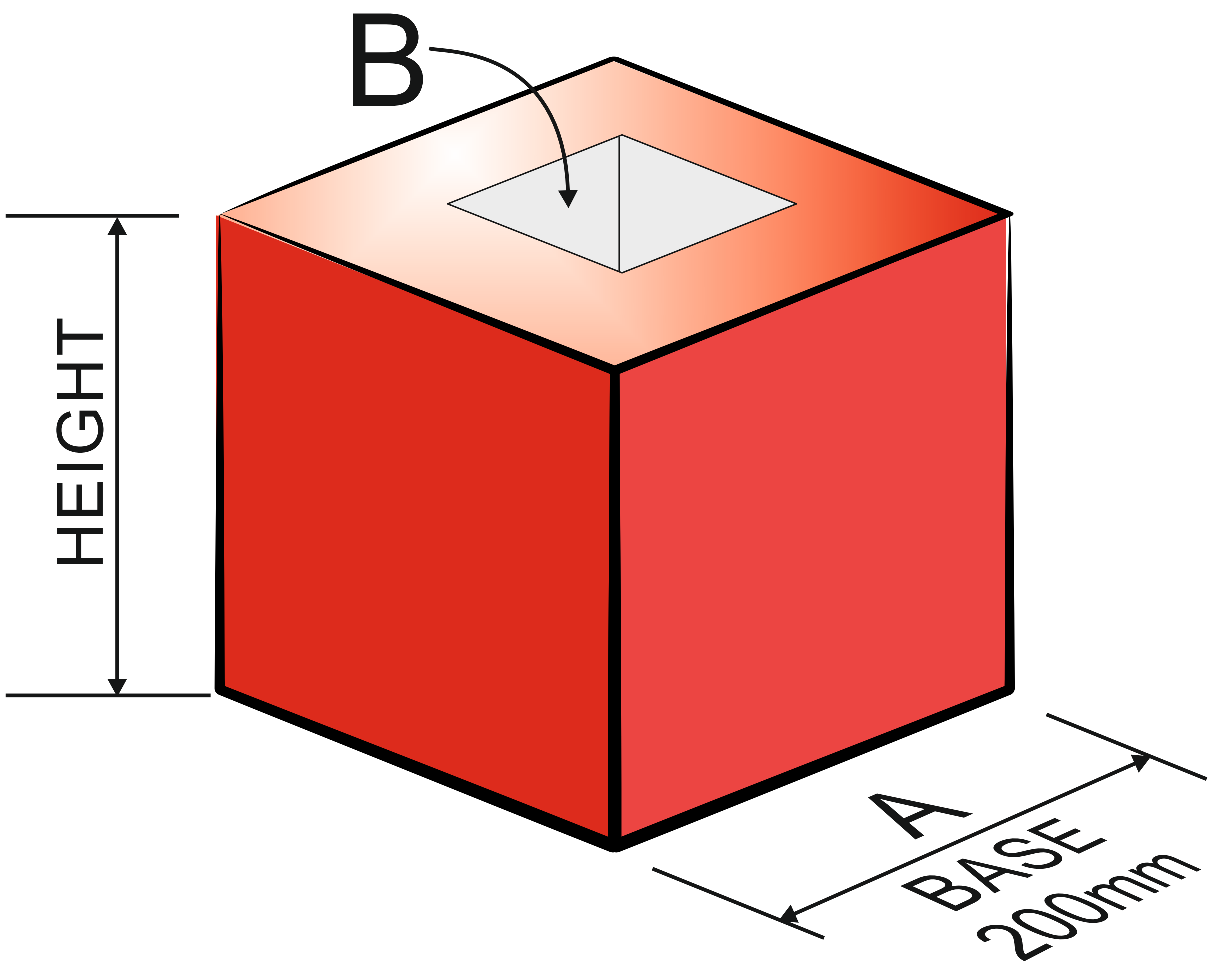


QUESTION 3

What is the volume of the cube shown opposite?

VOLUME (V) = A x A x A
OR A^3

EXAM QUESTION - CUBE



A solid cube of aluminium (A) has 200mm sides. However, a smaller area in the form of a cube with 100mm length sides, has been machined from the top surface (B). What is the volume of the finished 3D shape?

How to work out the answer:

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

CUBE ‘A’

If the measurement of one side is 200mm:

VOLUME =200mm x 200mm x 200mm
VOLUME = 8000000mm^3 or 8000cm^3

CUBE ‘B’

If the measurement of one side is 100mm:

VOLUME =100mm x 100mm x 100mm
VOLUME = 1000000mm^3 or 1000cm^3

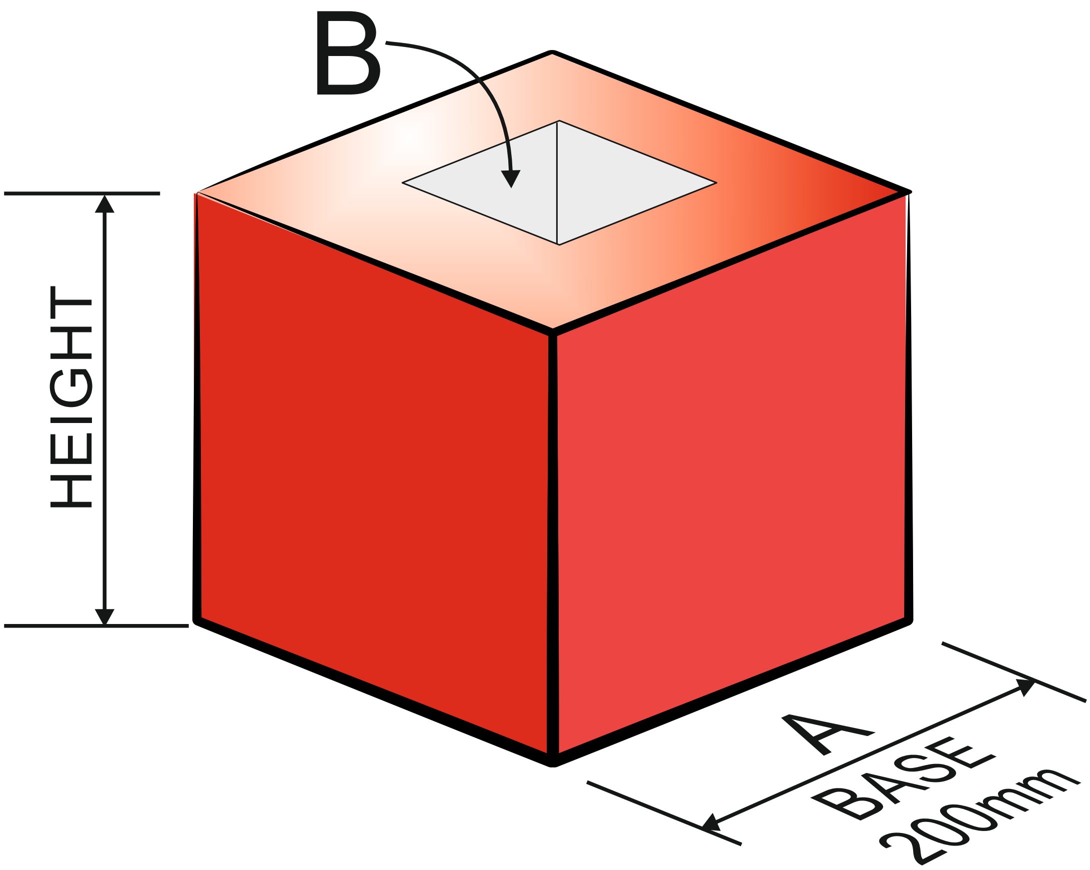
Then, subtract the volume of B away from the volume of A, to find the final overall volume

FINAL VOLUME = A - B

FINAL VOLUME = 8000000mm^3 - 1000000mm^3

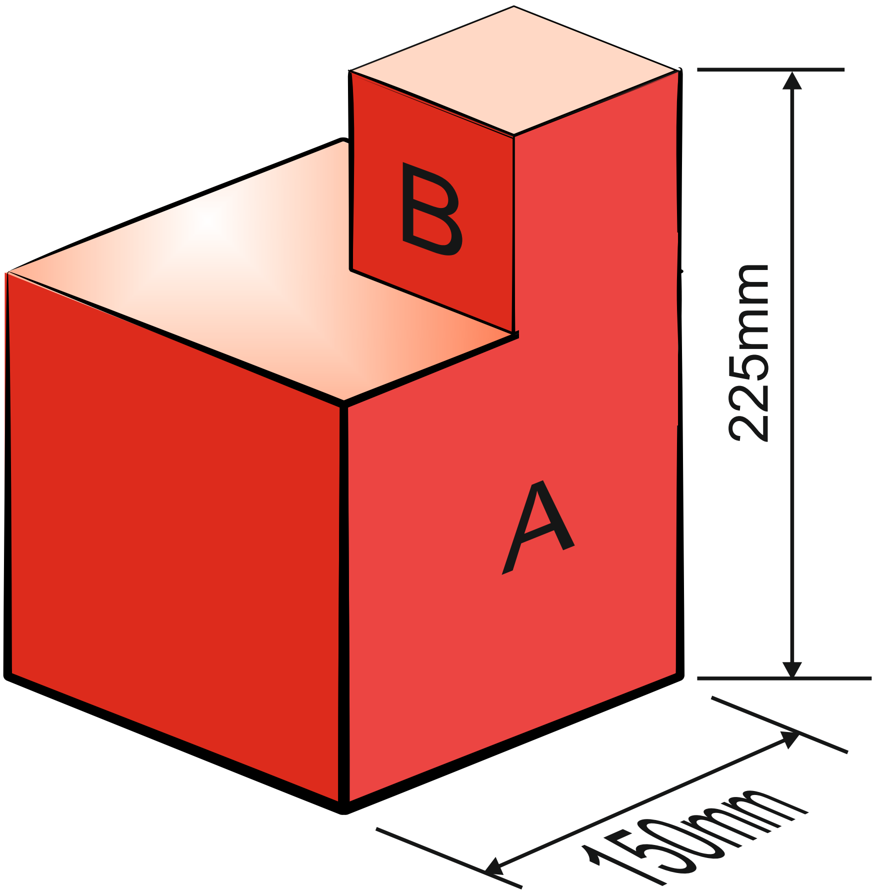
FINAL VOLUME = 7000000mm^3 or 7000cm^3

EXAM QUESTION - CUBE



A solid cube of aluminium (A) has 200mm sides. However, a smaller area in the form of a cube with 100mm length sides, has been machined from the top surface (B).
What is the volume of the finished 3D shape? Explain your working out.

EXAM QUESTION - CUBE



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

Calculate the entire volume of the shape/form.

Explain your working out.

The measurement of a side of cube A is clearly shown as 150mm

To work out the length of one side of cube B, simply subtract 150mm from the overall height of the shape.

225mm (overall height) - 150mm (length of one side of cube A)

225mm - 150mm = 75mm (this is the length of one side of cube B)

Then work out the volume of cubes A and B

CUBE 'A'

If the measurement of one side is 150mm:

VOLUME = 150mm x 150mm x 150mm
VOLUME = 3375000mm^3 or 3375cm^3

CUBE 'B'

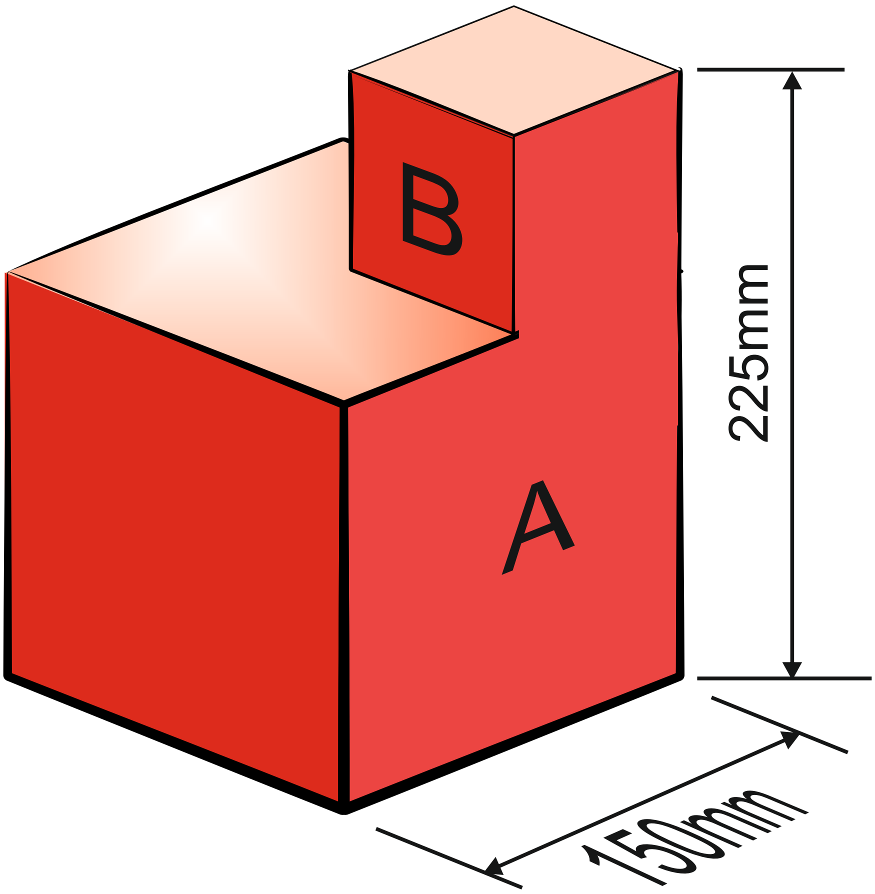
If the measurement of one side is 75mm:

VOLUME = 75mm x 75mm x 75mm
VOLUME = 421875mm^3 or 421.875cm^3

Then, add the volume of cube B with the volume of cube A, to find the final overall volume

FINAL VOLUME = A + B
FINAL VOLUME = 3375000mm^3 + 421875mm^3
FINAL VOLUME = 3796875mm^3 or 3796.875cm^3

EXAM QUESTION - CUBE



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