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.

\[
\text{VOLUME (V)} = A \times A \times A
\]

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?

\[
\text{VOLUME (V)} = \text{A} \times \text{A} \times \text{A}
\]

\[
\text{OR A}^3
\]

If the measurement of one side is 90mm:

\[
\text{VOLUME} = 90\text{mm} \times 90\text{mm} \times 90\text{mm}
\]

\[
\text{VOLUME} = 729000\text{mm}^3 \text{ or } 729\text{cm}^3
\]

QUESTION 2

What is the volume of the cube shown opposite?

\[
\text{VOLUME (V)} = \text{A} \times \text{A} \times \text{A}
\]

\[
\text{OR A}^3
\]

If the measurement of one side is 120mm:

\[
\text{VOLUME} = 120\text{mm} \times 120\text{mm} \times 120\text{mm}
\]

\[
\text{VOLUME} = 1728000\text{mm}^3 \text{ or } 1728\text{cm}^3
\]

QUESTION 3

What is the volume of the cube shown opposite?

\[
\text{VOLUME (V)} = \text{A} \times \text{A} \times \text{A}
\]

\[
\text{OR A}^3
\]

If the measurement of one side is 55mm:

\[
\text{VOLUME} = 55\text{mm} \times 55\text{mm} \times 55\text{mm}
\]

\[
\text{VOLUME} = 166375\text{mm}^3 \text{ or } 166.375\text{cm}^3
\]
QUESTION 1

What is the volume of the cube shown opposite?

\[ \text{VOLUME (V)} = A \times A \times A \]

\[ \text{OR } A^3 \]

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QUESTION 2

What is the volume of the cube shown opposite?

\[ \text{VOLUME (V)} = A \times A \times A \]

\[ \text{OR } A^3 \]

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QUESTION 3

What is the volume of the cube shown opposite?

\[ \text{VOLUME (V)} = A \times A \times A \]

\[ \text{OR } A^3 \]

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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:

\[
\text{VOLUME } = 200\text{mm} \times 200\text{mm} \times 200\text{mm} \\
\text{VOLUME } = 8000000\text{mm}^3 \text{ or } 8000\text{cm}^3
\]

**CUBE ‘B’**
If the measurement of one side is 100mm:

\[
\text{VOLUME } = 100\text{mm} \times 100\text{mm} \times 100\text{mm} \\
\text{VOLUME } = 1000000\text{mm}^3 \text{ or } 1000\text{cm}^3
\]

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

\[
\text{FINAL VOLUME } = A - B \\
\text{FINAL VOLUME } = 8000000\text{mm}^3 - 1000000\text{mm}^3 \\
\text{FINAL VOLUME } = 7000000\text{mm}^3 \text{ or } 7000\text{cm}^3
\]
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.
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 = 3375000mm³ or 3375cm³

CUBE ‘B’
If the measurement of one side is 75mm:

VOLUME = 75mm x 75mm x 75mm
VOLUME = 421875mm³ or 421.875cm³

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 = 3375000mm³ + 421875mm³
FINAL VOLUME = 3796875mm³ or 3796.875cm³
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.