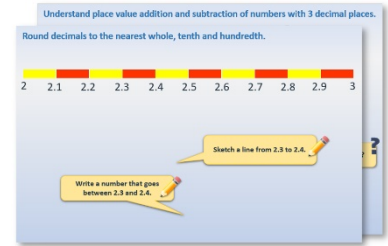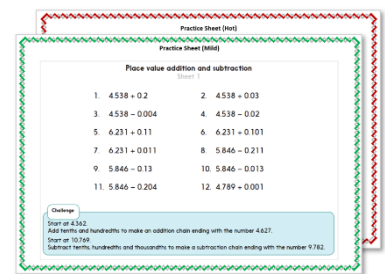# Year 6: Week 3, Day 4
Volume of cubes and cuboids

Each day covers one maths topic. It should take you about 1 hour or just a little more.
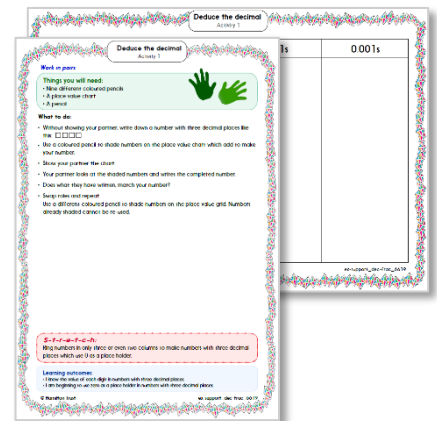
1. Start by reading through the **Learning Reminders**.
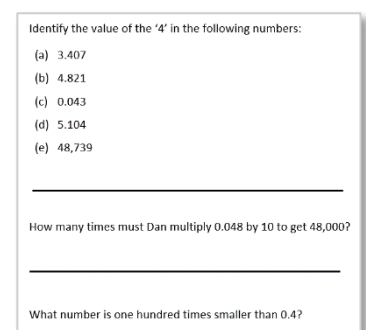   They come from our *PowerPoint* slides.

2. Tackle the questions on the **Practice Sheet**.
   There might be a choice of either Mild (easier) or
   Hot (harder)!
   Check the answers.

3. Finding it tricky? That's OK… have a go with a
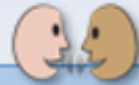   grown-up at **A Bit Stuck?**

4. Have I mastered the topic? A few questions to
   Check your understanding.
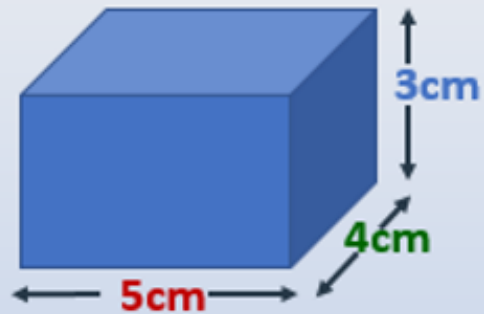   Fold the page to hide the answers!

Learning Reminders

Find volumes of cubes and cuboids.

Look at the cuboid made of $1cm^3$ cubes. How many cubes are in the cuboid?
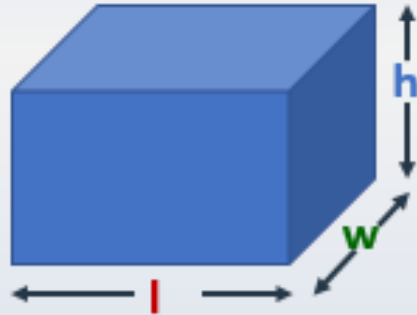
How many are in the bottom layer? **?**

How many layers are there? **?**

So how many cubes altogether? **?**

3cm
4cm
5cm

Each of the cubes in our cuboid measures $1cm^3$, so the **volume** − *the amount of space taken up by the shape* − is **$60cm^3$** (5cm x 4cm x 3cm).

Find volumes of cubes and cuboids.
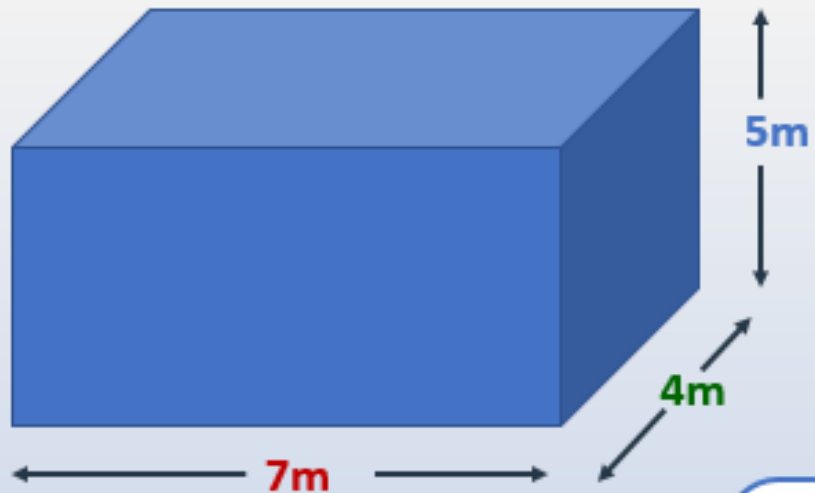

We can use a formula to describe this efficiently:
length × width × height, or **l × w × h** for short

We measure volume in centimetres cubed (cm^3) or metres cubed (m^3) or millimetres cubed (mm^3) or even kilometres cubed (km^3).

The small '3' after cm, stands for cubed, or 3 dimensions.

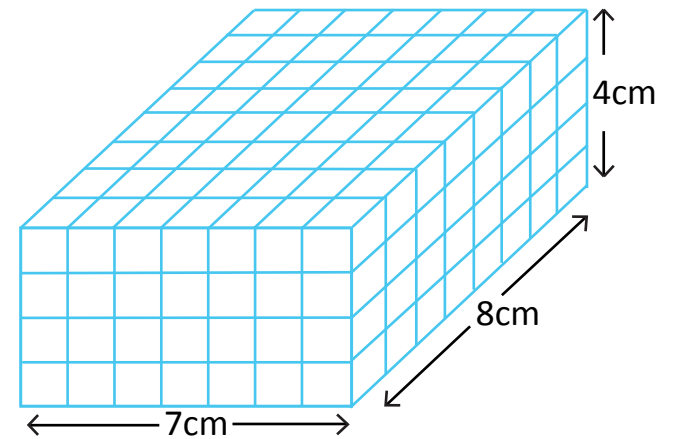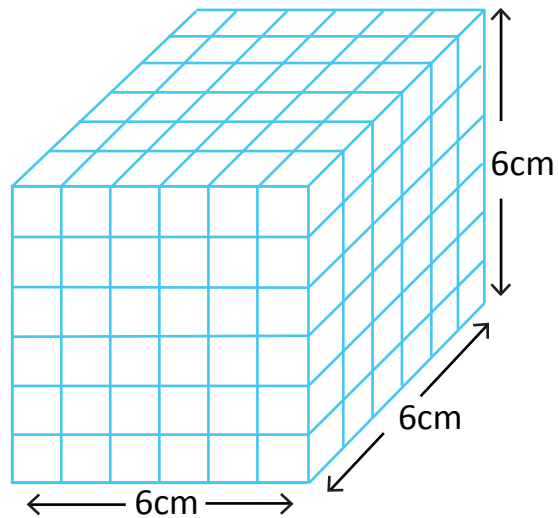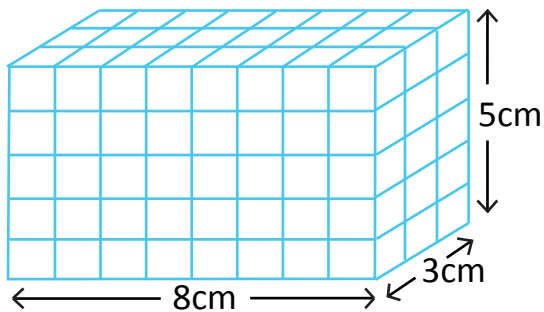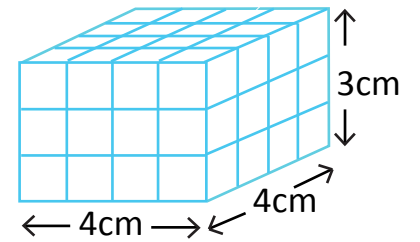# Learning Reminders

Find volumes of cubes and cuboids.

Calculate the volume in m^3.

$$5m \times 4m \times 7m = 140m^3$$

Practice Sheet Mild
Finding volumes of cuboids

4cm
3cm
10cm

3cm
6cm
5cm

3cm
4cm
4cm

5cm
8cm
3cm

6cm
6cm
6cm

4cm
8cm
7cm
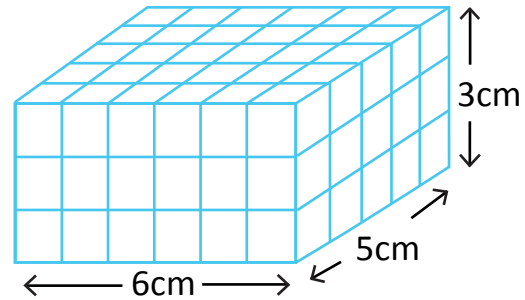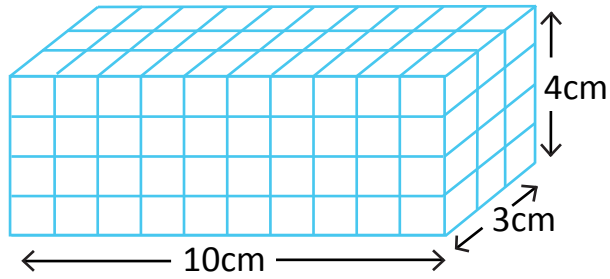
Challenge
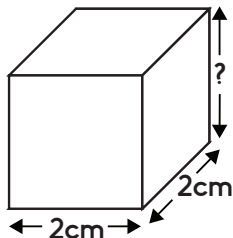
Make a set of cuboids with a volume of 36cm³.
HINT: Don't forget that one of the edges could be just 1cm long...
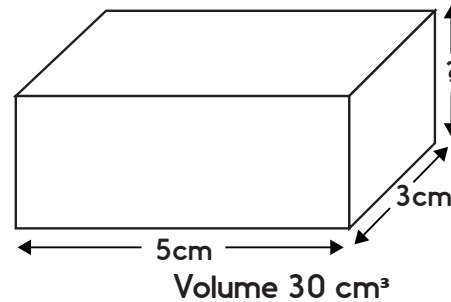
Practice Sheet Mild
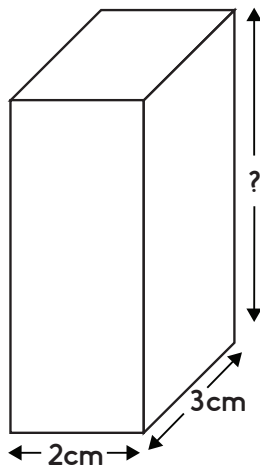## Missing edges

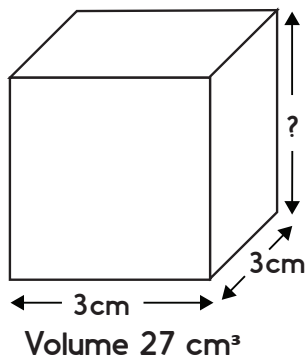Calculate the length of the missing edges of these cuboids.

Volume 8 cm³
?
2cm
2cm

Volume 30 cm³
?
3cm
2cm

?
3cm
5cm
Volume 30 cm³

Volume 27 cm³
?
3cm
3cm

?
2cm
2cm
Volume 36 cm³
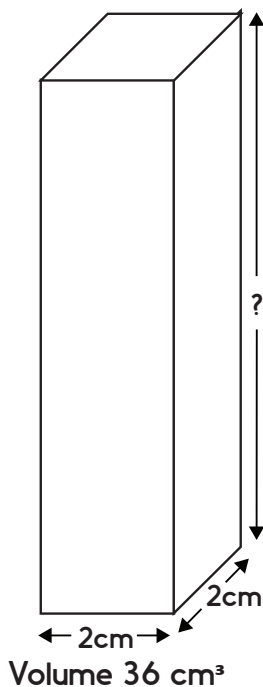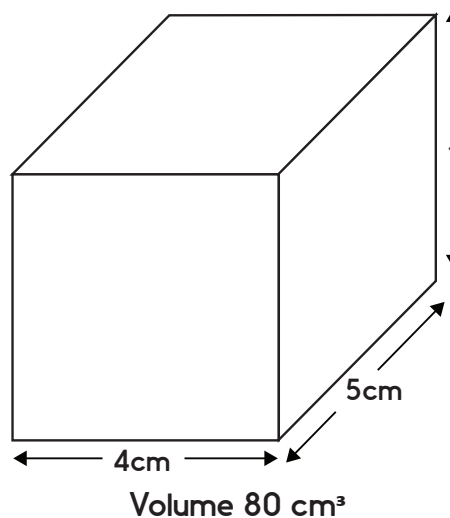
?
5cm
4cm
Volume 80 cm³

Challenge

Draw two or more 'missing edge' cuboids. Ask a friend to calculate the missing lengths.

Finding volumes of cuboids

4cm
3cm
10cm

3cm
5cm
6cm

3cm
4cm
4cm

5cm
3cm
8cm

6cm
6cm
6cm

4cm
8cm
7cm
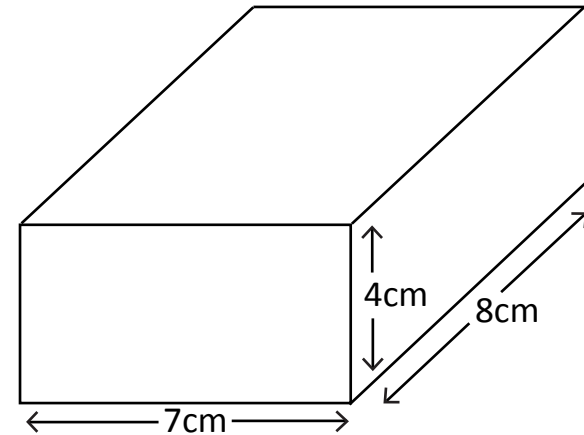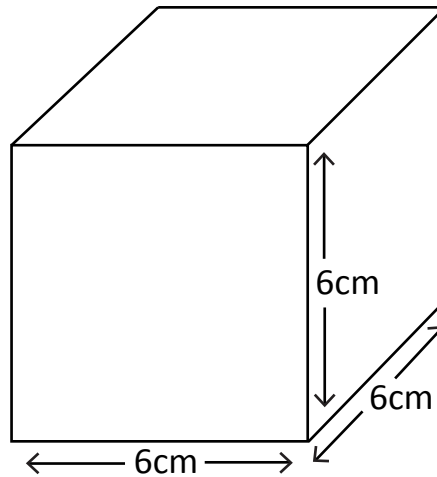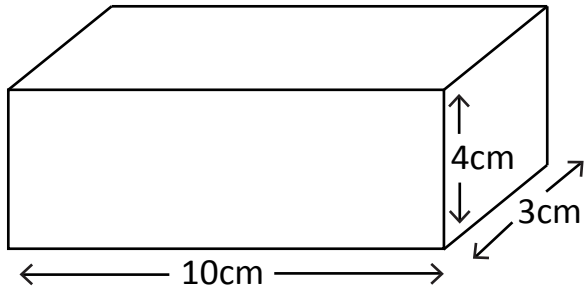
Challenge

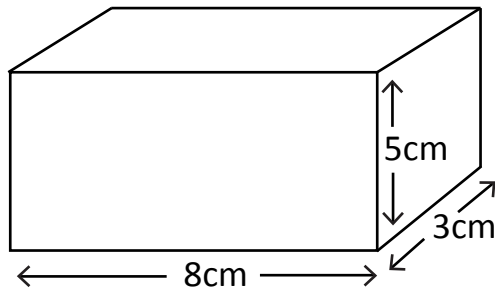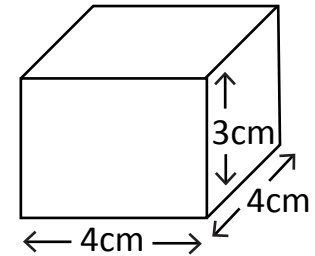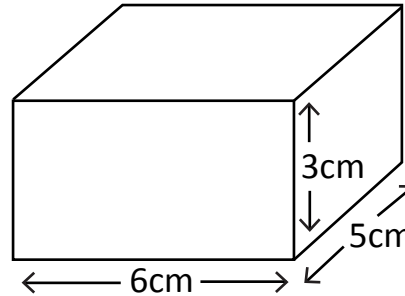Sketch your own cuboids with a volume of 36 cm³, note the dimensions of each.

Practice Sheet Hot
Missing edges

Calculate the length of the missing edges of these cuboids.

Volume 60cm³

x

5cm

4cm

Volume 120cm³

x

5cm

4cm

4cm

?

3cm

Volume 48 cm³

?

3cm

2cm

Volume 30 cm³

4 cm

?

4cm

Volume 64 cm³

4cm

2cm

?

Volume 48 cm³

5cm

3cm

?

Volume 45 cm³

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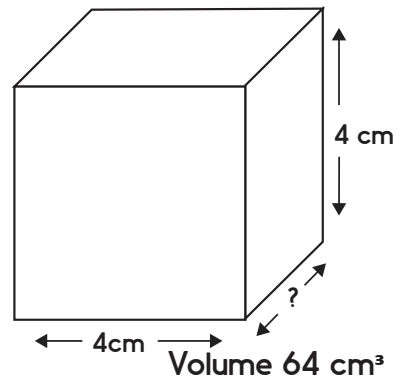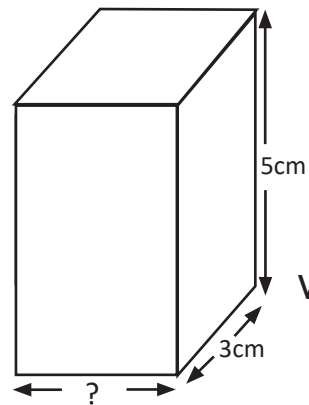
Practice Sheet Answers
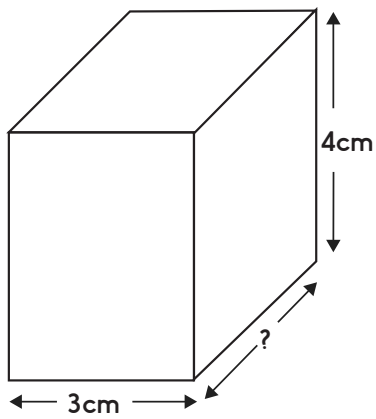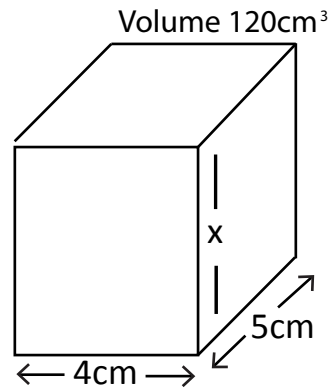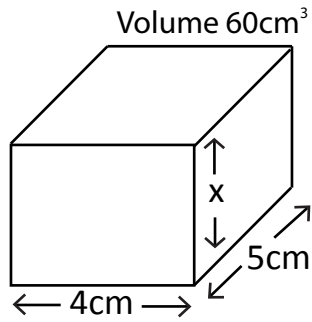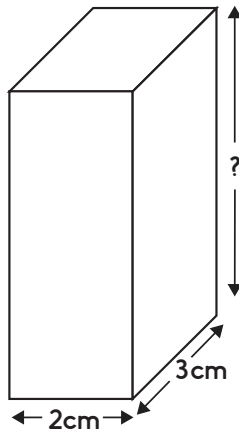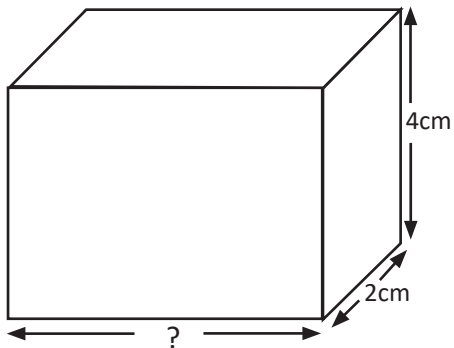
Finding volumes of cuboids (mild)

10cm x 3cm x 4cm = 120cm²
6cm x 5cm x 3cm = 90cm²
4cm x 4cm x 3cm = 48cm²
8cm x 3cm x 5cm = 120cm²
6cm x 6cm x 6cm = 216cm²
7cm x 8cm x 4cm = 224cm²

Challenge

Cuboids could have dimensions as follows:
1 x 1 x 36cm   2 x 2 x 9cm   3 x 3 x 4cm
1 x 2 x 18cm   2 x 3 x 6cm
1 x 3 x 12cm
1 x 4 x 9cm
1 x 6 x 6cm

Missing edges (mild)

Volume 8cm²	Edges are: 2 x 2 x 2cm
Volume 30cm²	Edges are: 2 x 3 x 5cm
Volume 30cm²	Edges are: 5 x 3 x 2cm
Volume 27cm²	Edges are: 3 x 3 x 3cm
Volume 36cm²	Edges are: 2 x 2 x 9cm
Volume 80cm²	Edges are: 4 x 5 x 4cm

Finding volumes of cuboids (hot)

10cm x 3cm x 4cm = 120cm²
6cm x 5cm x 3cm = 90cm²
4cm x 4cm x 3cm = 48cm²
8cm x 3cm x 5cm = 120cm²
6cm x 6cm x 6cm = 216cm²
7cm x 8cm x 4cm = 224cm²

Challenge

Cuboids could have dimensions as follows:
1 x 1 x 36cm   2 x 2 x 9cm   3 x 3 x 4cm
1 x 2 x 18cm   2 x 3 x 6cm
1 x 3 x 12cm
1 x 4 x 9cm
1 x 6 x 6cm

Missing edges)hot)

Volume 60cm²	Edges are: 4 x 5 x 3cm
Volume 120cm²	Edges are: 4 x 5 x 6cm
Volume 48cm²	Edges are: 3 x 4 x 4cm
Volume 30cm²	Edges are: 2 x 3 x 5cm
Volume 64cm²	Edges are: 4 x 4 x 4cm
Volume 48cm²	Edges are: 2 x 4 x 6cm
Volume 45cm²	Edges are: 3 x 5 x 3cm

*Work in pairs, but record your work on your own paper/in your own book.*

**Things you will need**:
- A pencil

What to do:

- Draw a cuboid made out of centimetre cubes. Label its dimensions.

- Find the number of cubes in one layer.

- Multiply the number of cubes in one layer by the number of layers to find the total number of cubes in the cuboid.

- Write the volume by the side.

- Repeat at least three more times.

3cm

5cm

← 4cm →
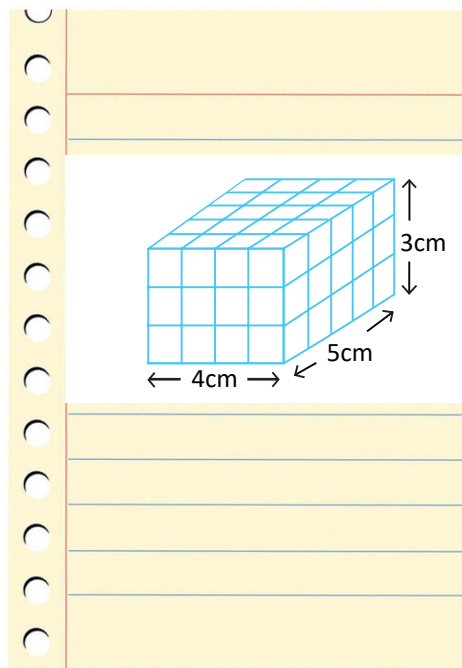
S-t-r-e-t-c-h:

Work out the volume of this cuboid:
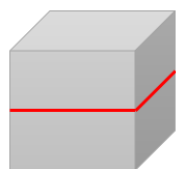
2cm

3cm

← 4cm →
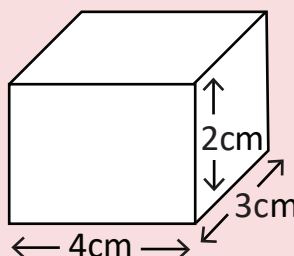
Learning outcomes:
- I can find the volume of cubes built from cm^3 cubes.
- I am beginning to calculate the volume of cuboids.
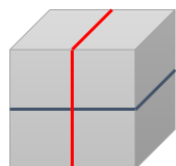
Check your understanding
Questions

A 6cm x 6cm x 6cm cube is chopped in half three times.
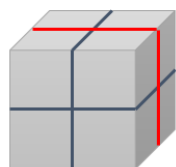Find the volume of each cuboid **after each of the three cuts** and write the lengths of their edges.

(i)   1st cut

(ii)   2nd cut

(iii)   3rd cut

Fold here to hide answers

Check your understanding
Answers

	number of cuboids	dimensions (cm)	volume of each (cm³)
after 1st cut	2	6 x 6 x 3	108
after 2nd cut	4	6 x 3 x 3	54
after 3rd cut	8	3 x 3 x 3	27