

11+ Maths Practice Paper

Year 6 · Advanced

Lesson 6.4: Surface area and volume

Read this with your child:

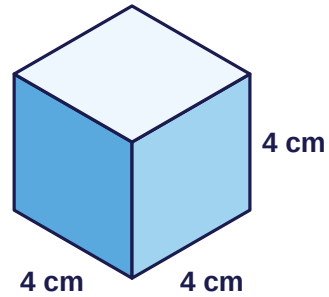
1. This paper has **27 questions** in two parts. Work through them in order. The questions get harder as you go.
2. **Part 1** is multiple choice. Choose **one** answer, A, B, C, D or E, and mark it on the separate answer sheet by drawing a firm line through the box next to its letter. If you change your mind, rub the line out completely and mark your new answer.
3. **Part 2** asks you to write your answer. Write it in the boxes on the answer sheet, **one digit in each box**, starting from the left.
4. If a question is hard, leave it and come back to it at the end.
5. You may use rough paper for working out. You may **not** use a calculator.
6. Suggested time: **35 minutes**.

The answer sheet is after the questions. The answers, with a short explanation of each, are at the back for a parent to mark with.

These are original practice questions written by Elite Learners in the style of 11+ entrance tests. They are not produced by, or connected with, GL Assessment or Cambridge University Press & Assessment (CEM).

Example

What is the surface area of this cube?



- A** 96 cm^2 **B** 64 cm^2 **C** 16 cm^2 **D** 48 cm^2 **E** 24 cm^2

Answer: A Each face is $4 \times 4 = 16 \text{ cm}^2$, and there are 6 faces: $6 \times 16 = 96 \text{ cm}^2$.

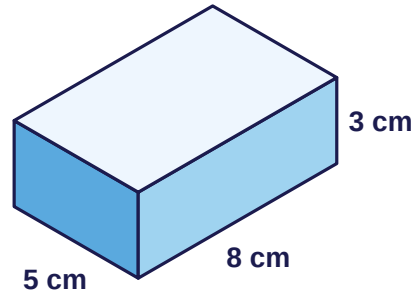
The answer, A, has already been marked on your answer sheet.

Now turn over and start Part 1.

Part 1: Multiple choice

1

What is the surface area of this cuboid?

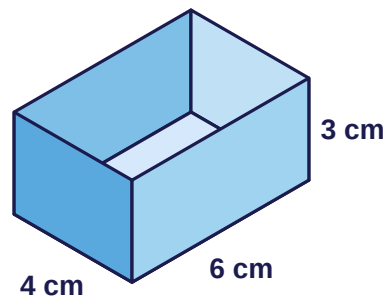


- A** 120 cm^2 **B** 79 cm^2 **C** 16 cm^2 **D** 143 cm^2 **E** 158 cm^2

2

This box has no lid.

What is its outside surface area?



- A** 108 cm^2 **B** 72 cm^2 **C** 54 cm^2 **D** 84 cm^2 **E** 60 cm^2

3

A box is 7 cm long, 4 cm wide and 5 cm high.

How many 2 cm cubes can fit inside it?

- A** 17 **B** 17.5 **C** 12 **D** 140 **E** 18

4

A tank is 20 cm long and 10 cm wide. The water is 8 cm deep. A stone is dropped in and the water rises to 11 cm.

What is the volume of the stone?

- A 600 cm³ B 2200 cm³ C 1600 cm³ D 200 cm³ E 30 cm³
-

5

A big cube is made of 64 small cubes, 4 along each edge. It is dipped in paint.

How many small cubes have exactly 1 painted face?

- A 8 B 24 C 16 D 48 E 6
-

6

The same 4 by 4 by 4 cube.

How many small cubes have no paint at all?

- A 4 B 0 C 16 D 8 E 27
-

7

A cube has a surface area of 150 cm².

What is its volume?

- A 25 cm³ B 125 cm³ C 150 cm³ D 625 cm³ E 75 cm³
-

8

A cube has a volume of 64 cm³.

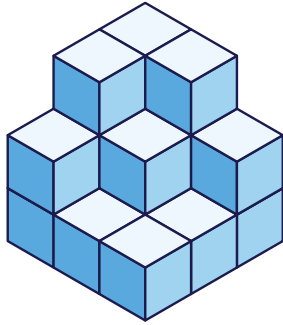
What is its surface area?

- A 64 cm² B 16 cm² C 96 cm² D 384 cm² E 24 cm²
-

9

The cubes stand on a table. Cubes cannot float, so there may be cubes hidden underneath.

How many cubes make this shape?



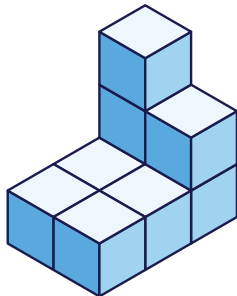
- A 11 B 15 C 18 D 19 E 14

10

The cubes stand on a table. Cubes cannot float, so there may be cubes hidden underneath.

More cubes are added to make this shape into a cuboid 3 cubes long, 2 cubes wide and 3 cubes high.

How many more cubes are needed?



- A 8 B 18 C 10 D 9 E 7

11

Box A is 6 cm long, 4 cm wide and 5 cm high. Box B is 8 cm long and 3 cm wide, and holds exactly the same amount as box A.

How high is box B?

- A 5 cm B 4 cm C 6 cm D 10 cm E 7 cm

12

A sandpit is 4 m long, 3 m wide and 0.5 m deep. Sand costs £25 for each cubic metre.

How much does it cost to fill the sandpit?

- A £300 B £187.50 C £25 D £175 E £150
-

13

Bricks are 4 cm long, 2 cm wide and 1 cm high. They are packed into a box 9 cm long, 4 cm wide and 3 cm high, all lying the same way, with their long side along the length of the box.

How many bricks fit?

- A 13 B 13.5 C 108 D 24 E 12
-

14

A fish tank is 30 cm long, 20 cm wide and 25 cm high. The water is 15 cm deep.

How much more water will fill it to the top?

- A 15000 cm³ B 6000 cm³ C 9000 cm³ D 600 cm³ E 10 cm³
-

15

Five 1 cm cubes are joined in a row.

What is the surface area of the row?

- A 22 cm² B 30 cm² C 26 cm² D 20 cm² E 5 cm²
-

16

A wooden cube with edges 3 m long is painted on the outside. One tin of paint covers 10 m².

How many tins must be bought?

- A 5 B 3 C 27 D 54 E 6
-

17

Shape A is a cube with edges 4 cm long. Shape B is a cuboid 8 cm long, 4 cm wide and 2 cm high.

Which of these is true?

- A They have the same volume and the same surface area
- B A has the bigger volume
- C They have the same volume, but B has the bigger surface area
- D B has the bigger volume
- E They have the same volume, but A has the bigger surface area

18

4000 cm³ of water is poured into an empty tank 25 cm long and 20 cm wide.

How deep is the water?

- A 8 cm B 160 cm C 200 cm D 80 cm E 4 cm

19

A cube 2 cm along each edge is cut out of one corner of a cube 5 cm along each edge.

What volume is left?

- A 123 cm³ B 119 cm³ C 125 cm³ D 117 cm³ E 27 cm³

20

Twelve 1 cm cubes are put together to make a cuboid.

What is the smallest surface area the cuboid can have?

- A 38 cm² B 32 cm² C 40 cm² D 50 cm² E 12 cm²

Part 2: Write your answer

21

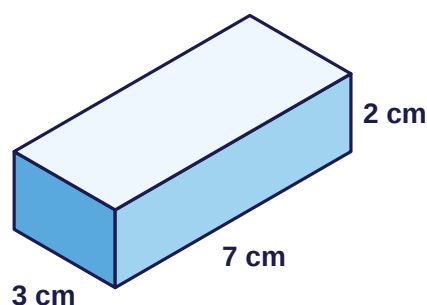
A cuboid is 12 cm long, 5 cm wide and 4 cm high.

What is its volume, in cm^3 ?

Write your answer in the boxes on the answer sheet, one digit in each box.

22

What is the surface area of this cuboid, in cm^2 ?

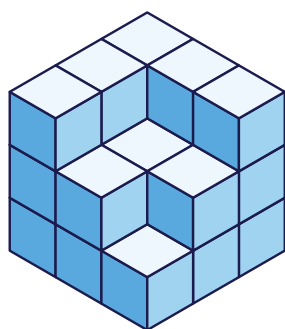


Write your answer in the boxes on the answer sheet, one digit in each box.

23

The cubes stand on a table. Cubes cannot float, so there may be cubes hidden underneath.

How many cubes make this shape?



Write your answer in the boxes on the answer sheet, one digit in each box.

24

A big cube is made of 125 small cubes, 5 along each edge. It is dipped in paint.

How many small cubes have exactly 2 painted faces?

Write your answer in the boxes on the answer sheet, one digit in each box.

25

4 identical marbles are dropped into a tank 25 cm long and 20 cm wide. The water rises by 2 cm.

What is the volume of one marble, in cm^3 ?

Write your answer in the boxes on the answer sheet, one digit in each box.

26

A box is 10 cm long, 7 cm wide and 6 cm high.

How many 3 cm cubes can fit inside it?

Write your answer in the boxes on the answer sheet, one digit in each box.

27

An open box (with no lid) is 10 cm long, 5 cm wide and 4 cm high.

What is its outside surface area, in cm^2 ?

Write your answer in the boxes on the answer sheet, one digit in each box.

Answer sheet

11+ Maths Practice Paper · Year 6 · Lesson 6.4: Surface area and volume

Name

Draw a firm line through the box next to your answer, like the example.

Part 1: Multiple choice

Ex	A ☒	B ☐	C ☐	D ☐	E ☐
1	A ☐	B ☐	C ☐	D ☐	E ☐
2	A ☐	B ☐	C ☐	D ☐	E ☐
3	A ☐	B ☐	C ☐	D ☐	E ☐
4	A ☐	B ☐	C ☐	D ☐	E ☐
5	A ☐	B ☐	C ☐	D ☐	E ☐
6	A ☐	B ☐	C ☐	D ☐	E ☐
7	A ☐	B ☐	C ☐	D ☐	E ☐
8	A ☐	B ☐	C ☐	D ☐	E ☐
9	A ☐	B ☐	C ☐	D ☐	E ☐
10	A ☐	B ☐	C ☐	D ☐	E ☐
11	A ☐	B ☐	C ☐	D ☐	E ☐
12	A ☐	B ☐	C ☐	D ☐	E ☐
13	A ☐	B ☐	C ☐	D ☐	E ☐
14	A ☐	B ☐	C ☐	D ☐	E ☐
15	A ☐	B ☐	C ☐	D ☐	E ☐
16	A ☐	B ☐	C ☐	D ☐	E ☐
17	A ☐	B ☐	C ☐	D ☐	E ☐
18	A ☐	B ☐	C ☐	D ☐	E ☐
19	A ☐	B ☐	C ☐	D ☐	E ☐
20	A ☐	B ☐	C ☐	D ☐	E ☐

Part 2: Write your answer, one digit in each box

21			
22			
23			
24			
25			
26			
27			

Answers

For a parent to mark with. One mark for each question: the paper is out of 27. Talk through any your child got wrong, using the explanation.

Q	Answer	How to get it
1	E 158 cm ²	Front and back: $8 \times 3 = 24$ each. Top and bottom: $8 \times 5 = 40$ each. Ends: $5 \times 3 = 15$ each. $24 + 24 + 40 + 40 + 15 + 15 = 158$ cm ² .
2	D 84 cm ²	Front and back: $6 \times 3 = 18$ each. Ends: $4 \times 3 = 12$ each. The bottom: $6 \times 4 = 24$, and no lid. $18 + 18 + 12 + 12 + 24 = 84$ cm ² .
3	C 12	Along: $7 \div 2 = 3$ r 1, so 3. Across: $4 \div 2 = 2$. Up: $5 \div 2 = 2$ r 1, so 2. $3 \times 2 \times 2 = 12$. ($140 \div 8 = 17.5$ is wrong: the gaps cannot be used.)
4	A 600 cm ³	The water rises $11 - 8 = 3$ cm: $20 \times 10 \times 3 = 600$ cm ³ .
5	B 24	Each face has a 2 by 2 square of cubes in its middle: $6 \times 4 = 24$.
6	D 8	The cubes inside make a smaller cube, 2 along each edge: $2 \times 2 \times 2 = 8$.
7	B 125 cm ³	One face is $150 \div 6 = 25$ cm ² , so each edge is 5 cm ($5 \times 5 = 25$). $5 \times 5 \times 5 = 125$ cm ³ .
8	C 96 cm ²	$4 \times 4 \times 4 = 64$, so each edge is 4 cm. Each face is $4 \times 4 = 16$, and $6 \times 16 = 96$ cm ² .
9	C 18	Bottom layer: 9 cubes. Middle layer: 6 cubes. Top layer: 3 cubes. $9 + 6 + 3 = 18$. You can only see 11.
10	D 9	The cuboid holds $3 \times 2 \times 3 = 18$ cubes. The shape has $6 + 2 + 1 = 9$. $18 - 9 = 9$ more.
11	A 5 cm	Box A holds $6 \times 4 \times 5 = 120$ cm ³ . One layer of box B is $8 \times 3 = 24$. $120 \div 24 = 5$ cm.
12	E £150	The volume is $4 \times 3 \times 0.5 = 6$ m ³ , and $6 \times £25 = £150$.
13	E 12	Along: $9 \div 4 = 2$ r 1, so 2. Across: $4 \div 2 = 2$. Up: $3 \div 1 = 3$. $2 \times 2 \times 3 = 12$ bricks.
14	B 6000 cm ³	There are $25 - 15 = 10$ cm left: $30 \times 20 \times 10 = 6000$ cm ³ .
15	A 22 cm ²	5 cubes have $5 \times 6 = 30$ faces, but the 4 joins hide 8 of them: $30 - 8 = 22$ cm ² .
16	E 6	The surface area is $6 \times 3 \times 3 = 54$ m ² . 5 tins cover only 50 m ² , so 6 tins are needed.
17	C They have the same volume, but B has the bigger surface area	Both hold 64 cm ³ ($4 \times 4 \times 4$ and $8 \times 4 \times 2$). A: $6 \times 16 = 96$ cm ² . B: $2 \times (32 + 16 + 8) = 112$ cm ² .
18	A 8 cm	One layer 1 cm deep is $25 \times 20 = 500$ cm ³ . $4000 \div 500 = 8$ cm.
19	D 117 cm ³	The big cube: $5 \times 5 \times 5 = 125$. The small cube: $2 \times 2 \times 2 = 8$. $125 - 8 = 117$ cm ³ .
20	B 32 cm ²	The closer to a cube, the smaller the surface area. $2 \times 2 \times 3$: $2 \times (4 + 6 + 6) = 32$ cm ² . ($1 \times 3 \times 4$ gives 38, $1 \times 2 \times 6$ gives 40 and $1 \times 1 \times 12$ gives 50.)
21	240	$12 \times 5 = 60$, and $60 \times 4 = 240$ cm ³ .

Q	Answer	How to get it
22	82	Front and back: $7 \times 2 = 14$ each. Top and bottom: $7 \times 3 = 21$ each. Ends: $3 \times 2 = 6$ each. $14 + 14 + 21 + 21 + 6 + 6 = 82 \text{ cm}^2$.
23	22	Bottom layer: 9 cubes. Middle layer: 8 cubes (all but the front left). Top layer: 5 cubes. $9 + 8 + 5 = 22$.
24	36	Each of the 12 edges has 3 cubes between its corners: $12 \times 3 = 36$.
25	250	All 4 marbles: $25 \times 20 \times 2 = 1000 \text{ cm}^3$. One marble: $1000 \div 4 = 250 \text{ cm}^3$.
26	12	Along: $10 \div 3 = 3 \text{ r } 1$, so 3. Across: $7 \div 3 = 2 \text{ r } 1$, so 2. Up: $6 \div 3 = 2$. $3 \times 2 \times 2 = 12$.
27	170	Front and back: $10 \times 4 = 40$ each. Ends: $5 \times 4 = 20$ each. The bottom: $10 \times 5 = 50$. $40 + 40 + 20 + 20 + 50 = 170 \text{ cm}^2$.

Score: out of 27