MATHEMATICS · GRADES 4-6

Surface area introduction

Difficulty level: Intermediate

Mathematics: Grades 4-6

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Overview of the concept

This is how you work out how much wrapping paper, paint, or fabric you need to cover a whole object, like a gift box or a storage crate, by adding up every face. Surface area is the total of all the outside faces, not just the one you can see from the front. If you miss a face, you run short on paper or paint, so counting every side matters. That is how you buy the right amount of wrapping, paint, or fabric for a real object, instead of guessing.



Rule

Surface area: the surface area of an object is the total area of all its outside faces added together.

Count every face, including the ones you cannot see, and add them up.

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Worked examples

EXAMPLE 1

Q What is the surface area of a cube with side 3 cm?

SOLUTION

This is a surface area question, so the one rule to remember is: add up the area of every face, including the ones you cannot see. A cube is the easy case because all six faces are the same square.

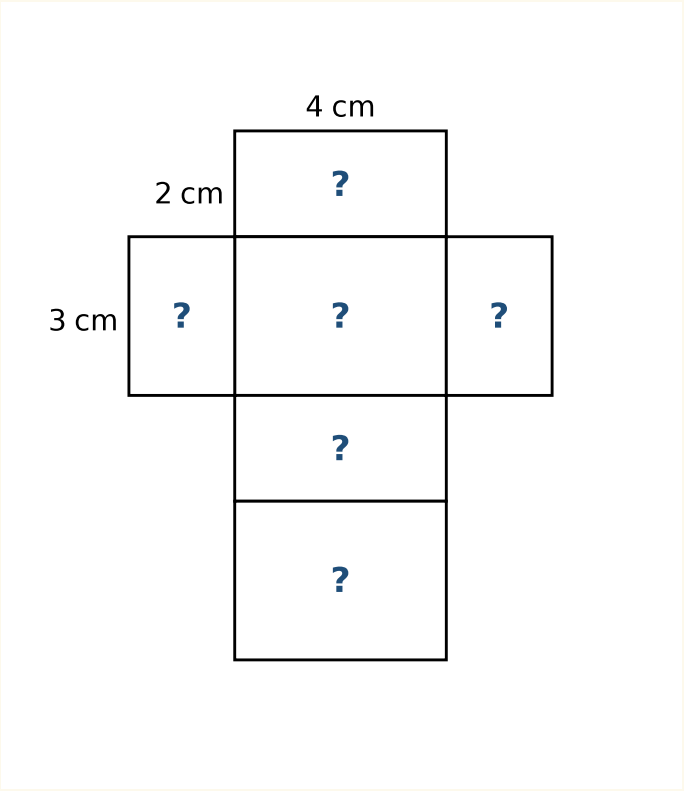
One face is a 3 cm square: $3 \times 3 = 9$ cm^2

Six faces at 9 cm^2 each gives $6 \times 9 = 54$ cm^2

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EXAMPLE 2

Q What is the surface area of a box 4 cm by 3 cm by 2 cm?



SOLUTION

This is the same question type with a box instead of a cube, so the faces come in three matching pairs: front and back, top and bottom, left and right.

The three different faces are $4 \times 3 = 12$ cm^2, $4 \times 2 = 8$ cm^2 and $3 \times 2 = 6$ cm^2

Each appears twice, so add $12 + 12 + 8 + 8 + 6 + 6 = 52$ cm^2

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Practice questions

1 What is the surface area of a cube with side 5 cm?

- **A** 25 cm²
- **B** 150 cm²
- **C** 125 cm²
- **D** 30 cm²

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2 What is the area of ONE face of a cube with side 2 cm?

- **A** 2 cm²
- **B** 4 cm²
- **C** 8 cm²
- **D** 24 cm²

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3 What is the surface area of a box 6 cm long, 4 cm wide and 2 cm high?

- A 44 cm^2
- B 48 cm^2
- C 88 cm^2
- D 96 cm^2

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4 One face of a cube has an area of 25 cm^2. What is the surface area of the cube?

- A 25 cm^2
- B 50 cm^2
- C 100 cm^2
- D 150 cm^2

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5 How many faces does a rectangular prism (a box shape) have?

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6 How much wrapping paper is needed to wrap a gift box 10 cm long, 8 cm wide and 3 cm high?

A 240 cm^2

B 268 cm^2

C 134 cm^2

D 80 cm^2

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7 A cube has a surface area of 96 cm^2. What is the length of one side?

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8 A rectangular prism is 5 m long and 3 m wide. Its surface area is 62 m². What is its height?

- **A** 1 m
- **B** 2 m
- **C** 3 m
- **D** 4 m

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9 Which has the greater surface area: a cube with side 4 cm, or a box 5 cm by 4 cm by 3 cm?

- **A** The cube
- **B** The box

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10

A cube has side 2 cm. Its side is doubled to 4 cm. What happens to its surface area?

A It doubles

B It quadruples

C It stays the same

D It halves

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ANSWER KEY

1. 150 cm^2

2. 4 cm^2

3. 88 cm^2

4. 150 cm^2

5. 6

6. 268 cm^2

7. 4 cm

8. 2 m

9. The cube

10. It quadruples

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