

WA7MMGTH1

Three-dimensional space and structures

Core + Challenge

Views of Prisms and Cube Stacks

I can draw and interpret front, side and top views of prisms and cube stacks, and count cubes from drawings and views.

Name: _____ Date: _____ Score: _____ / 58

Key idea

The **front view** shows the tallest cube in each column as seen from the front. The **side view** looks from the right. The **top view** (plan) looks straight down.

Views show **squares only**, not depth. Hidden cubes can make different stacks share the same view.

Prisms: a rectangular prism has 6 faces, 12 edges, 8 vertices. A triangular prism has 5 faces, 9 edges, 6 vertices.

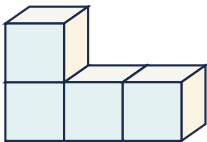
Euler's rule for prisms and pyramids: faces + vertices – edges = 2.

A Fluency *practise the skill*

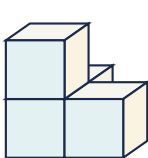
/ 16 marks

Use stacks A–D (the teal faces are the front). 1 mark each.

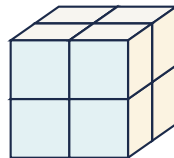
A



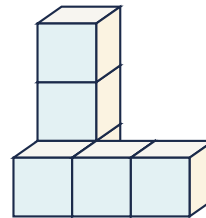
B



C



D



1. A: number of cubes _____

9. D: squares in the front view _____

2. A: squares in the front view _____

10. D: squares in the top view _____

3. A: squares in the top view _____

11. Faces of a rectangular prism _____

4. B: number of cubes _____

12. Edges of a rectangular prism _____

5. B: squares in the top view _____

13. Vertices of a rectangular prism _____

6. C: number of cubes _____

14. Faces of a triangular prism _____

7. C: squares in the front view _____ 15. Edges of a triangular prism _____

8. D: number of cubes _____ 16. Top view of a cylinder standing up _____

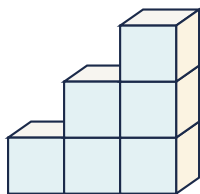
B

Core *apply the skill to problems*

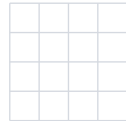
/ 22 marks

1 Draw the front, right-side and top views of this stack on the grids.

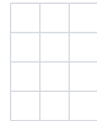
[3 marks]



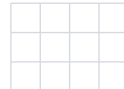
Front



Right side

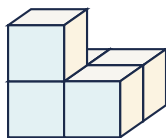


Top



2 Count the cubes in this stack, then draw its front, right-side and top views.

[3 marks]



Front



Right side



Top



Answer: _____

3 A rectangular prism is built from 1 cm cubes: 3 long, 3 wide and 2 high. How many cubes are used?

[2 marks]

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Answer: _____

4 A triangular prism (like a tent) lies on one rectangular face. Describe its front view (looking at the triangle), its side view and its top view.

[2 marks]

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Answer: _____

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- 5 A solid stack has a top view of a 2×3 rectangle and every column is 2 cubes high. How many cubes are in it? [2 marks]

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Answer: _____

- 6 A solid has a rectangle as its front view, a rectangle as its side view and a circle as its top view. Name the solid. [2 marks]

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Answer: _____

- 7 A solid has triangles as its front and side views and a square as its top view. Name the solid. [2 marks]

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Answer: _____

- 8 A $3 \times 3 \times 3$ cube made from small cubes is painted on the outside. How many small cubes have paint on exactly 3 faces? [2 marks]

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Answer: _____

- 9 Check Euler's rule ($F + V - E = 2$) for a rectangular prism and a triangular prism. [2 marks]

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Answer: _____

- 10 A building plan shows heights: back row 2, 1 and front row 3, 1. How many cubes are there? Draw the front view. [2 marks]

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Answer: _____

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C**Reasoning** *explain, justify and check*

/ 9 marks

- 1 Stack B has 4 cubes but its top view has only 3 squares. Explain why. [2 marks]

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- 2 Show that two different stacks can have the same front view. Describe an example. [2 marks]

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- 3 Explain why you can't always work out the number of cubes from one view. [2 marks]

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- 4 Explain why the left-side view of a stack is the mirror image of its right-side view. [3 marks]

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D**Challenge** *multi-step and problem-solving*

/ 11 marks

- 1 A stack sits on a 2×2 base. Its front view has columns of height 2 and 3 (left to right). Its right-side view has height 3 (front row) and 1 (back row). What are the greatest and least numbers of cubes it could have? [3 marks]

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Answer: _____

- 2 A $3 \times 3 \times 3$ painted cube is cut into 27 small cubes. How many have paint on exactly 2 faces, exactly 1 face and no faces? [3 marks]

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Answer: _____

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- 3 Stack A is made of 1 cm cubes. Find its total surface area, including the bottom. [3 marks]

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Answer: _____

- 4 A stack's top view is a 2×2 square and its front view shows two columns, each 3 cubes tall. What is the greatest number of cubes it can have? [2 marks]

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Answer: _____

How did I go?

Fluency ____ / 16 Core ____ / 22 Reasoning ____ / 9 Challenge ____ / 11 **Total ____ / 58**

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