

Nets of solids

Topic cliff notes / objectives, key ideas and examples

Learning objectives

- Recognise nets that close without overlapping faces.
- Match face dimensions and connect a cylinder net to circumference.

Key ideas

- A net unfolds the surface of a solid. Shared edges become folds; matching edges must fit.
- A cube has six equal square faces, but six joined squares are not always a valid net.
- A cuboid has three pairs of equal opposite rectangles.
- A closed cylinder has two circles and a rectangle of height h and width equal to the circumference.

$$\text{rectangle width} = 2\pi r$$

Worked example

List the faces in a net for a 5 cm by 3 cm by 2 cm cuboid. Each different rectangular face occurs twice.

$$2 \text{ of } 5 \times 3, \quad 2 \text{ of } 5 \times 2, \quad 2 \text{ of } 3 \times 2$$

Answer

6 rectangles in three equal pairs

Quick example

A cylinder has radius 3 cm and height 5 cm. Find the dimensions of its rectangular net piece. The wrapped edge matches the circumference of either circular end.

$$2\pi r = 2\pi \times 3 = 6\pi \text{ cm}$$

Answer

$$6\pi \text{ cm} \times 5 \text{ cm}$$

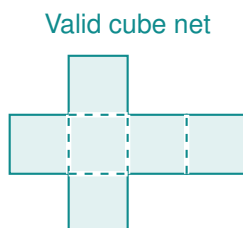
Watch out

Check that the net closes without overlap. The wrapped rectangle edge of a cylinder is its circumference, not its diameter.



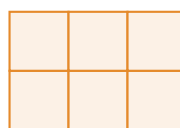
Visual guide: which six squares make a cube?

A valid net folds into a closed surface with each face used once. Below, every square is the same size. The dashed edges in the valid net are folds.



Six different faces
when folded

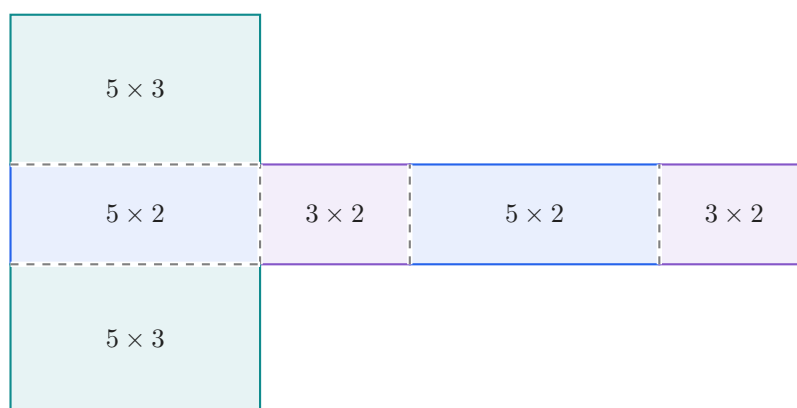
Not a cube net



A 2×3 rectangle
forces overlap when folded

A cuboid net has three pairs of equal rectangles

This net closes to make a cuboid measuring $5 \text{ cm} \times 3 \text{ cm} \times 2 \text{ cm}$. The labels give face dimensions, not areas. The drawing uses a common scale.



Cylinder connection: unwrapping the curved surface gives a rectangle. Its width must fit around the circle, so it is $2\pi r$, while its height is h . A closed cylinder also needs two circular ends.

$$r = 3, h = 5 \implies \text{rectangle } 6\pi \text{ cm} \times 5 \text{ cm}$$

