

Surface Area

Maths

Level 2

Exam-style practice · 9 questions · 29 marks · Calculator allowed

Remember

Cuboid: $2 \times (l \times w) + 2 \times (l \times h) + 2 \times (w \times h)$. Three pairs of identical faces.

Cube: $6 \times \text{side}^2$. **Triangular prism:** 2 triangles + 3 rectangles – work each one out.

Cylinder: 2 circles ($2 \times \pi r^2$) + the curved surface, which unrolls to a rectangle of width $2\pi r$ and height h : $2\pi rh$.

Open top / no lid: leave out that face. **A room's walls:** $2 \times (l \times h) + 2 \times (w \times h)$ – no floor or ceiling.

Section A – Formulas

1. Find the surface area of a cuboid 8 cm by 5 cm by 3 cm. (2 marks)

2. A cube has a surface area of 294 cm^2 . What is the length of one edge? (2 marks)

3. A triangular prism has a right-angled triangle as its end, with sides 3 cm, 4 cm and 5 cm, and is 10 cm long. Find its total surface area. (3 marks)

4. A closed cylindrical tin has a radius of 5 cm and a height of 12 cm. Find its surface area to 1 decimal place. (3 marks)

Section B – In context

5. A storage box is a cuboid 60 cm by 40 cm by 30 cm with no lid. What area of plastic is needed to make it? (3 marks)

6. A water tank is a cuboid 2 m by 1.5 m by 1.2 m. All six outside faces are to be painted with rust-proof paint that covers 8 m^2 per tin. How many tins are needed? (3 marks)

7. A gift box is 25 cm by 18 cm by 10 cm. Wrapping paper costs £1.20 per sheet of 70 cm by 50 cm. Assuming 20% extra is needed for overlaps, is one sheet enough? (4 marks)

8. A cylindrical pillar in a shop has a diameter of 40 cm and is 3 m tall. The curved surface is to be covered with vinyl at £14.99 per m². What does the vinyl cost? (4 marks)

9. A room is 5 m long, 4 m wide and 2.5 m high. The walls (but not the ceiling) are to be painted. There is a door 2 m × 0.9 m and a window 1.5 m × 1.2 m. Paint covers 10 m² per litre and is sold in 2.5-litre tins. How many tins for two coats? (5 marks)

Surface Area – Answers

Level 2 · Working shown so you can check your method, not just the final number.

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Section A

- $2 \times 40 + 2 \times 24 + 2 \times 15 = 80 + 48 + 30 = \mathbf{158 \text{ cm}^2}$.
- $294 \div 6 = 49$; $\sqrt{49} = \mathbf{7 \text{ cm}}$.
- Triangles: $2 \times (\frac{1}{2} \times 3 \times 4) = 12$. Rectangles: $3 \times 10 + 4 \times 10 + 5 \times 10 = 120$. Total **132 cm²**.
- Circles: $2 \times \pi \times 25 = 157.1$. Curved: $2 \times \pi \times 5 \times 12 = 377.0$. Total **534.1 cm²**.

Section B

- Base $60 \times 40 = 2,400$. Sides: $2 \times (60 \times 30) + 2 \times (40 \times 30) = 3,600 + 2,400 = 6,000$. Total **8,400 cm²** (0.84 m²).
- $2 \times (2 \times 1.5) + 2 \times (2 \times 1.2) + 2 \times (1.5 \times 1.2) = 6 + 4.8 + 3.6 = 14.4 \text{ m}^2$. $14.4 \div 8 = 1.8 \rightarrow \mathbf{2 \text{ tins}}$.
- Surface area = $2 \times (450 + 250 + 180) = 1,760 \text{ cm}^2$. $\times 1.2 = 2,112 \text{ cm}^2$. Sheet = $3,500 \text{ cm}^2$. **Yes**, one sheet is enough.
- $r = 0.2 \text{ m}$. Curved surface = $2 \times \pi \times 0.2 \times 3 = 3.77 \text{ m}^2 \times 14.99 = \mathbf{£56.51}$.
- Walls: $2 \times (5 \times 2.5) + 2 \times (4 \times 2.5) = 25 + 20 = 45 \text{ m}^2$. Minus door 1.8 and window 1.8 = 41.4 m^2 . Two coats = $82.8 \text{ m}^2 \div 10 = 8.28 \text{ litres} \div 2.5 = 3.3 \rightarrow \mathbf{4 \text{ tins}}$.

Where Level 2 students lose marks on this topic

- Counting all six faces when the box has no lid, or including the floor and ceiling when only walls are painted.
- Confusing surface area (cm²) with volume (cm³) – if the question mentions paint, card, paper or vinyl, it is surface area.
- Using the diameter as the radius for a cylinder's circles.