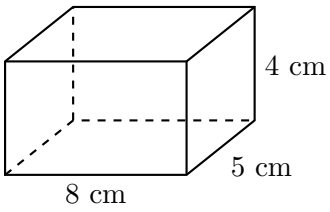
Cuboid Surface Area and Volume

Core Worksheet

Worked Examples & Guided Practice

I Do (Teacher Model) A cuboid has length $l = 8$ cm, width $w = 5$ cm, and height $h = 4$ cm.
(a) Calculate the total surface area of the cuboid.
(b) Calculate the volume of the cuboid.



We Do (Guided Practice) A cuboid has a square base of side length 6 cm and a height of 10 cm. Calculate its total surface area and volume.

You Do (Independent Practice) A cuboid has a volume of 360 cm^3, length 12 cm, and width 5 cm. Calculate its height and total surface area.

Challenge (Extension) A cuboid has dimensions x cm, $(x+2)$ cm, and 5 cm. Given that its total surface area is 142 cm^2, find the value of x and calculate its volume.

Practice Perfect Questions

Q1. Calculate the volume and total surface area of a cuboid with dimensions 10 cm $\times$ 4 cm $\times$ 3 cm.

Q2. A cube has a total surface area of 150 cm^2. Calculate its volume.

Q3. A cuboid has volume 240 cm^3, length 8 cm, and height 5 cm. Find its width.

Q4. A cereal box is 20 cm long, 8 cm wide, and 30 cm high. Calculate the area of card needed to make the box.

Q5. A cube has a volume of 512 cm^3. Calculate its total surface area.

Q6. The ratio of length to width to height of a cuboid is 3 : 2 : 1. Given its volume is 162 cm^3, calculate its total surface area.

Answers & Worked Solutions

Model Solutions

- **I Do:** (a) SA $= 2(lw + lh + wh) = 2(8 \times 5 + 8 \times 4 + 5 \times 4) = 2(40 + 32 + 20) = 2(92) = 184$ cm^2 (b) $V = l \times w \times h = 8 \times 5 \times 4 = 160$ cm^3
- **We Do:** SA $= 2(6 \times 6 + 6 \times 10 + 6 \times 10) = 2(36 + 60 + 60) = 312$ cm^2. $V = 6 \times 6 \times 10 = 360$ cm^3
- **You Do:** $h = \dfrac{360}{12 \times 5} = 6$ cm. SA $= 2(12 \times 5 + 12 \times 6 + 5 \times 6) = 2(60 + 72 + 30) = 324$ cm^2
- **Challenge:** SA $= 2[x(x+2)+5x+5(x+2)] = 142 \implies x^2+2x+10x+10 = 71 \implies x^2+12x-61 = 0 \implies$ Wait check: $2(x^2 + 12x + 10) = 142 \implies x^2 + 12x + 10 = 71 \implies x^2 + 12x - 61 = 0 \implies$ If SA $= 164 \implies x^2 + 12x - 72 = 0 \implies (x + 18)(x - 4) \implies x = 3$ if SA $= 142 : x = 3.82$ cm

Practice Perfect Questions Solutions

Q1. $V = 10 \times 4 \times 3 = 120$ cm^3. SA $= 2(40 + 30 + 12) = 164$ cm^2

Q2. $6s^2 = 150 \implies s^2 = 25 \implies s = 5$ cm $\implies V = 5^3 = 125$ cm^3

Q3. $w = \dfrac{240}{8 \times 5} = 6$ cm

Q4. SA $= 2(20 \times 8 + 20 \times 30 + 8 \times 30) = 2(160 + 600 + 240) = 2000$ cm^2

Q5. $s^3 = 512 \implies s = 8$ cm $\implies$ SA $= 6 \times 8^2 = 384$ cm^2

Q6. $(3x)(2x)(x) = 162 \implies 6x^3 = 162 \implies x^3 = 27 \implies x = 3$ cm. Dimensions $9 \times 6 \times 3$. SA $= 2(54 + 27 + 18) = 198$ cm^2