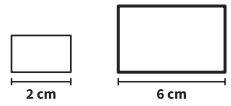
Area and volume scale factors

ANSWERS

1

These two rectangles are similar.
The small one has an area of 5 cm².
Find the area of the large one.



Not drawn accurately

$6 \div 2 = 3$

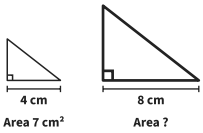
$3^2 = 9$

$5 \times 9 = 45\ cm^2$

Answer $45\ cm^2$

2

These two triangles are similar.
The small one has an area of 7 cm².
Find the area of the large one.



Not drawn accurately

$8 \div 4 = 2$

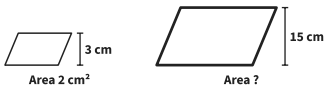
$2^2 = 4$

$7 \times 4 = 28\ cm^2$

Answer $28\ cm^2$

3

These two parallelograms are similar.
The small one has an area of 2 cm².
Find the area of the large one.



Not drawn accurately

$15 \div 3 = 5$

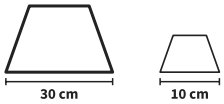
$5^2 = 25$

$2 \times 25 = 50\ cm^2$

Answer $50\ cm^2$

4

These two trapeziums are similar.
The small one has an area of 6 cm².
Find the area of the large one.

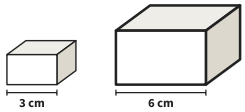


Not drawn accurately

Answer $54\ cm^2$

5

These two cuboids are similar.
The small one has a volume of 5 cm³.
Find the volume of the large one.



Not drawn accurately

$6 \div 3 = 2$

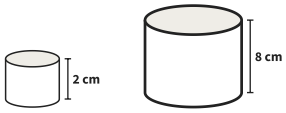
$2^3 = 8$

$5 \times 8 = 40\ cm^3$

Answer $40\ cm^3$

6

These two cylinders are similar.
The small one has a volume of 3 cm³.
Find the volume of the large one.



Not drawn accurately

$8 \div 2 = 4$

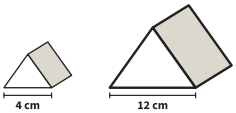
$4^3 = 64$

$3 \times 64 = 192\ cm^3$

Answer $192\ cm^3$

7

These two prisms are similar.
The small one has a volume of 2 cm³.
Find the volume of the large one.



Not drawn accurately

$12 \div 4 = 3$

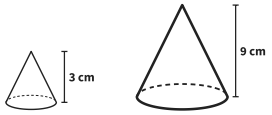
$3^3 = 27$

$2 \times 27 = 54\ cm^3$

Answer $54\ cm^3$

8

These two cones are similar.
Sam says the large one has a volume of $10 \times 3 = 30\ cm^3$. Explain Sam's mistake.
Find the right volume.



Not drawn accurately

Volume: $\times 3^3 = \times 27$, not $\times 3$

$10 \times 27 = 270\ cm^3$

Answer $270\ cm^3$

Area and volume scale factors *further practice*

ANSWERS

9

Two similar pentagons have widths 4 cm and 20 cm. The small pentagon has an area of 3 cm². Find the area of the large pentagon.

$20 \div 4 = 5$

$5^2 = 25$

$3 \times 25 = 75\ cm^2$

Answer $75\ cm^2$

10

Two similar cones have heights 2 cm and 10 cm. The small cone has a volume of 4 cm³. Find the volume of the large cone.

$10 \div 2 = 5$

$5^3 = 125$

$4 \times 125 = 500\ cm^3$

Answer $500\ cm^3$

11

A small poster is 20 cm wide.
A similar large poster is 60 cm wide.
The small poster uses 5 ml of ink.
How much ink does the large poster use?

Ink covers an area

$60 \div 20 = 3$

$3^2 = 9$

$5 \times 9 = 45\ ml$

Answer $45\ ml$

12

Two fish tanks are similar.
The small tank is 30 cm long and the large tank is 60 cm long. The small tank holds 20 litres of water. How much water does the large tank hold?

Water fills a volume

$60 \div 30 = 2$

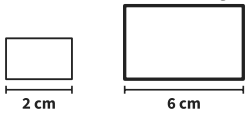
$2^3 = 8$

$20 \times 8 = 160\ litres$

Answer $160\ litres$

13

These two rectangles are similar.
Find the area of the small rectangle.



Not drawn accurately

$6 \div 2 = 3$

$3^2 = 9$

$72 \div 9 = 8\ cm^2$

Answer $8\ cm^2$

14

Complete the table for pairs of similar shapes.

Length scale factor	Area scale factor	Volume scale factor
2	4	8
5	25	125
10	100	1000

15

Two similar shapes have areas 5 cm² and 45 cm². The small shape is 4 cm long.
How long is the large shape?

$45 \div 5 = 9$

$9 = 3^2$, so the lengths are $\times 3$

$4 \times 3 = 12\ cm$

Answer $12\ cm$

16

The volume of a large cube is 64 times the volume of a small cube. Ali says each face of the large cube has 16 times the area of a face of the small cube.
Is Ali right? Explain.

Yes. $64 = 4^3$, so the lengths are $\times 4$ and the areas $\times 4^2 = 16$.

Answer Yes