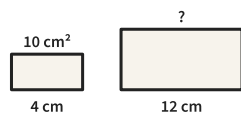


Similar shapes, area and volume

1

The two rectangles are similar.
Find the area of the larger rectangle.

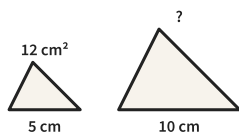


length scale factor $12 \div 4 = 3$
 area scale factor $3^2 = 9$
 area $10 \times 9 = 90 \text{ cm}^2$

Answer 90 cm²

2

The two triangles are similar. Find the area of the larger triangle.

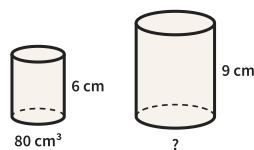


length scale factor $10 \div 5 = 2$
 area scale factor $2^2 = 4$
 area $12 \times 4 = 48 \text{ cm}^2$

Answer 48 cm²

3

The two cylinders are similar.
Find the volume of the larger cylinder.

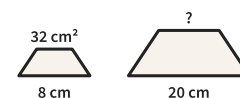


length scale factor $9 \div 6 = 1.5$
 volume scale factor $1.5^3 = 3.375$
 volume $80 \times 3.375 = 270 \text{ cm}^3$

Answer 270 cm³

4

The two trapeziums are similar.
Find the area of the larger trapezium.

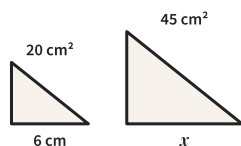


area $32 \times 6.25 = 200 \text{ cm}^2$

Answer 200 cm²

5

The two triangles are similar, with areas of 20 cm² and 45 cm². Find the length marked x.

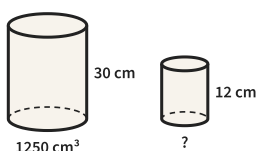


area scale factor $45 \div 20 = 2.25$,
 $\sqrt{2.25} = 1.5$

Answer 9 cm

6

Two similar vases are 30 cm and 12 cm tall. The larger holds 1250 cm³. How much does the smaller hold?

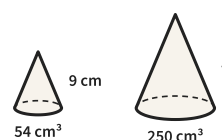


length scale factor $12 \div 30 = 0.4$,
 $0.4^3 = 0.064$

Answer 80 cm³

7

Two similar cones have volumes of 54 cm³ and 250 cm³. The smaller cone is 9 cm tall. How tall is the larger cone?



volume scale factor $250 \div 54 = 125 \div 27$,
 $\sqrt[3]{125 \div 27} = 5 \div 3$

Answer 15 cm

8

Two similar solids have surface areas of 36 cm² and 81 cm². The smaller has a volume of 40 cm³. Find the volume of the larger.

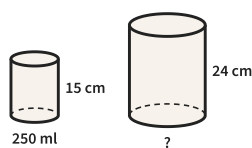
area scale factor 2.25 gives length 1.5,
 then $1.5^3 = 3.375$

Answer 135 cm³

Similar shapes, area and volume *further practice*

9

Two similar bottles are 15 cm and 24 cm tall. The smaller holds 250 ml. How much does the larger hold?



scale factor 1.6, $1.6^3 = 4.096$

Answer 1024 ml

10

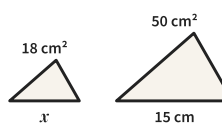
A photo 10 cm wide and 15 cm tall is enlarged so that its area is 4 times as big. Find the size of the enlarged photo.

length scale factor $\sqrt{4} = 2$

Answer 20 cm by 30 cm

11

Two similar triangles have areas of 18 cm² and 50 cm². The base of the larger is 15 cm. Find the base of the smaller.



$50 \div 18 = 25 \div 9$, so the length scale factor is $5 \div 3$

Answer 9 cm

12

A statue needs 0.6 litres of paint to cover it. A similar statue is 3 times as tall. How much paint does it need?

paint covers the surface, so area: $3^2 = 9$

Answer 5.4 litres

13

Two similar cones have volumes of 128 cm³ and 54 cm³. The curved surface of the larger has an area of 96 cm². Find the curved surface area of the smaller.

$54 \div 128 = 27 \div 64$, length $3 \div 4$, area $9 \div 16$

Answer 54 cm²

14

Two similar boxes of chocolates are 8 cm and 12 cm long. The small box holds 200 g and costs £1.60. The large box costs £5. Which is better value?

675 g for £5 is 0.74p a gram; 200 g for £1.60 is 0.8p a gram

Answer the large box

15

A cone 12 cm tall has a volume of 320 cm³. The top 4 cm is cut off, leaving a frustum. Find the volume of the frustum to 1 decimal place.

the small cone is a third as tall:
 $320 \div 27 = 11.85 \text{ cm}^3$

Answer 308.1 cm³

16

One box is twice as long, twice as wide and twice as tall as a similar box that holds 3 litres. Mia says it holds 6 litres. Explain her mistake and find the right amount.

volume scale factor is $2^3 = 8$, not 2

Answer 24 litres