

Name: _____

Exam Style Questions



Similar Shapes: Area/Volume

Corbettmaths

Ensure you have: Pencil, pen, ruler, protractor, pair of compasses and eraser

You may use tracing paper if needed

Guidance

1. Read each question carefully before you begin answering it.
2. Don't spend too long on one question.
3. Attempt every question.
4. Check your answers seem right.
5. Always show your workings

Revision for this topic

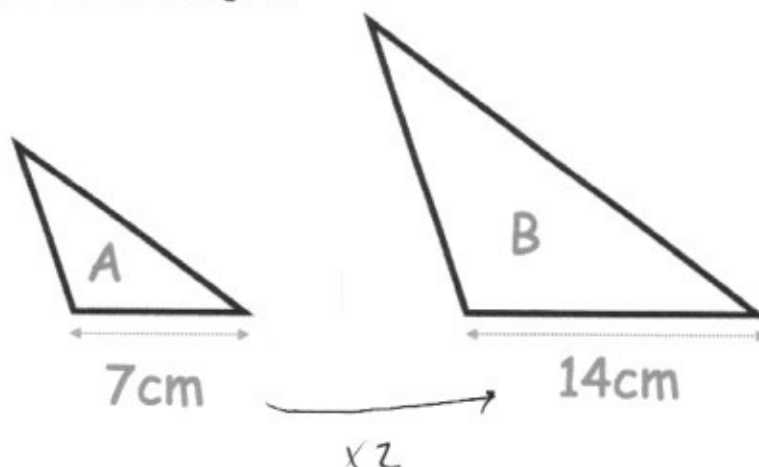
www.corbettmaths.com/contents

Video 293a

Video 293b



1. Below are two similar triangles.



The area of triangle A is 20cm^2
Work out the area of triangle B.

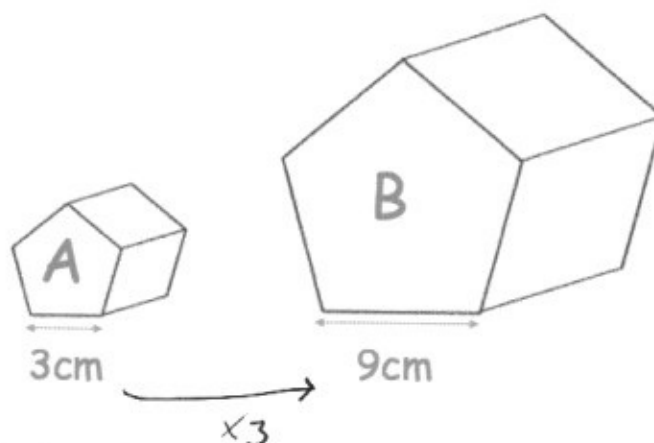
$$\text{Area} \times 4 \quad (2^2)$$

$$20 \times 4$$

$$\dots\dots\dots 80 \text{ cm}^2$$

(2)

2. Below are two similar pentagonal prisms.



The volume of prism A is 15cm^3
Work out the volume of prism B.

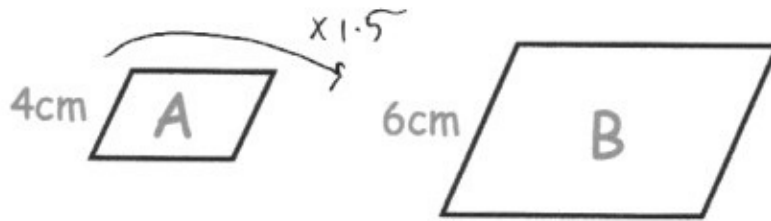
$$\text{Volume} \times 3^3 \quad (\times 27)$$

$$15 \times 27 =$$

$$\dots\dots\dots 405 \text{ cm}^3$$

(2)

3. Below are two similar parallelograms.



The area of parallelogram A is 28cm^2

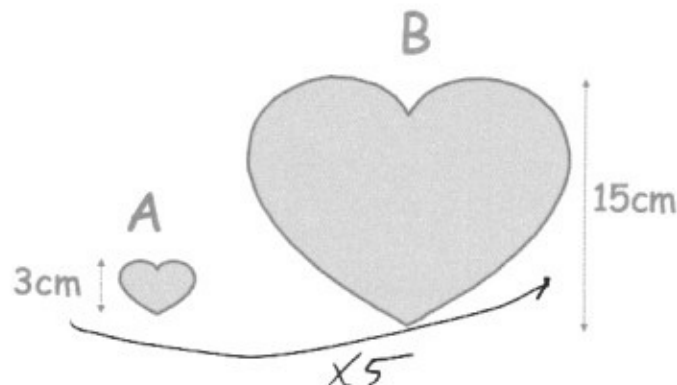
Work out the area of parallelogram B.

$$\text{Area} \times 1.5^2 \quad (\times 2.25)$$

$$28 \times 1.5^2$$

..... 63cm^2
(2)

4. Shown below are two mathematically similar shapes.



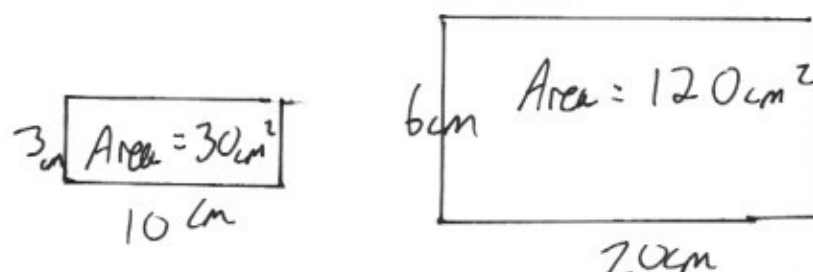
The area of shape B is 150cm^2

Work out the area of shape A. $\text{Area A} \rightarrow \text{Area B} \times 5^2 \quad (\times 25)$

$$150 \div 5^2$$

..... 6cm^2
(2)

5. Explain why the area of a rectangle increases by a factor of 4 when the side length is doubled.

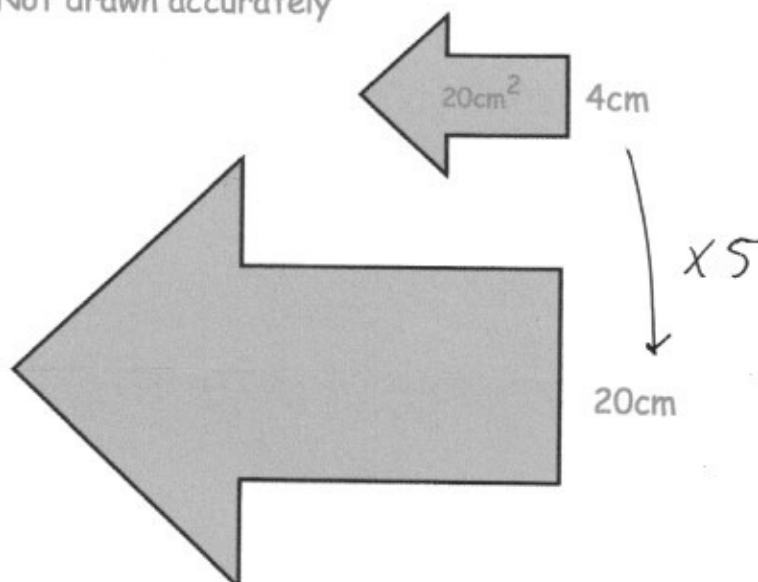


The area of a rectangle is length $\times$ width.
As both the length and width are double, the answer will be four times larger. (2)

6. Shown are two logos that are mathematically similar.



Not drawn accurately



The area of the smaller logo is 20 cm^2

$$\text{Area} \times 5^2 (\times 25)$$

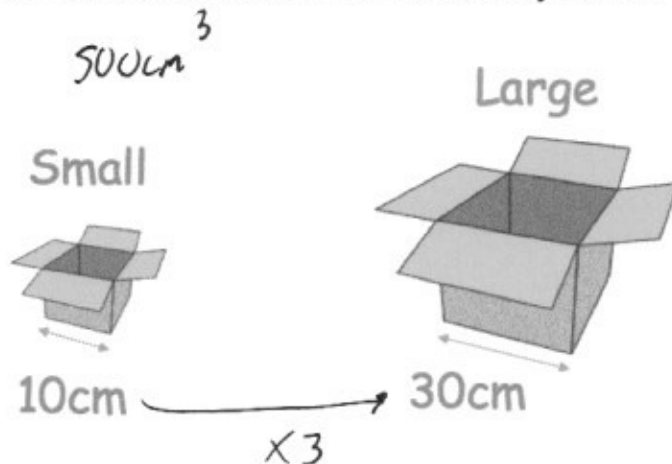
Find the area of the larger logo.

$$20 \times 5^2$$

$$\dots\dots\dots 500 \text{ cm}^2$$

(2)

7. Shown below are two boxes that are mathematically similar.



The volume of the small box is 500cm³
Work out the volume of the larger box.

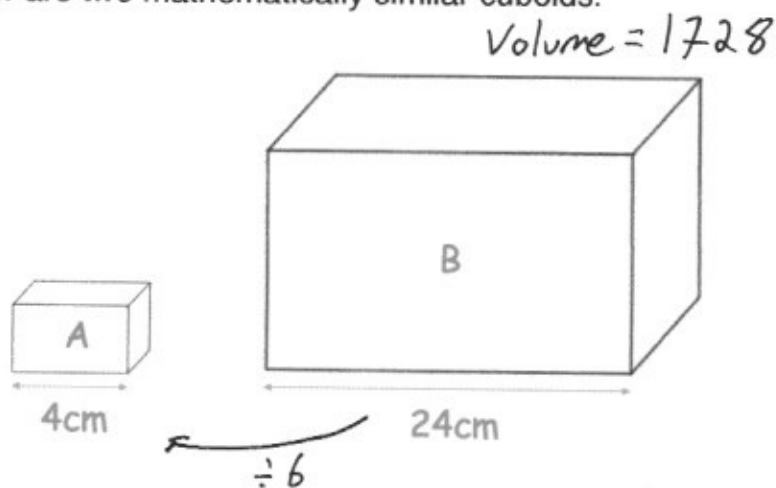
$$\text{Volume } \times 3^3 \text{ (x27)}$$

$$500 \times 3^3 = 13500$$

$$\dots\dots\dots 13500 \text{ cm}^3$$

(2)

8. Shown below are two mathematically similar cuboids.



The volume of cuboid B is 1728cm³

$$\text{Volume } \div 6^3 \div 216$$

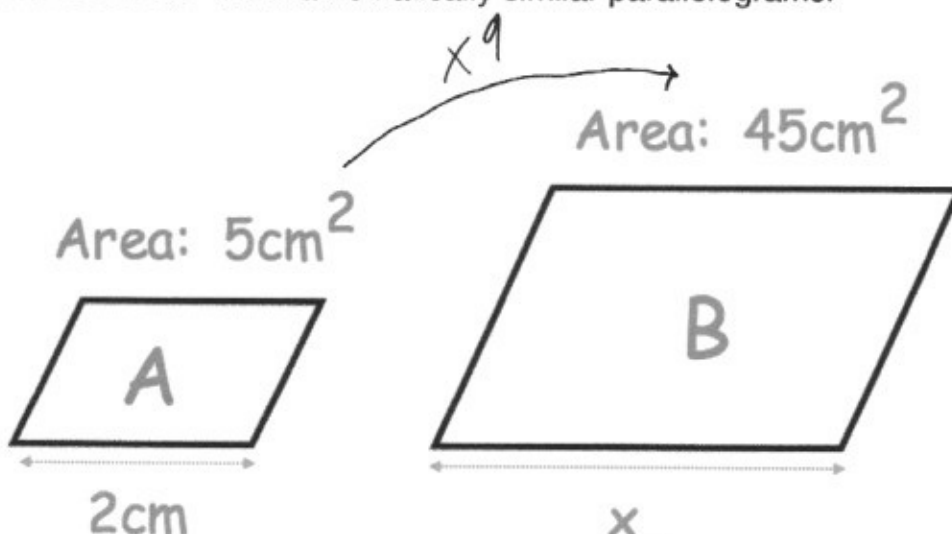
Find the volume of cuboid A.

$$1728 \div 6^3 =$$

$$\dots\dots\dots 8 \text{ cm}^3$$

(2)

9. Shown below are two mathematically similar parallelograms.



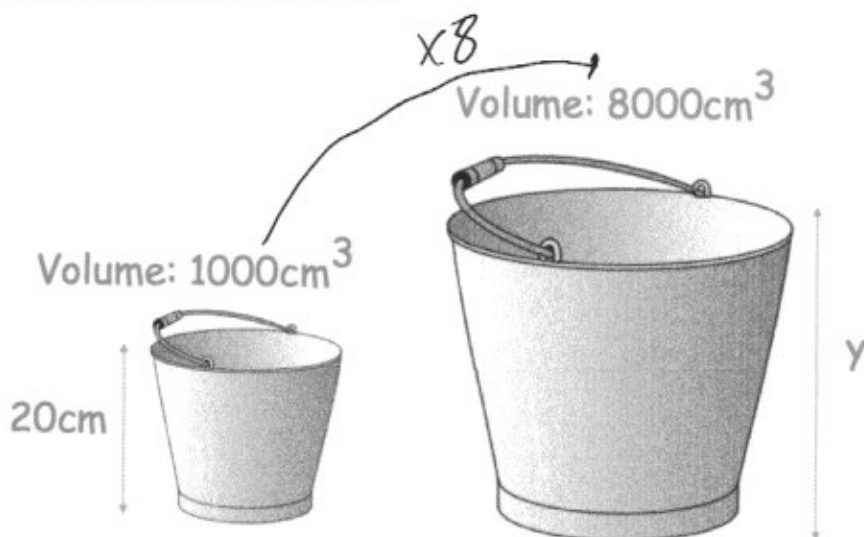
Find x

sides $\times \sqrt{9}$ ($\times 3$)

$$2 \times 3$$

.....cm
(2)

10. The two buckets below are similar.



Find y

sides $\times \sqrt[3]{8}$ ($\times 2$)

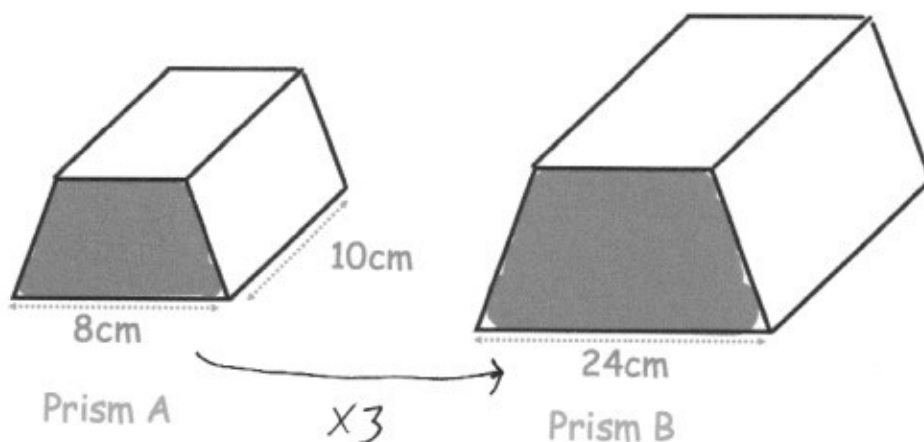
$$20 \times 2$$

40
.....cm
(2)

11. Prism A and prism B are mathematically similar



Not drawn to scale



Prism A has a cross-sectional area of 25cm^2

Work out the volume of prism B.

$$25 \times 3^2 = 225$$

$$10 \times 3 = 30$$

$$225 \times 30$$

$$\text{or } 250 \times 3^3$$

$$\dots\dots\dots 6750 \text{ cm}^3$$

(2)

12. A swimming pool has surface area 300m^2



The swimming pool is a prism of depth 110cm . 1.1m

- (a) Work out the volume of the swimming pool.
Give your answer in m^3 .

$$\dots\dots\dots 330 \text{ m}^3$$

(2)

A scale model of the swimming pool is made.
The depth of the model swimming pool is 5.5cm

- (b) Find the surface area of the model swimming pool.

$$110 \div 5.5 = 20$$

$$300 \div 20^2$$

$$\dots\dots\dots 0.75 \text{ m}^2$$

(2)

13.



Cone A



Cone B



Cone A and cone B are mathematically similar.

The total surface area of cone A is 120cm^2

The total surface area of cone B is 1080cm^2

The diameter of cone A is 8cm.

Work out the diameter of cone B.

$$1080 \div 120 = 9$$

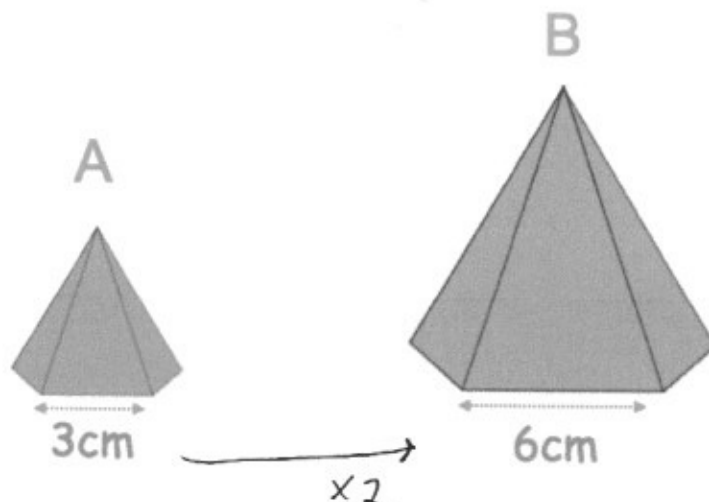
$$\sqrt{9} = 3$$

$$8 \times 3$$

$$\underline{\quad 24 \quad} \text{cm}$$

(3)

14. Below are two similar pyramids.



Pyramid A has a volume of 26cm^3

- (a) Work out the volume of Pyramid B.

$$26 \times 2^3$$

$$\dots\dots\dots 208 \dots\dots\dots \text{cm}^3$$

(2)

Pyramid B has a total surface area of 224cm^2

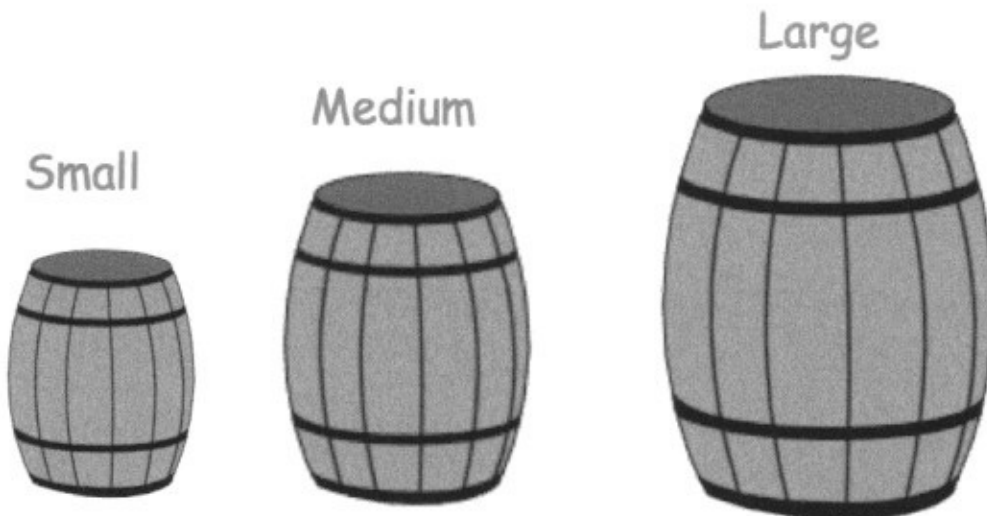
- (b) Work out the total surface area of Pyramid A.

$$224 \div 2^2$$

$$\dots\dots\dots 56 \dots\dots\dots \text{cm}^2$$

(2)

15. Wine is kept in three different sized barrels that are mathematically similar.



The table below shows information about the barrels.

	Height	Capacity
Small	24 inches	100 litres
Medium	30 inches	195.3125 litres
Large	32.1327816 inches	240 litres

Complete the table.

$$\frac{30}{24} = 1.25 \quad 100 \times 1.25^3$$

$$240 \div 100 = 2.4 \quad \sqrt[3]{2.4} = 1.3388659..$$

$$24 \times 1.3388... = 32.132$$

16. A shop sells two different sizes of rugby ball.



A small rugby ball has a length of 8cm and surface area of 90 cm²

↓ × 2

A large rugby ball has a length of 16cm.

Calculate the surface area of a large rugby ball.

$$90 \times 2^2$$

$$90 \times 4$$

$$\begin{array}{r} 360 \\ \hline \end{array} \text{cm}^2$$

(2)

17. Duncan bought a toy that grows when placed in water.



Grows 10 times
larger

Before placing the toy in water it was 4cm tall.

After placing the toy in water it grew to a similarly shaped toy that was 10cm tall.

Is the claim reasonable?

$$10 \div 4 = 2.5$$

volume is $2.5^3 / 15.625$ larger, so it
is a reasonable, if slightly inaccurate claim.

(3)

18. Two clay models of the Statue of Liberty are mathematically similar.



The smaller model has a height of 15cm.
The larger model has a height of 20cm.

The smaller model weighs 108g.

Work out the weight of the larger model.

$$20 \div 15 = \frac{4}{3}$$

$$108 \times \left(\frac{4}{3}\right)^3 = 256$$

$$\begin{array}{r} 256 \\ \hline \text{g} \\ (3) \end{array}$$

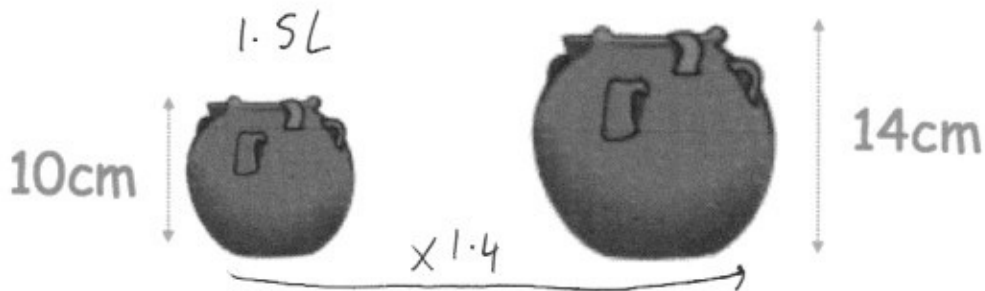
19. Mrs Hampton is potting plants.



She is using two mathematically similar pots, the smaller is 10cm tall and the larger 14cm tall.

She has two bags of soil, each containing 30 litres of soil.

With the first bag, Mrs Hampton fills 20 small pots using all of the soil in the bag.



How many large pots can be filled completely using the second bag of soil?

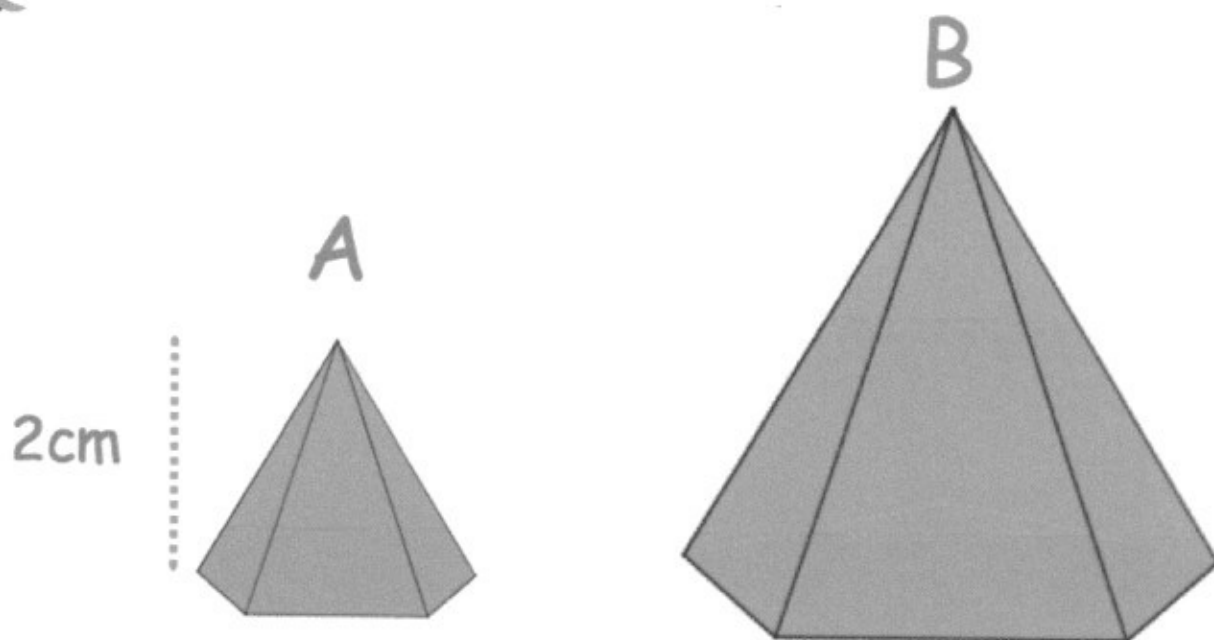
$$30 \text{ L} \div 20 = \underline{1.5 \text{ Litres}}$$

$$1.5 \times 1.4^3 = 4.116 \text{ L}$$

$$30 \div 4.116 = 7.28...$$

7.
.....
(5)

20. Two pyramids are mathematically similar.



Pyramid A has a surface area of 20cm^2
Pyramid B has a surface area of 320cm^2
The height of pyramid A is 2cm

- (a) Work out the height of pyramid B.

$$320 \div 20 = 16$$

$$\sqrt{16} = 4$$

$$2 \times 4$$

8 cm
(3)

Pyramid A has a weight of 800g
Both pyramids are made of the same material.

- (b) Work out the weight of pyramid B.
Include suitable units.

$$0.8\text{kg} \times 4^3$$

51.2kg
(4)

21. Two solids are mathematically similar.
The surface area of the smaller solid is $42\pi \text{ cm}^2$
The surface area of the larger solid is $1512\pi \text{ cm}^2$

The height of the larger solid is 96cm.

Work out the height of the smaller solid.

$$1512\pi \div 42\pi = 36$$
$$\sqrt{36} = 6$$

$$96 \div 6 =$$

16
.....cm
(3)

22. The areas of two mathematically similar shapes are in the ratio 49 : 81

The length of the smaller shape is 24.5cm

Work out the length of the larger shape.

$$7 : 9$$

$$24.5 \div 7 = 3.5$$

$$3.5 \times 9$$

31.5
.....cm
(3)

23. The volumes of two mathematically similar solids are in the ratio 8 : 125

The surface area of the smaller solid is 24 cm^2

Work out the surface area of the larger solid.

sides $2 : 5$

Areas $4 : 25$

$$24 \div 4 = 6$$

$$6 \times 25$$

150
.....cm²
(3)