1 *ABC* and *DEF* are similar triangles.

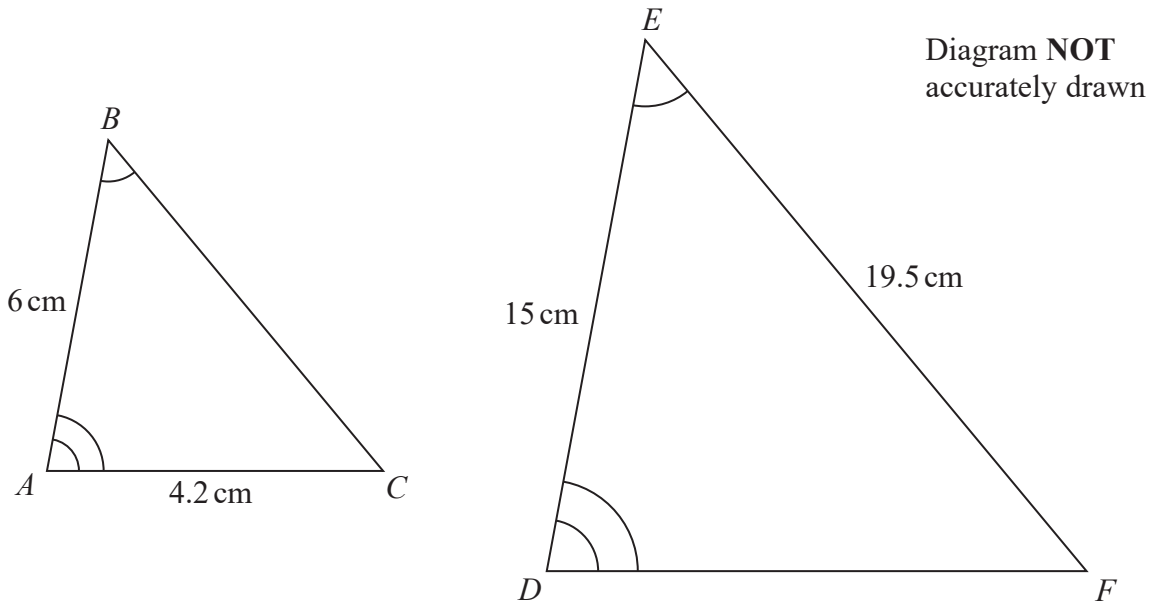


Diagram **NOT** accurately drawn

(a) Work out the length of *DF*.

.....cm

(2)

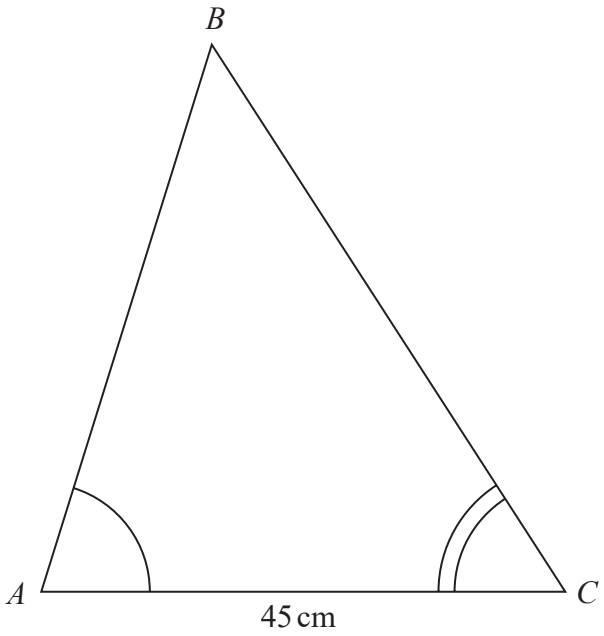
(b) Work out the length of *BC*.

.....cm

(2)

(Total for Question 1 is 4 marks)

2 *ABC* and *DEF* are similar triangles.



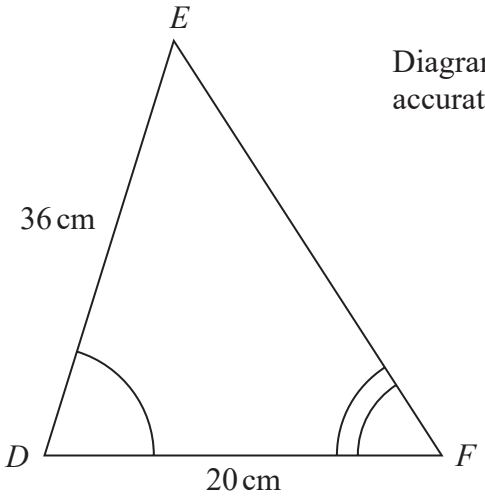


Diagram **NOT** accurately drawn

(a) Work out the length of *AB*.

..... cm

(2)

Given that *BC* = 54 cm,

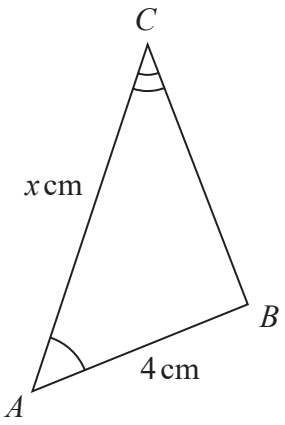
(b) work out the length of *EF*.

..... cm

(2)

(Total for Question 2 is 4 marks)

3



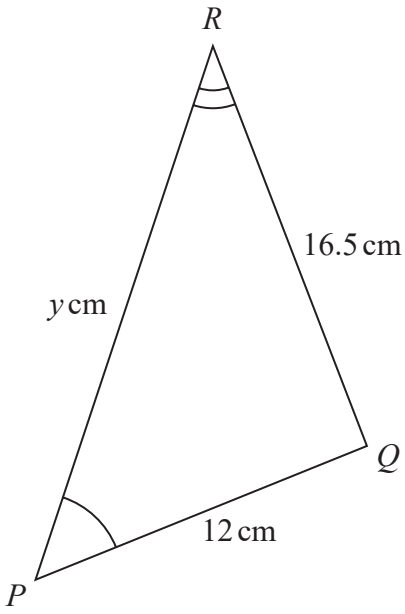


Diagram **NOT** accurately drawn

Triangle ABC is similar to triangle PQR

$AB = 4$ cm $\quad PQ = 12$ cm $\quad RQ = 16.5$ cm $\quad AC = x$ cm $\quad PR = y$ cm

(a) Calculate the length of BC

..... cm

(2)

(b) Write down an expression for y in terms of x

$y =$ .....

(1)

(Total for Question 3 is 3 marks)

4 *ABC* and *DEF* are similar triangles.

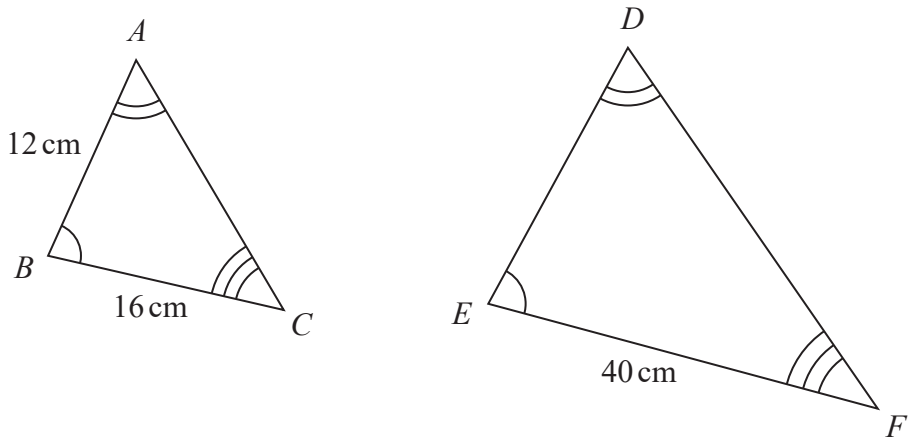


Diagram **NOT** accurately drawn

(a) Work out the length of *DE*.

..... cm

(2)

The area of triangle *DEF* is 525 cm^2

(b) Find the area of triangle *DEF* in m^2

..... m^2

(2)

(Total for Question 4 is 4 marks)

5 The diagram shows two cylinders, **A** and **B**.

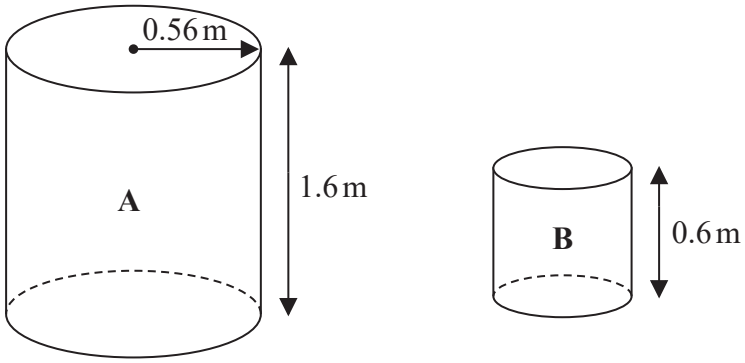


Diagram **NOT** accurately drawn

Cylinder **A** has height 1.6 m and radius 0.56 m.

(a) Work out the curved surface area of cylinder **A**.
Give your answer in m^2 correct to 3 significant figures.

..... m^2

(2)

Cylinder **B** is mathematically similar to cylinder **A**.
The height of cylinder **B** is 0.6 m.

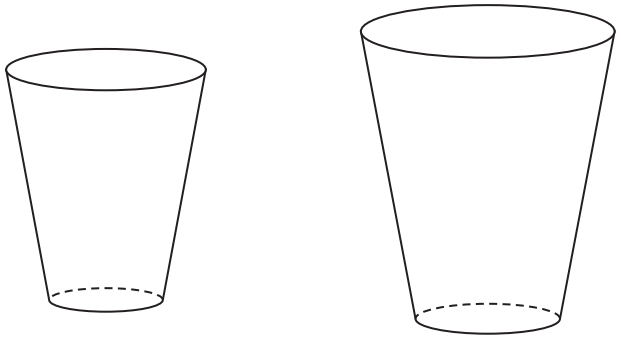
(b) Work out the radius of cylinder **B**.

..... m

(2)

(Total for Question 5 is 4 marks)

6 The diagram shows two mathematically similar vases, **A** and **B**.



A **B**

Diagram **NOT** accurately drawn

A has a volume of 405 cm^3
B has a volume of 960 cm^3

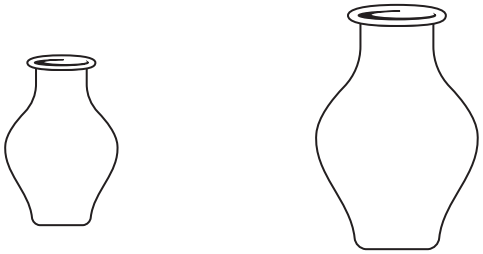
B has a surface area of 928 cm^2

Work out the surface area of **A**.

cm^2

(Total for Question 6 is 3 marks)

7 **A** and **B** are two similar vases.



A **B**

Diagram **NOT** accurately drawn

Vase **A** has height 24 cm.
Vase **B** has height 36 cm.

Vase **A** has a surface area of 960 cm^2

(a) Work out the surface area of vase **B**.

..... cm^2

(2)

Vase **B** has a volume of $V cm^3$

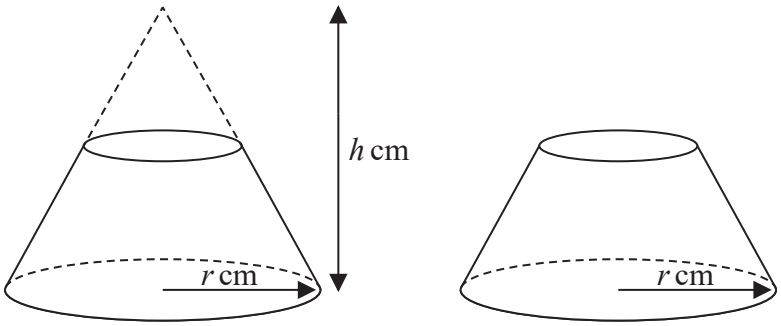
(b) Find in terms of V, an expression for the volume, in cm^3, of vase **A**.

..... cm^3

(2)

(Total for Question 7 is 4 marks)

8 A frustum is made by removing a small cone from a large cone.
The cones are mathematically similar.



Frustum

Diagram **NOT** accurately drawn

The large cone has base radius r cm and height h cm.

Given that

$$\frac{\text{volume of frustum}}{\text{volume of large cone}} = \frac{98}{125}$$

find an expression, in terms of h, for the height of the frustum.

..... cm

(Total for Question 8 is 4 marks)

9 **A** and **B** are two similar vases.

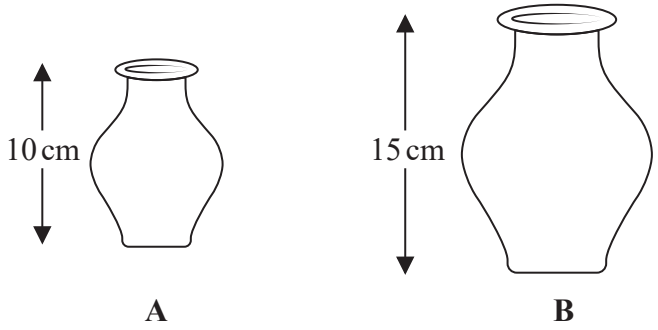


Diagram **NOT** accurately drawn

Vase **A** has height 10 cm.
Vase **B** has height 15 cm.

The difference between the volume of vase **A** and the volume of vase **B** is 1197 cm^3

Calculate the volume of vase **A**

..... cm^3

(Total for Question 9 is 4 marks)

10 The three solids **A**, **B** and **C** are similar such that

the surface area of **A** : the surface area of **B** = 4 : 9

and

the volume of **B** : the volume of **C** = 125 : 343

Work out the ratio

the height of **A** : the height of **C**

Give your ratio in its simplest form.

.....

(Total for Question 10 is 4 marks)

11 The diagram shows two similar metal statues.

Diagram **NOT** accurately drawn

A

B

The volume of statue **B** is 20% less than the volume of statue **A**

The surface area of statue **B** is k% less than the surface area of statue **A**

Work out the value of k
Give your answer correct to 3 significant figures.

k = ...

(Total for Question 11 is 4 marks)

12 **R** and **S** are two similar solid shapes.

Shape **R** has surface area 108 cm^2 and volume 135 cm^3
Shape **S** has surface area 300 cm^2

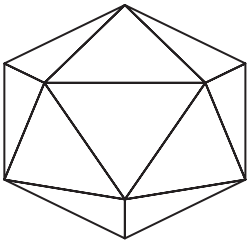
Work out the volume of shape **S**.

..... cm^3

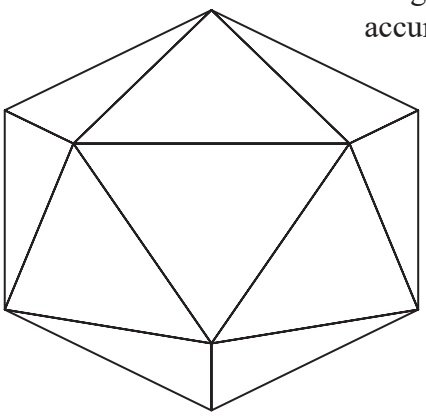
(Total for Question 12 is 3 marks)

13 **A** and **B** are two similar solids.

Diagram **NOT** accurately drawn



A



B

A has a volume of 1836 cm^3
B has a volume of 4352 cm^3

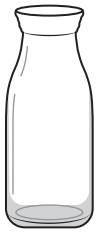
B has a total surface area of 1120 cm^2

Work out the total surface area of **A**.

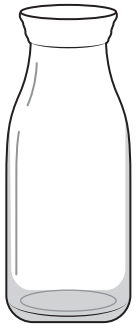
..... cm^2

(Total for Question 13 is 3 marks)

14 The diagram shows two similar bottles, **A** and **B**.



A



B

Diagram **NOT** accurately drawn

Bottle **A** has surface area 240 cm^2
Bottle **B** has surface area 540 cm^2 and volume 2025 cm^3

Work out the volume of bottle **A**.

..... cm^3

(Total for Question 14 is 3 marks)

15 The diagram shows two similar vases, **A** and **B**.

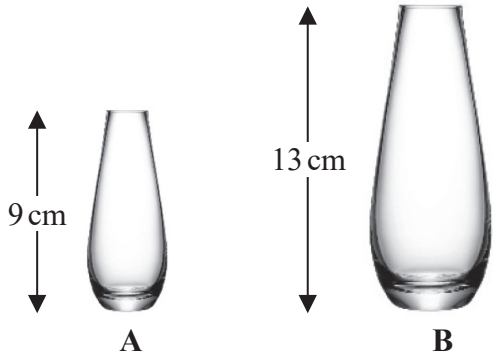


Diagram **NOT** accurately drawn

The height of vase **A** is 9 cm and the height of vase **B** is 13 cm.

Given that

surface area of vase **A** + surface area of vase **B** = 1800 cm^2

calculate the surface area of vase **A**.

..... cm^2

(Total for Question 15 is 4 marks)

16 Mathematically similar wooden blocks are made in a workshop.

There are small blocks and there are large blocks.

The volume of each small block is 300 cm^3

Given that

the surface area of each small block : the surface area of each large block = 25 : 36

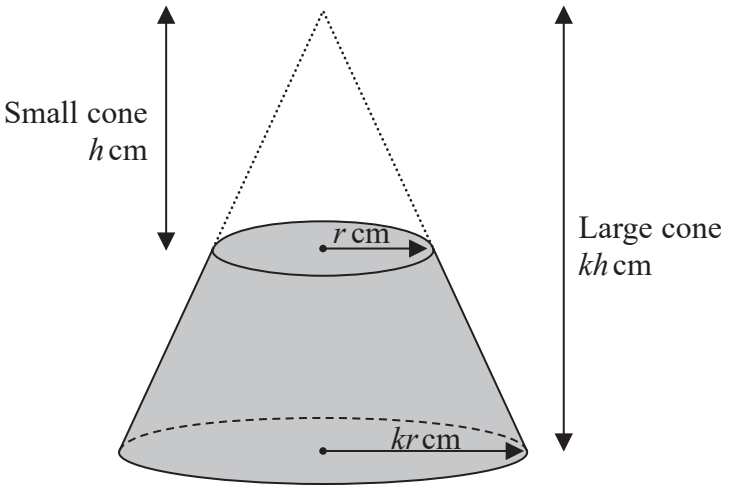
work out the volume of each large block.

..... cm^3

(Total for Question 16 is 3 marks)

17 The diagram shows a frustum of a cone, and a sphere.

The frustum, shown shaded in the diagram, is made by removing the small cone from the large cone.
The small cone and the large cone are similar.



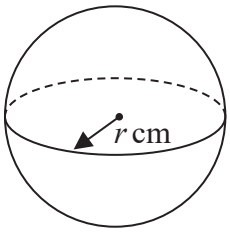


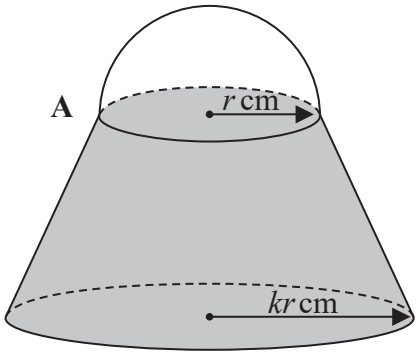
Diagram **NOT** accurately drawn

The height of the small cone is h cm and the radius of the base of the small cone is r cm.
The height of the large cone is kh cm and the radius of the base of the large cone is kr cm.
The radius of the sphere is r cm.

The sphere is divided into two hemispheres, each of radius r cm.

Solid **A** is formed by joining one of the hemispheres to the frustum.
The plane face of the hemisphere coincides with the upper plane face of the frustum, as shown in the diagram below.

Solid **B** is formed by joining the other hemisphere to the small cone that was removed from the large cone.
The plane face of the hemisphere coincides with the plane face of the base of the small cone, as shown in the diagram below.



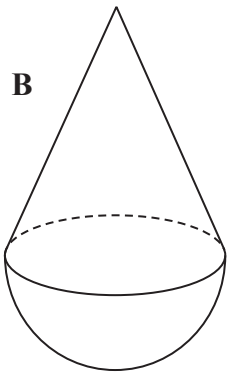


Diagram **NOT** accurately drawn

The volume of solid **A** is 6 times the volume of solid **B**.

Given that $k > \sqrt[3]{7}$

find an expression for h in terms of k and r

$h =$ .....

(Total for Question 17 is 6 marks)