

Name: _____

GCSE (1 – 9)

Similar Shapes (Area and Volume)

Instructions

- Use **black** ink or ball-point pen.
- Answer all questions.
- Answer the questions in the spaces provided
– *there may be more space than you need.*
- Diagrams are **NOT** accurately drawn, unless otherwise indicated.
- You must **show all your working out.**

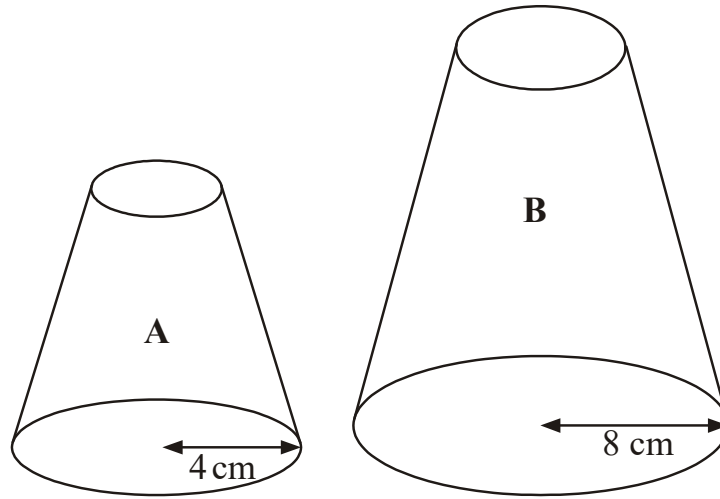
Information

- The marks for each question are shown in brackets
– *use this as a guide as to how much time to spend on each question.*

Advice

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end

1



Two solid shapes, A and B, are mathematically similar.

The base of shape A is a circle with radius 4 cm.

The base of shape B is a circle with radius 8 cm.

The surface area of shape A is 80 cm^2 .

- (a) Work out the surface area of shape B.

..... cm^2
(2)

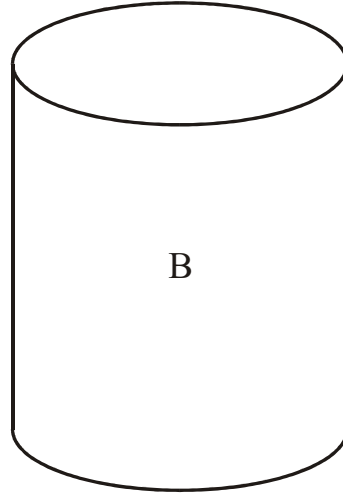
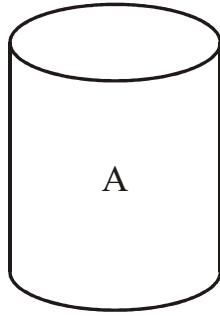
The volume of shape B is 600 cm^3 .

- (b) Work out the volume of shape A.

..... cm^3
(2)

(Total for Question 1 is 4 marks)

2



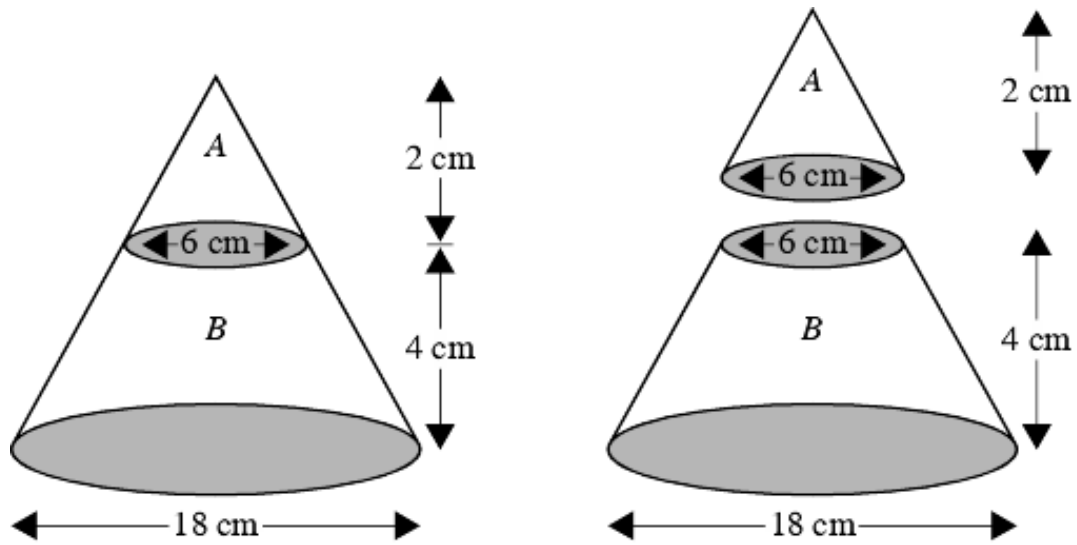
The two cylinders, A and B, are mathematically similar.
The height of cylinder B is twice the height of cylinder A.

The total surface area of cylinder A is 180 cm^2

Calculate the total surface area of cylinder B.

..... cm^2
(Total for Question 2 is 3 marks)

3



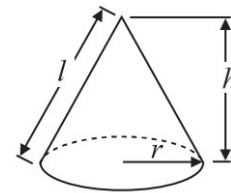
The diagram represents a large cone of height 6 cm and base diameter 18 cm.

The large cone is made by placing a small cone A of height 2 cm and base diameter 6 cm on top of a frustum B.

Calculate the volume of the frustum B.
Give your answer in terms of π .

$$\text{Volume of cone} = \frac{1}{3}\pi r^2 h$$

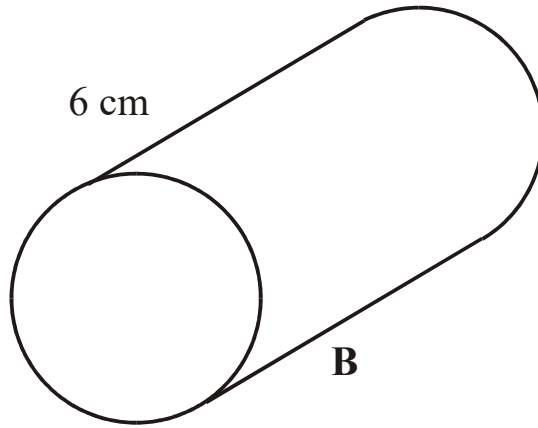
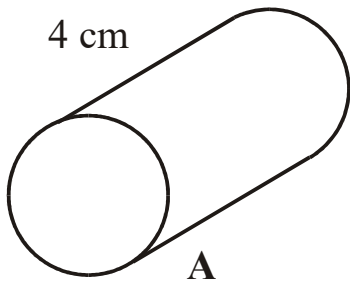
$$\text{Curved surface area of cone} = \pi r l$$



..... cm³

(Total for Question 3 is 4 marks)

4



Cylinder A and cylinder B are mathematically similar.
The length of cylinder A is 4 cm and the length of cylinder B is 6 cm.
The volume of cylinder A is 80 cm^3 .

Calculate the volume of cylinder B.

5 X and Y are two geometrically similar solid shapes.

The total surface area of shape X is 450 cm^2

The total surface area of shape Y is 800 cm^2

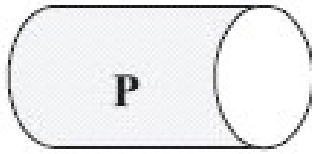
The volume of shape X is 1350 cm^3

Calculate the volume of shape Y.

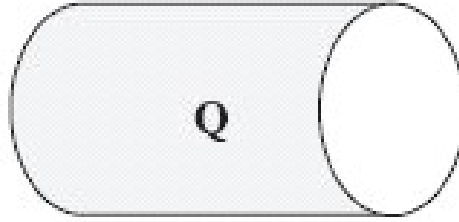
..... cm^3

(Total for Question 5 is 3 marks)

6



4 cm



Two cylinders, P and Q, are mathematically similar.

The total surface area of cylinder P is $90\pi \text{ cm}^2$.

The total surface area of cylinder Q is $810\pi \text{ cm}^2$.

The length of cylinder P is 4 cm.

(a) Work out the length of cylinder Q.

The volume of cylinder P is $100\pi \text{ cm}^3$.

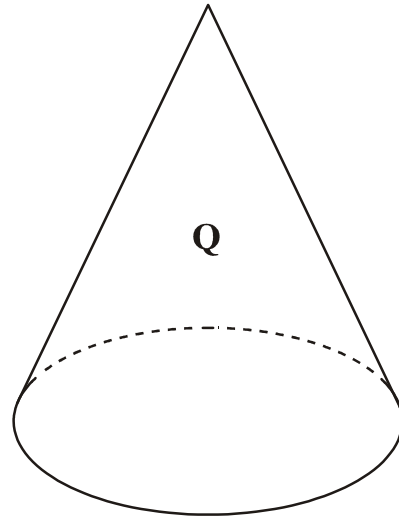
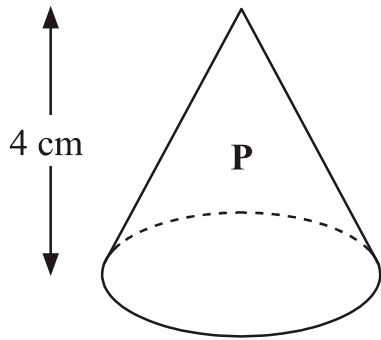
..... cm
(3)

(b) Work out the volume of cylinder Q.
Give your answer as a multiple of π .

..... cm^3
(2)

(Total for Question 6 is 5 marks)

7



Two cones, P and Q, are mathematically similar.
The total surface area of cone P is 24 cm^2 .
The total surface area of cone Q is 96 cm^2 .
The height of cone P is 4 cm.

(a) Work out the height of cone Q.

The volume of cone P is 12 cm^3

..... cm
(3)

(b) Work out the volume of cone Q.

..... cm^3
(2)

(Total for Question 7 is 5 marks)