

Spheres, Cones, Pyramids and Frustums

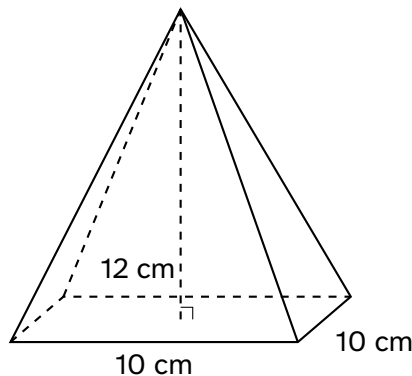
For Pearson Edexcel GCSE Mathematics (1MA1) • Higher tier

Name _____

Total marks: **26**

Answer **all** questions in the spaces provided. Show your working: marks are given for correct method. You may use a calculator. Volume of cone = $\frac{1}{3}\pi r^2 h$; volume of sphere = $\frac{4}{3}\pi r^3$; curved surface area of cone = $\pi r l$; surface area of sphere = $4\pi r^2$

- 1** Here is a square-based pyramid.



The base is a square of side 10 cm.
The perpendicular height of the pyramid is 12 cm.
Work out the volume of the pyramid.

..... cm³
(2)

(Total for Question 1 is 2 marks)

- 2** A hemisphere has a total surface area (including the flat face) of $75\pi \text{ cm}^2$.
Find its radius.

..... cm
(3)

(Total for Question 2 is 3 marks)

- 3** A solid metal sphere of radius 6 cm is melted down and made into a cone of radius 8 cm.
Work out the height of the cone.

..... cm
(3)

(Total for Question 3 is 3 marks)

- 4 The diagram shows a frustum.
It is made by removing a cone of radius 4 cm and height 6 cm from the top of a cone of radius 10 cm and height 15 cm.

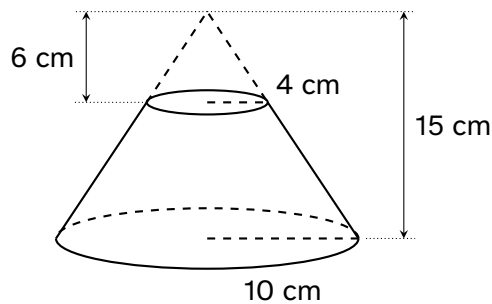


Diagram **NOT** accurately drawn

Work out the volume of the frustum.
Give your answer correct to 3 significant figures.

..... cm^3
(3)

(Total for Question 4 is 3 marks)

- 5 A sphere has radius r cm.
A cylinder has radius r cm and height h cm.

The surface area of the sphere is equal to the area of the curved surface of the cylinder.
Work out the ratio $h:r$

.....
(2)

(Total for Question 5 is 2 marks)

- 6 The diagram shows a solid made from a hemisphere on top of a cylinder. The hemisphere and the cylinder each have radius r cm. The height of the cylinder is 12 cm. The volume of the hemisphere is $\frac{1}{3}$ of the volume of the cylinder.

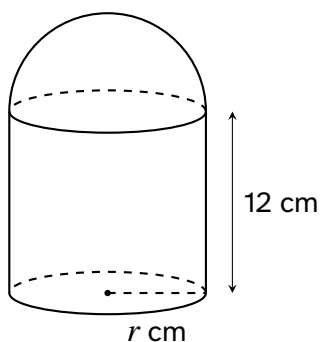


Diagram **NOT** accurately drawn

Work out the total volume of the solid.
Give your answer in terms of π .
You must show all your working.

..... cm^3
(4)

(Total for Question 6 is 4 marks)

- 7 The diagram shows a lampshade.
The lampshade is the curved surface of a frustum of a cone.
The top has radius 6 cm and the bottom has radius 15 cm.
The sloping edge of the lampshade is 15 cm long.

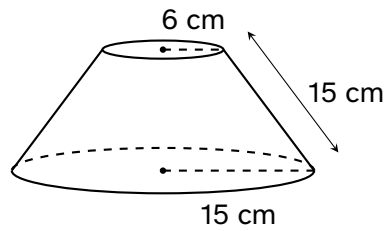


Diagram **NOT** accurately drawn

Work out the area of the curved surface of the lampshade.
Give your answer correct to 3 significant figures.

..... cm²
(4)

(Total for Question 7 is 4 marks)

- 8 The diagram shows a solid toy made from a cone and a hemisphere.
The cone and the hemisphere both have radius 5 cm.
The vertical height of the cone is 12 cm.

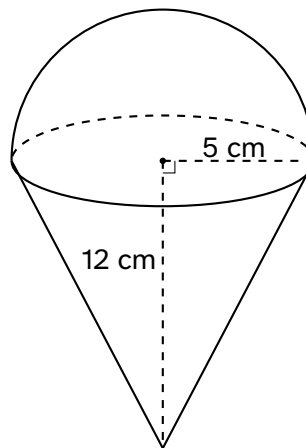


Diagram **NOT** accurately drawn

Calculate the total surface area of the toy.
Give your answer correct to 3 significant figures.

..... cm²
(5)

(Total for Question 8 is 5 marks)