

# Perimeters, Area and Volumes

## Difficulty: Medium

### Question Paper 2

Level	IGCSE
Subject	Maths (0580/0980)
Exam Board	CIE
Topic	Perimeters, Area and Volumes
Paper	Paper 4
Difficulty	Medium
Booklet	Question Paper 2

**Time allowed:** 94 minutes

**Score:** /82

**Percentage:** /100

#### Grade Boundaries:

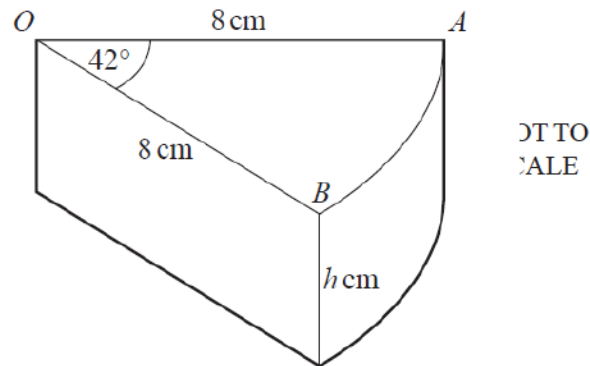
##### CIE IGCSE Maths (0580)

A*	A	B	C	D
>83%	67%	51%	41%	31%

##### CIE IGCSE Maths (0980)

9	8	7	6	5	4
>95%	87%	80%	69%	58%	46%

## Question 1



A wedge of cheese in the shape of a prism is cut from a cylinder of cheese of height  $h$  cm. The radius of the cylinder,  $OA$ , is  $8$  cm and the angle  $AOB = 42^\circ$ .

(a) (i) The volume of the wedge of cheese is  $90$  cm<sup>3</sup>.

Show that the value of  $h$  is  $3.84$  cm correct to 2 decimal places.

[4]

(ii) Calculate the **total** surface area of the wedge of cheese.

[5]

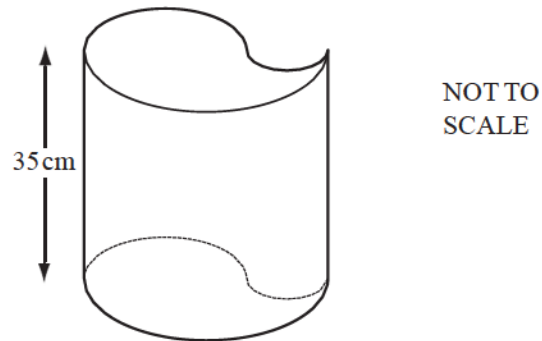
(b) A mathematically similar wedge of cheese has a volume of  $22.5$  cm<sup>3</sup>.

Calculate the height of this wedge.

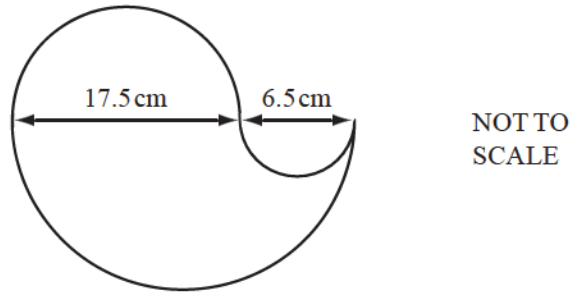
[3]

## Question 2

Sandra has designed this open container.  
The height of the container is 35 cm.



The cross section of the container is designed from three semi-circles with diameters 17.5 cm, 6.5 cm and 24 cm.



(a) Calculate the area of the cross section of the container. [3]

(b) Calculate the external surface area of the container, including the base. [4]

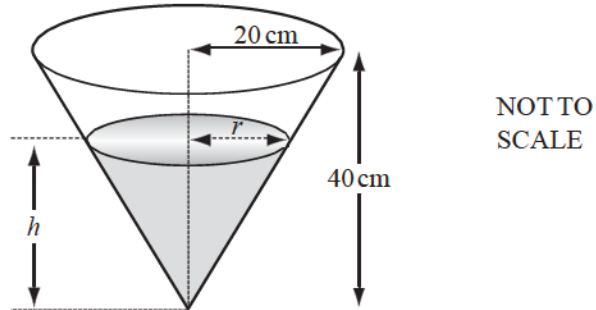
(c) The container has a height of 35 cm.

Calculate the capacity of the container.  
Give your answer in litres.

[3]

(d) Sandra's container is completely filled with water.

All the water is then poured into another container in the shape of a cone.  
The cone has radius 20 cm and height 40 cm.



(i) The diagram shows the water in the cone.

Show that  $r = \frac{h}{2}$ .

[1]

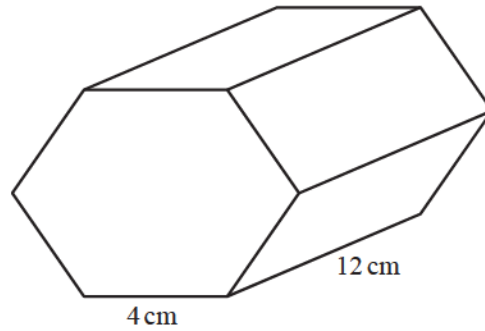
(ii) Find the height,  $h$ , of the water in the cone.

[The volume,  $V$ , of a cone with radius  $r$  and height  $h$  is  $V = \frac{1}{3}\pi r^2 h$ .]

[3]

### Question 3

(a)



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SCALE

The diagram shows a prism of length 12 cm.  
The cross section is a regular hexagon of side 4 cm.

Calculate the total surface area of the prism.

[4]

(b) Water flows through a cylindrical pipe of radius 0.74 cm.  
It fills a 12 litre bucket in 4 minutes.

(i) Calculate the speed of the water through the pipe in centimetres per minute.

[4]

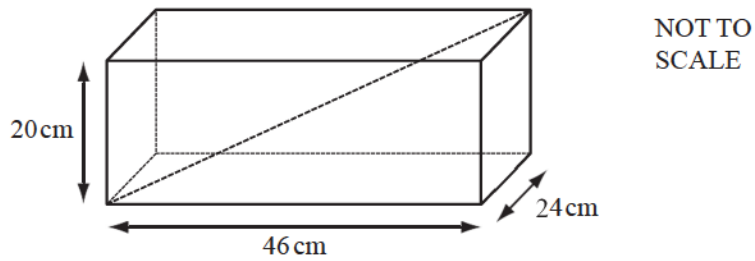
(ii) When the 12 litre bucket is emptied into a circular pool, the water level rises by 5 millimetres.

Calculate the radius of the pool correct to the nearest centimetre.

[5]

## Question 4

(a)



Jose has a fish tank in the shape of a cuboid measuring 46 cm by 24 cm by 20 cm.

Calculate the length of the diagonal shown in the diagram.

[3]

(b) Maria has a fish tank with a volume of  $20\,000\text{ cm}^3$ .

Write the volume of Maria's fish tank as a percentage of the volume of Jose's fish tank.

[3]

(c) Lorenzo's fish tank is mathematically similar to Jose's and double the volume.

Calculate the dimensions of Lorenzo's fish tank.

[3]

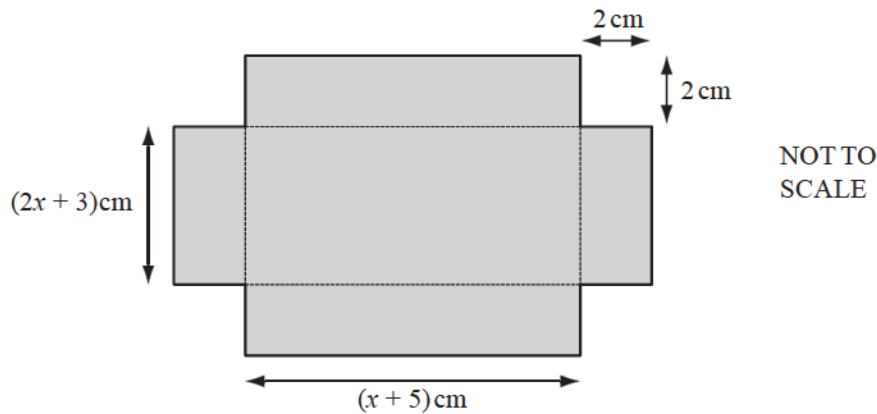
(d) A sphere has a volume of  $20\,000\text{ cm}^3$ . Calculate its radius.

[The volume,  $V$ , of a sphere with radius  $r$  is  $V = \frac{4}{3}\pi r^3$ .]

[3]

## Question 5

A rectangular piece of card has a square of side 2 cm removed from each corner.



- (a) Write expressions, in terms of  $x$ , for the dimensions of the rectangular card before the squares are removed from the corners. [2]
- (b) The diagram shows a net for an open box.  
Show that the volume,  $V \text{ cm}^3$ , of the open box is given by the formula  $V = 4x^2 + 26x + 30$ . [3]
- (c) (i) Calculate the values of  $x$  when  $V = 75$ .  
Show all your working and give your answers correct to two decimal places. [5]
- (ii) Write down the length of the longest edge of the box. [1]

## Question 6

A metal cuboid has a volume of  $1080 \text{ cm}^3$  and a mass of 8 kg.

(a) Calculate the mass of one cubic centimetre of the metal.

Give your answer in grams.

[1]

(b) The base of the cuboid measures 12 cm by 10 cm.

Calculate the height of the cuboid.

[2]

(c) The cuboid is melted down and made into a sphere with radius  $r$  cm.

(i) Calculate the value of  $r$ .

[The volume,  $V$ , of a sphere with radius  $r$  is  $V = \frac{4}{3}\pi r^3$ .]

[3]



(ii) Calculate the surface area of the sphere.

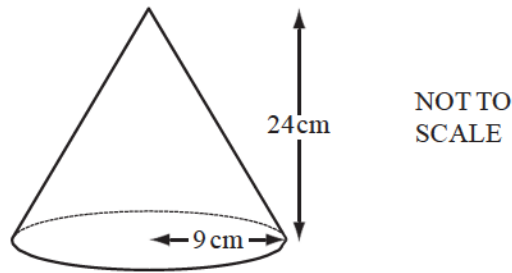
[The surface area,  $A$ , of a sphere with radius  $r$  is  $A = 4\pi r^2$ .] [2]

(d) A larger sphere has a radius  $R$  cm.

The surface area of this sphere is double the surface area of the sphere with radius  $r$  cm in part (c).

Find the value of  $\frac{R}{r}$ . [2]

## Question 7

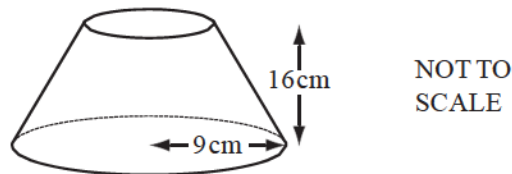


A solid metal cone has base radius 9 cm and vertical height 24 cm.

(a) Calculate the volume of the cone.

[The volume,  $V$ , of a cone with radius  $r$  and height  $h$  is  $V = \frac{1}{3} \pi r^2 h$ .] [2]

(b)



A cone of height 8 cm is removed by cutting parallel to the base, leaving the solid shown above. Show that the volume of this solid rounds to  $1960 \text{ cm}^3$ , correct to 3 significant figures. [4]

3

(c) The  $1960 \text{ cm}^3$  of metal in the solid in part (b) is melted and made into 5 identical cylinders, each of length 15 cm. Show that the radius of each cylinder rounds to 2.9 cm, correct to 1 decimal place. [4]