

Perimeters, Area and Volumes

Difficulty: Hard

Question Paper 1

Level	IGCSE
Subject	Maths (0580/0980)
Exam Board	CIE
Topic	Perimeters, Area and Volumes
Paper	Paper 4
Difficulty	Hard
Booklet	Question Paper 1

Time allowed: 93 minutes

Score: /81

Percentage: /100

Grade Boundaries:

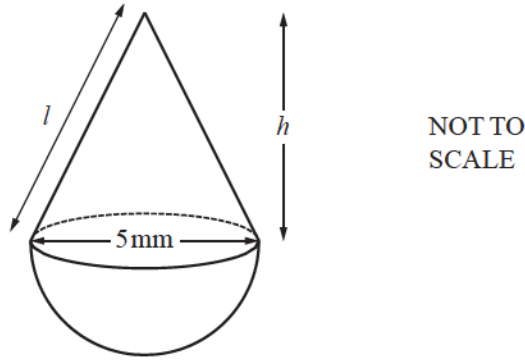
CIE IGCSE Maths (0580)

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



The diagram shows a solid made from a hemisphere and a cone.
The base diameter of the cone and the diameter of the hemisphere are each 5 mm.

- (a) The total surface area of the solid is $\frac{115r}{4} \text{ mm}^2$.

Show that the slant height, l , is 6.5 mm.

[The curved surface area, A , of a cone with radius r and slant height l is $A = \pi r l$.]
[The surface area, A , of a sphere with radius r is $A = 4\pi r^2$.]

[4]

- (b) Calculate the height, h , of the cone.

[3]

- (c) Calculate the volume of the solid.

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

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

[4]

- (d) The solid is made from gold.

1 **cubic centimetre** of gold has a mass of 19.3 grams.

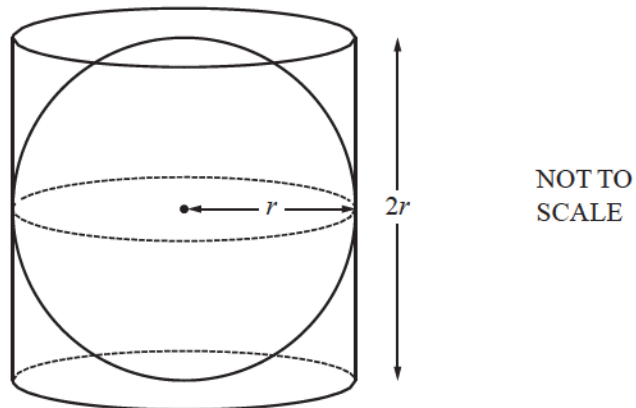
The value of 1 gram of gold is \$38.62.

Calculate the value of the gold used to make the solid.

[3]

Question 2

(a)



A sphere of radius r is inside a closed cylinder of radius r and height $2r$.

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

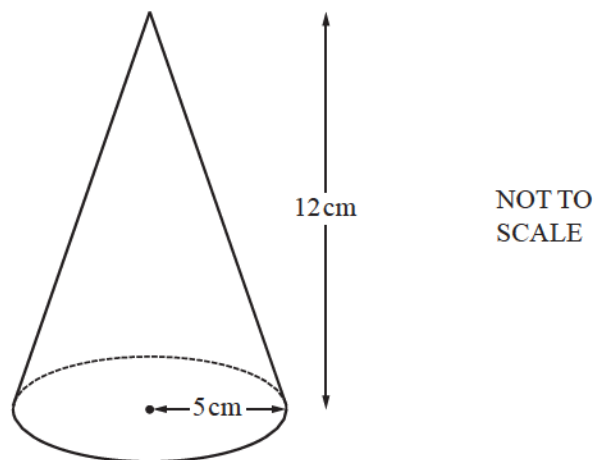
(i) When $r = 8$ cm, calculate the volume inside the cylinder which is **not** occupied by the sphere.

[3]

(ii) Find r when the volume inside the cylinder **not** occupied by the sphere is 36cm^3 .

[3]

(b)



The diagram shows a solid cone with radius 5 cm and perpendicular height 12 cm.

- (i) The **total** surface area is painted at a cost of \$0.015 per cm^2 .

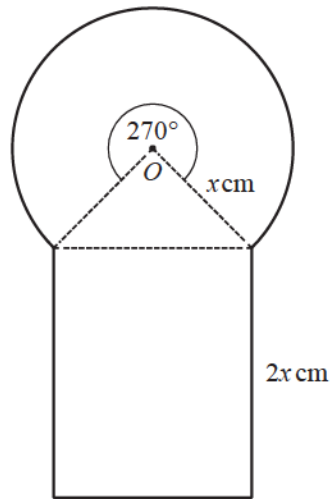
Calculate the cost of painting the cone.

[The curved surface area, A , of a cone with radius r and slant height l is $A = \pi r l$.] [4]

- (ii) The cone is made of metal and is melted down and made into smaller solid cones with radius 1.25 cm and perpendicular height 3 cm.

Calculate the number of smaller cones that can be made. [3]

Question 3



NOT TO
SCALE

The diagram shows a sector of a circle, a triangle and a rectangle.
The sector has centre O , radius x cm and angle 270° .
The rectangle has length $2x$ cm.

The total area of the shape is kx^2 cm².

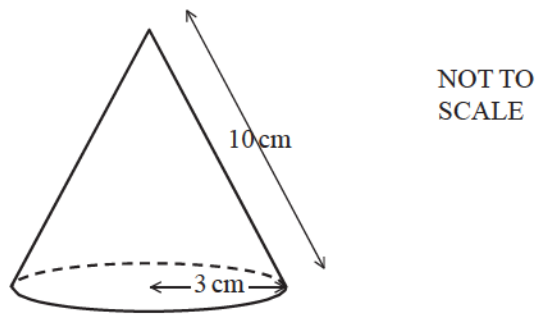
(a) Find the value of k .

[5]

(b) Find the value of x when the total area is 110 cm².

[2]

Question 4



The diagram shows a hollow cone with radius 3 cm and slant height 10 cm.

- (a) (i) Calculate the curved surface area of the cone.

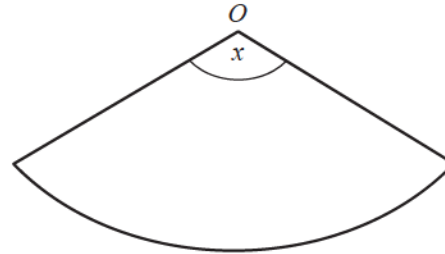
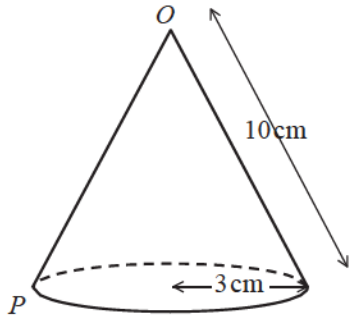
[The curved surface area, A , of a cone with radius r and slant height l is $A = \pi r l$.] [2]

- (ii) Calculate the perpendicular height of the cone. [3]

- (iii) 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)



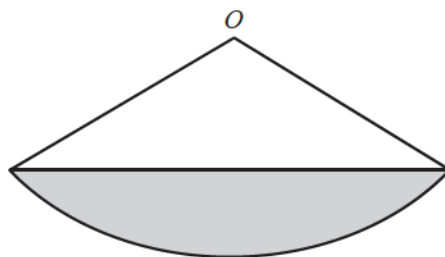
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The cone is cut along the line OP and is opened out into a sector as shown in the diagram.

Calculate the sector angle x .

[4]

(c)



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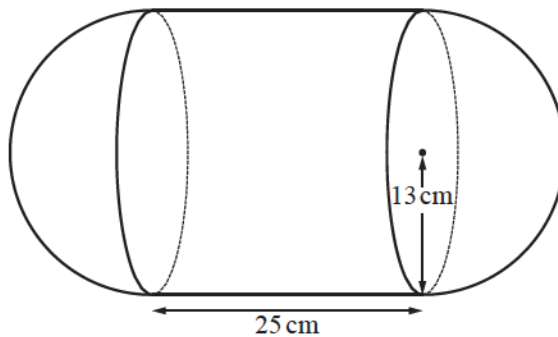
The diagram shows the same sector as in **part (b)**.

Calculate the area of the shaded segment.

[4]

Question 5

(a)



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The diagram shows a solid made up of a cylinder and two hemispheres.
The radius of the cylinder and the hemispheres is 13 cm.
The length of the cylinder is 25 cm.

- (i) One cubic centimetre of the solid has a mass of 2.3 g.

Calculate the mass of the solid.
Give your answer in kilograms.

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

[4]

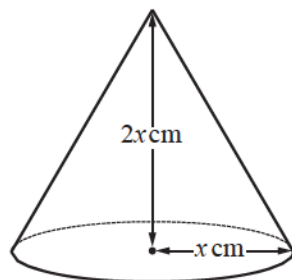
- (ii) The surface of the solid is painted at a cost of \$4.70 per square metre.

Calculate the cost of painting the solid.

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

[4]

(b)



NOT TO
SCALE

The cone in the diagram has radius x cm and height $2x$ cm.
The volume of the cone is 500 cm^3 .

Find the value of x .

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

[3]

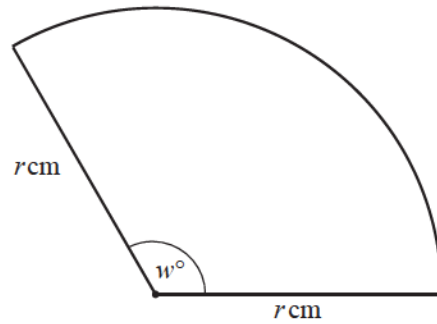
- (c) Two mathematically similar solids have volumes of 180 cm^3 and 360 cm^3 .
The surface area of the smaller solid is 180 cm^2 .

Calculate the surface area of the larger solid.

[3]

Question 6

(a)



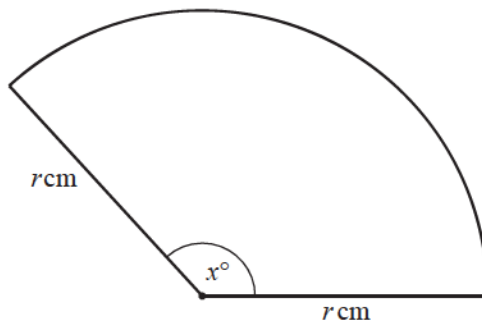
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The area of this sector is r^2 square centimetres.

Find the value of w .

[3]

(b)



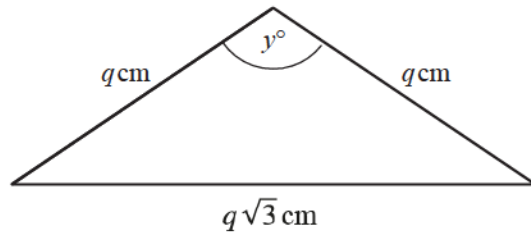
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The perimeter of this sector is $2r + \frac{7\pi r}{10}$ centimetres.

Find the value of x .

[3]

(c)



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The perimeter of the isosceles triangle is $2q + q\sqrt{3}$ centimetres.

Find the value of y .

[4]

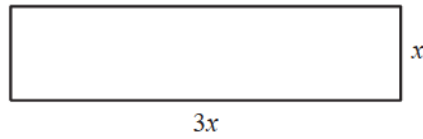
Question 7

The **perimeter** of each of the three shapes is 60cm.

Find x in each part.

(a)

Rectangle

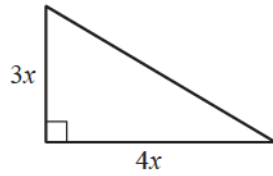


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[2]

(b)

Triangle

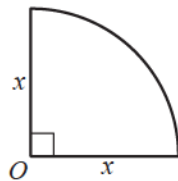


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[3]

(c)

Sector



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[3]