Perimeters, Area and Volumes Difficulty: Hard

Question Paper 5

Level	IGCSE
Subject	Maths (0580/0980)
Exam Board	CIE
Topic	Perimeters, Area and Volumes
Paper	Paper 4
Difficulty	Hard
Booklet	Question Paper 5

Time allowed: **85 minutes**

Score: **/74**

Percentage: **/100**

Grade Boundaries:

CIE IGCSE Maths (0580)

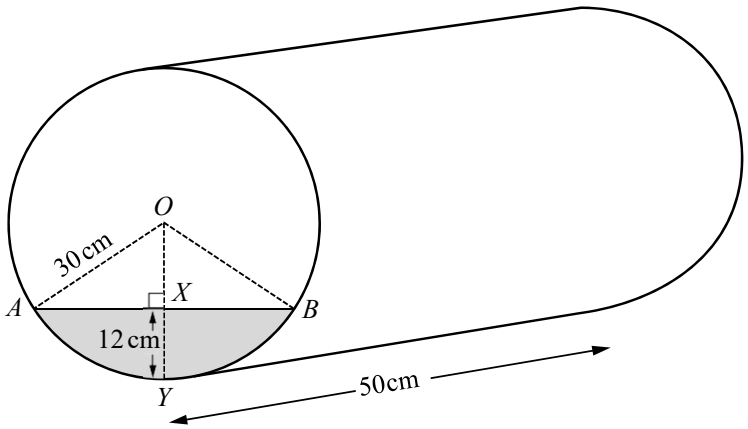
A*	A	B	C	D
>83%	67%	51%	41%	31%

CIE IGCSE Maths (0980)

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

(a) Calculate the volume of a cylinder with radius 30 cm and height 50 cm. [2]

(b)



NOT TO SCALE

A cylindrical tank, radius 30 cm and length 50 cm, lies on its side.
It is partially filled with water.
The shaded segment $AXBY$ in the diagram shows the cross-section of the water.
The greatest depth, XY, is 12 cm.
$OA = OB = 30$ cm.

(i) Write down the length of OX. [1]

(ii) Calculate the angle AOB correct to two decimal places, showing all your working. [3]

(c) Using angle $AOB = 106.3°$, find

(i) the area of the sector $AOBY$, [3]

(ii) the area of triangle AOB, [2]

(iii) the area of the shaded segment $AXBY$. [1]

(d) Calculate the volume of water in the cylinder, giving your answer

(i) in cubic centimetres, [2]

(ii) in litres. [1]

(e) How many more litres must be added to make the tank half full? [2]

In each of the diagrams below, triangle ABC is an isosceles right-angled triangle.
$AB = AC = 6$ cm.
A straight line or a circular arc divides the triangle into two parts, one of which is shaded.

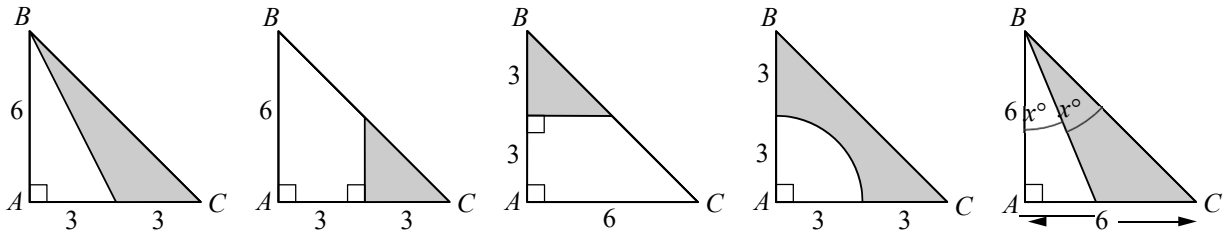


Diagram 1 **Diagram 2** **Diagram 3** **Diagram 4** **Diagram 5**

(a) Which diagram has a shaded region showing **all** the points in the triangle which are

(i) closer to BC than to BA, [1]

(ii) more than 3 cm from A, [1]

(iii) closer to C than to A? [1]

(b) For **each** of the five diagrams, calculate the shaded area. [11]

(a) Calculate the area of an equilateral triangle with sides 10 cm. [2]

(b) Calculate the radius of a circle with circumference 10 cm. [2]

(c)

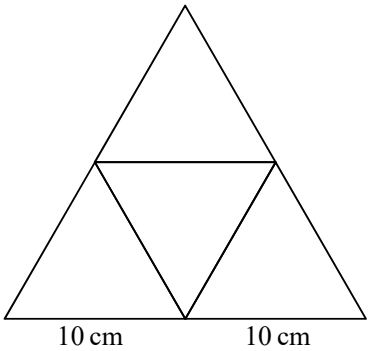


Diagram 1

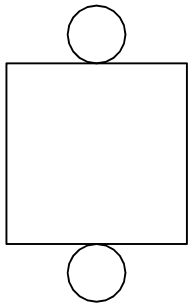


Diagram 2

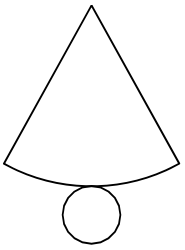


Diagram 3

The diagrams represent the nets of 3 solids. Each straight line is 10 cm long. Each circle has circumference 10 cm. The arc length in Diagram 3 is 10 cm.

(i) Name the solid whose net is Diagram 1. Calculate its surface area. [3]

(ii) Name the solid whose net is Diagram 2. Calculate its volume. [4]

(iii) Name the solid whose net is Diagram 3. Calculate its perpendicular height. [4]

(a)

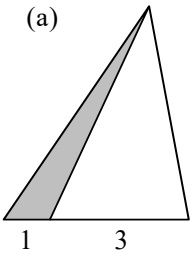


Diagram 1

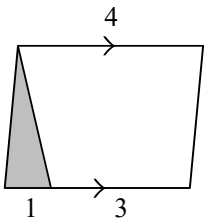


Diagram 2

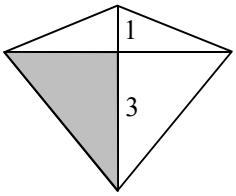


Diagram 3

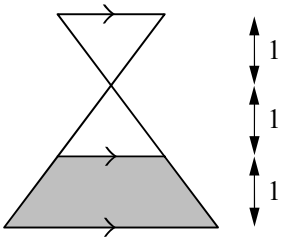


Diagram 4

Diagram 1 shows a triangle with its base divided in the ratio 1 : 3.

Diagram 2 shows a parallelogram with its base divided in the ratio 1 : 3.

Diagram 3 shows a kite with a diagonal divided in the ratio 1 : 3.

Diagram 4 shows two congruent triangles and a trapezium each of height 1 unit.

For each of the four diagrams, write down the **percentage** of the total area which is shaded. [7]

(b)

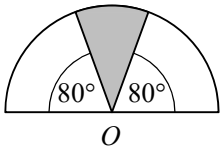


Diagram 5

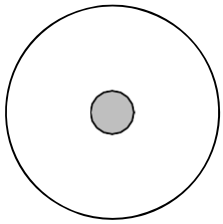


Diagram 6

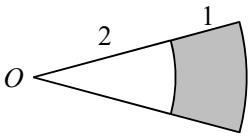


Diagram 7

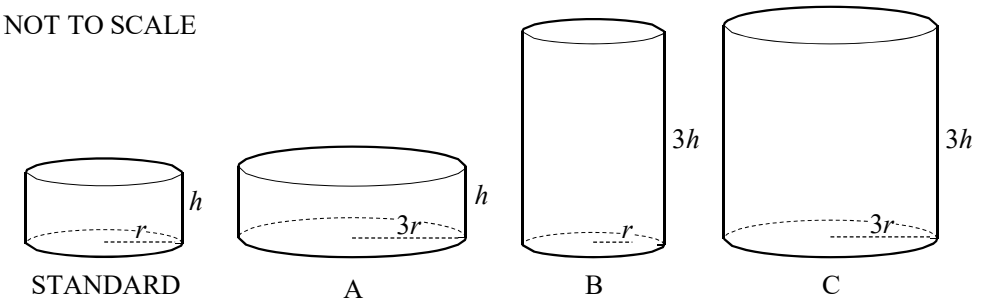
Diagram 5 shows a semicircle, centre O.

Diagram 6 shows two circles with radii 1 unit and 5 units.

Diagram 7 shows two sectors, centre O, with radii 2 units and 3 units.

For each of diagrams 5, 6 and 7, write down the **fraction** of the total area which is shaded. [6]

NOT TO SCALE



Sarah investigates cylindrical plant pots.
The standard pot has base radius r cm and height h cm.
Pot A has radius $3r$ and height h. Pot B has radius r and height $3h$. Pot C has radius $3r$ and height $3h$.

(a) **(i)** Write down the volumes of pots A, B and C in terms of π , r and h. [3]

[2]

(ii) Find in its lowest terms the ratio of the volumes of $A : B : C$.

[2]

(iii) Which one of the pots A, B or C is mathematically similar to the standard pot?
Explain your answer.

(iv) The surface area of the standard pot is S cm^2. Write down in terms of S the surface area of the similar pot. [2]

(b) Sarah buys a cylindrical plant pot with radius 15 cm and height 20 cm. She wants to paint its outside surface (base and curved surface area).

(i) Calculate the area she wants to paint. [2]

(ii) Sarah buys a tin of paint which will cover 30 m^2.
How many plant pots of this size could be painted on their outside surfaces **completely** using this tin of paint? [4]