

3D Shapes

Volumes & Surface Areas

Question Paper 2

Level	IGCSE
Subject	Maths (0580)
Exam Board	Cambridge International Examinations (CIE)
Paper Type	Extended
Topic	Mensuration (Perimeters, Areas & Volumes)
Sub-Topic	3D Shapes: Volumes & Surface Areas
Booklet	Question Paper 2

Time Allowed: 57 minutes

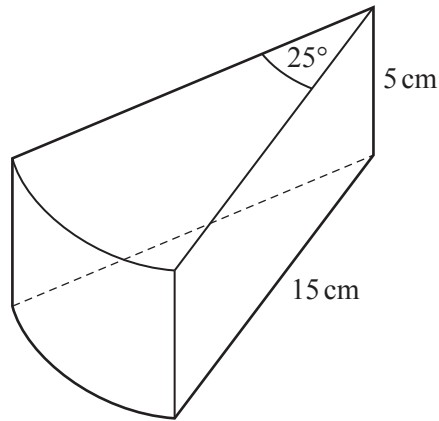
Score: /47

Percentage: /100

Grade Boundaries:

A*	A	B	C	D	E	U
>85%	75%	60%	45%	35%	25%	<25%

1



NOT TO
SCALE

The diagram shows a wooden prism of height 5 cm.
The cross section of the prism is a sector of a circle with sector angle 25° .
The radius of the sector is 15 cm.

Calculate the **total** surface area of the prism.

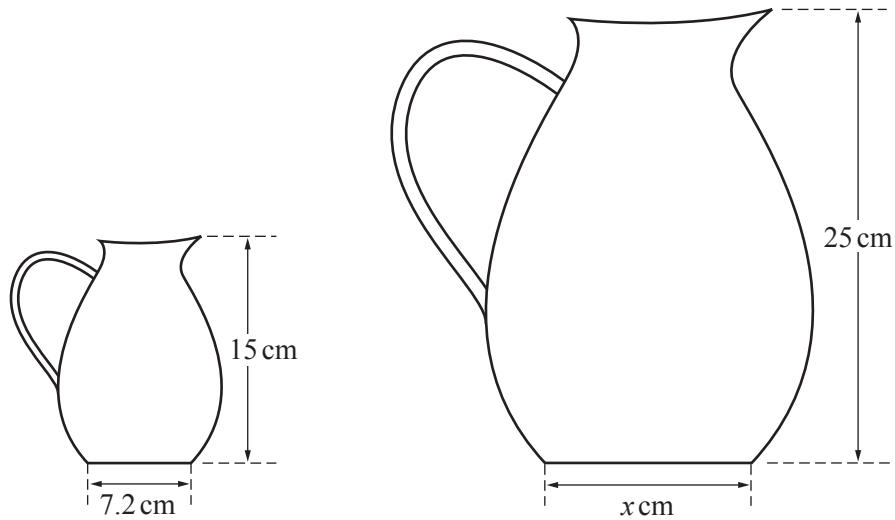
Answer cm^2 [5]

- 2 Calculate the volume of a hemisphere with radius 5 cm.

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

Answer cm³ [2]

3 (a)



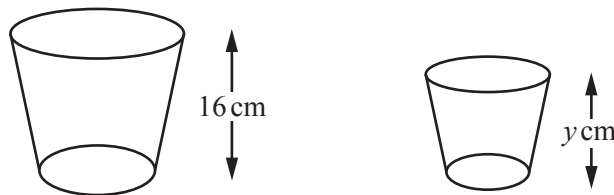
NOT TO SCALE

The diagram shows two jugs that are mathematically similar.

Find the value of x .

Answer(a) $x = \dots\dots\dots$ [2]

(b)



NOT TO SCALE

The diagram shows two glasses that are mathematically similar.
The height of the larger glass is 16 cm and its volume is 375 cm^3 .
The height of the smaller glass is $y \text{ cm}$ and its volume is 192 cm^3 .

Find the value of y .

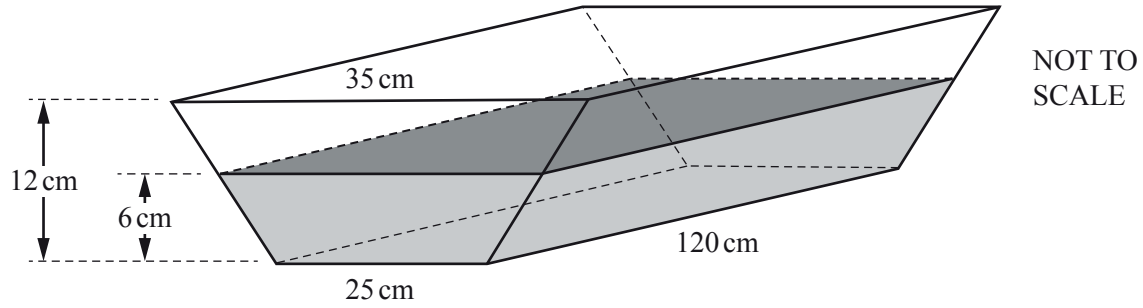
Answer(b) $y = \dots\dots\dots$ [3]

- 4 Two containers are mathematically similar.
Their volumes are 54 cm^3 and 128 cm^3 .
The height of the smaller container is 4.5 cm.

Calculate the height of the larger container.

Answer cm [3]

- 5 The diagram shows a horizontal water trough in the shape of a prism.



The cross section of this prism is a trapezium.
 The trapezium has parallel sides of lengths 35 cm and 25 cm and a perpendicular height of 12 cm.
 The length of the prism is 120 cm.

- (a) Calculate the volume of the trough.

Answer(a) cm³ [3]

- (b) The trough contains water to a depth of 6 cm.

- (i) Show that the volume of water is 19 800 cm³.

Answer (b)(i)

[2]

- (ii) Calculate the percentage of the trough that contains water.

Answer(b)(ii) % [1]

- (c) The water is drained from the trough at a rate of 12 litres per hour.

Calculate the time it takes to empty the trough.
Give your answer in hours and minutes.

Answer(c) h min [4]

- (d) The water from the trough just fills a cylinder of radius r cm and height $3r$ cm.

Calculate the value of r .

Answer(d) $r =$ [3]

- (e) The cylinder has a mass of 1.2 kg.
1 cm³ of water has a mass of 1 g.

Calculate the total mass of the cylinder and the water.
Give your answer in kilograms.

Answer(e) kg [2]

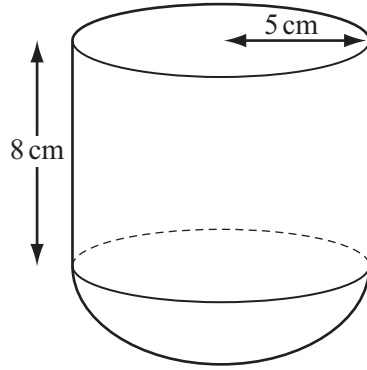
6 The base of a rectangular tank is 1.2 metres by 0.9 metres.

The water in the tank is 53 **centimetres** deep.

Calculate the number of litres of water in the tank.

Answer litres [2]

7 The diagram shows a child's toy.



NOT TO
SCALE

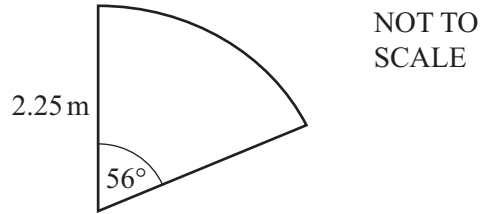
The shape of the toy is a cylinder of radius 5 cm and height 8 cm on top of a hemisphere of radius 5 cm.

Calculate the volume of the toy.

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

Answer cm³ [5]

8



The diagram shows a sand pit in a child's play area.
The shape of the sand pit is a sector of a circle of radius 2.25 m and sector angle 56°.

(a) Calculate the area of the sand pit.

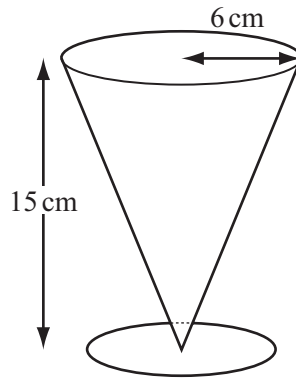
Answer(a) m² [2]

(b) The sand pit is filled with sand to a depth of 0.3 m.

Calculate the volume of sand in the sand pit.

Answer(b) m³ [1]

9



NOT TO SCALE

The diagram shows a glass, in the shape of a cone, for drinking milk.
The cone has a radius of 6 cm and height 15 cm.
A bottle of milk holds 2 litres.

- (a) How many times can the glass be completely filled from the bottle?
[The volume, V , of a cone with radius r and height h is $V = \frac{1}{3}\pi r^2 h$.]

Answer(a) [4]

- (b) Calculate the volume of milk left in the bottle.
Give your answer in cm^3 .

Answer(b) cm^3 [3]