

3D Shapes

Volumes & Surface Areas

Question Paper 15

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 15

Time Allowed: 63 minutes

Score: /52

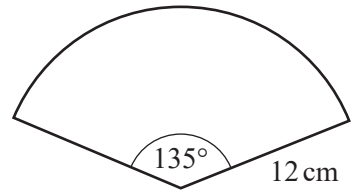
Percentage: /100

Grade Boundaries:

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

1 (a) A sector of a circle has radius 12 cm and an angle of 135° .

- (i) Calculate the length of the arc of this sector.
Give your answer as a multiple of π .

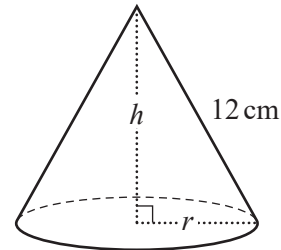


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Answer(a)(i) cm [2]

(ii) The sector is used to make a cone.

- (a) Calculate the base radius, r .



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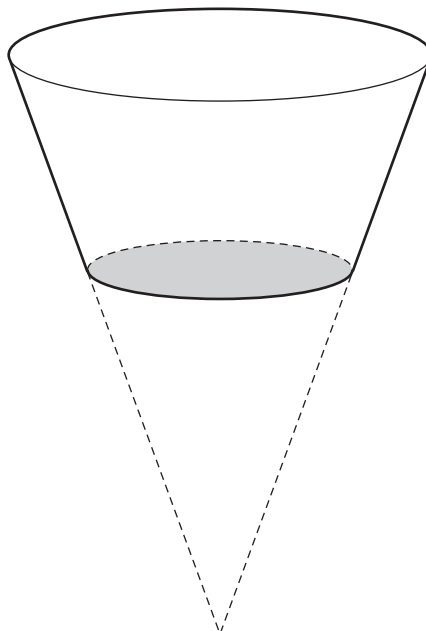
Answer(a)(ii)(a) $r =$ cm [2]

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

Answer(a)(ii)(b) $h =$ cm [3]

(b) The diagram shows a plant pot.

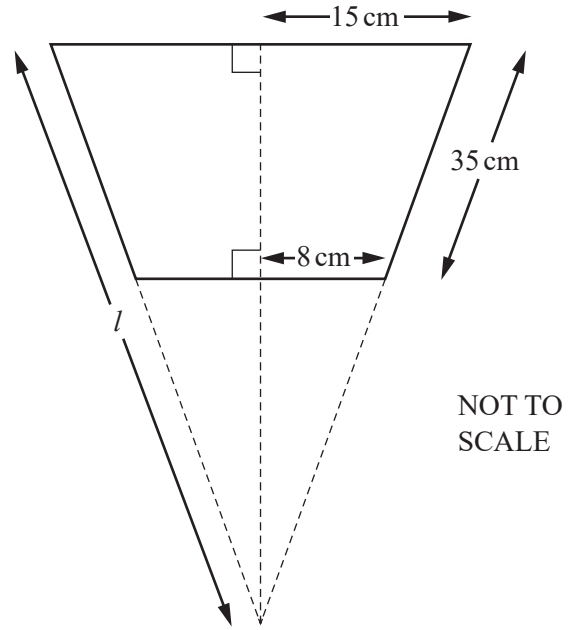
It is made by removing a small cone from a larger cone and adding a circular base.



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This is the cross section of the plant pot.

- (i) Find l .



Answer(b)(i) $l = \dots\dots\dots$ cm [3]

- (ii) Calculate the total surface area of the outside of the plant pot.
 [The curved surface area, A , of a cone with radius r and slant height l is $A = \pi rl$.]

Answer(b)(ii) $\dots\dots\dots$ cm² [3]

- (c) Some cones are mathematically similar.
 For these cones, the mass, M grams, is proportional to the cube of the base radius, r cm.
 One of the cones has mass 1458 grams and base radius 4.5 cm.

- (i) Find an expression for M in terms of r .

Answer(c)(i) $M = \dots\dots\dots$ [2]

- (ii) Two of the cones have radii in the ratio 2 : 3.

Write down the ratio of their masses.

Answer(c)(ii) $\dots\dots\dots : \dots\dots\dots$ [1]

2 The volume of a cuboid is 878 cm^3 , correct to the nearest cubic centimetre.

The length of the base of the cuboid is 7 cm, correct to the nearest centimetre.

The width of the base of the cuboid is 6 cm, correct to the nearest centimetre.

Calculate the lower bound for the height of the cuboid.

Answer cm [3]

- 3 (a) Luc is painting the doors in his house.
He uses $\frac{3}{4}$ of a tin of paint for each door.

Work out the least number of tins of paint Luc needs to paint 7 doors.

Answer(a) [3]

- (b) Jan buys tins of paint for \$17.16 each.

For how much does Jan sell each tin of paint?

Answer(b) \$ [2]

- (c) The cost of \$17.16 for each tin of paint is 4% more than the cost in the previous year.

Work out the cost of each tin of paint in the previous year.

Answer(c) \$ [3]

- (d) In America a tin of paint costs \$17.16 .
In Italy the same tin of paint costs €13.32 .
The exchange rate is \$1 = €0.72 .

Calculate, in dollars, the difference in the cost of the tin of paint.

Answer(d) \$ [2]

- (e) Paint is sold in cylindrical tins of height 11 cm.
Each tin holds 750 ml of paint.

(i) Write 750 ml in cm^3 .

Answer(e)(i) cm^3 [1]

- (ii) Calculate the radius of the tin.
Give your answer correct to 1 decimal place.

Answer(e)(ii) cm [3]

- (iii) A mathematically similar tin has a height of 22 cm.
How many **litres** of paint does this tin hold?

Answer(e)(iii) litres [2]

- (f) The mass of a tin of paint is 890 grams, correct to the nearest 10 grams.
Work out the upper bound of the total mass of 10 tins of paint.

Answer(f) g [1]

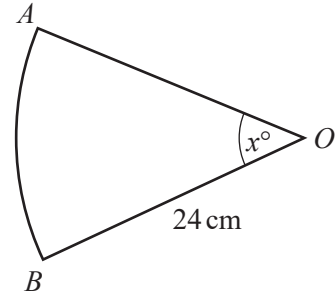
- (g) The probability that a tin of paint is dented is 0.07 .
Out of 3000 tins of paint, how many would you expect to be dented?

Answer(g) [2]

- (h) T m^3 per minute.
How many 750

Answer(h) [3]

- 4 (a) The diagram shows a sector of a circle with centre O and radius 24 cm.



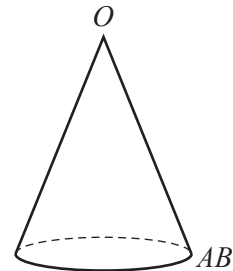
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- (i) The total perimeter of the sector is 68 cm.

Calculate the value of x .

Answer(a)(i) $x = \dots\dots\dots$ [3]

- (ii) The points A and B of the sector are joined together to make a hollow cone. The arc AB becomes the circumference of the base of the cone.



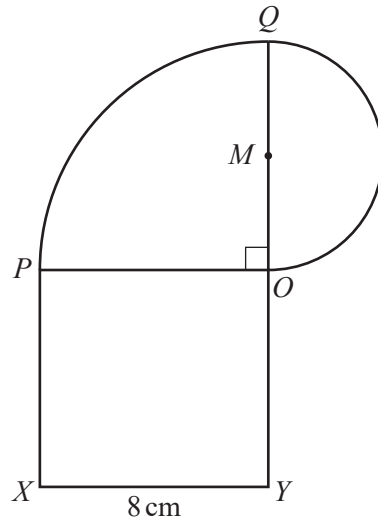
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Calculate the volume of the cone.

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

Answer(a)(ii) $\dots\dots\dots$ cm³ [6]

(b)



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The diagram shows a shape made from a square, a quarter circle and a semi-circle.

$OPXY$ is a square of side 8 cm.

OPQ is a quarter circle, centre O .

The line OMQ is the diameter of the semi-circle.

Calculate the area of the shape.

Answer(b) cm^2 [5]