E4.4 3D Shapes: Volumes & Surface Areas

Question Paper

Level	IGCSE
Subject	Maths (0580)
Exam Board	Cambridge International Examinations (CIE)
Level	Core
Topic	E4. Mensuration (Perimeters, Areas and Volumes)
Sub-Topic	E4.4 3D shapes: Volumes & Surface Areas
Booklet	Question Paper

Time Allowed: **56 minutes**

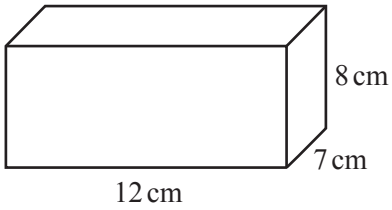
Score: **/47**

Percentage: **/100**

Grade Boundaries:

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

1 **(a)**



NOT TO SCALE

Calculate the volume of this cuboid.

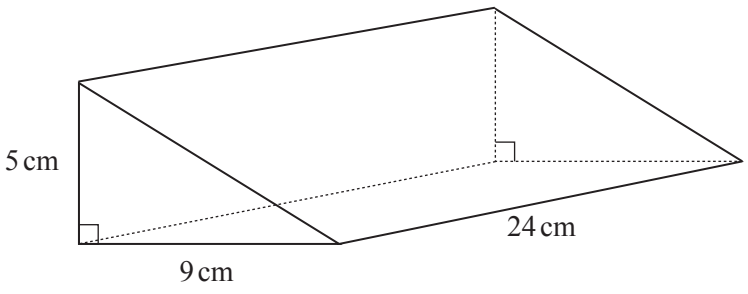
..... cm^3 [2]

(b) Another cuboid has width 6 cm, height 9 cm and volume 675 cm^3.

Calculate the length of this cuboid.

..... cm [2]

(c) The diagram shows a right-angled triangular prism.



NOT TO SCALE

Calculate the volume of this prism.

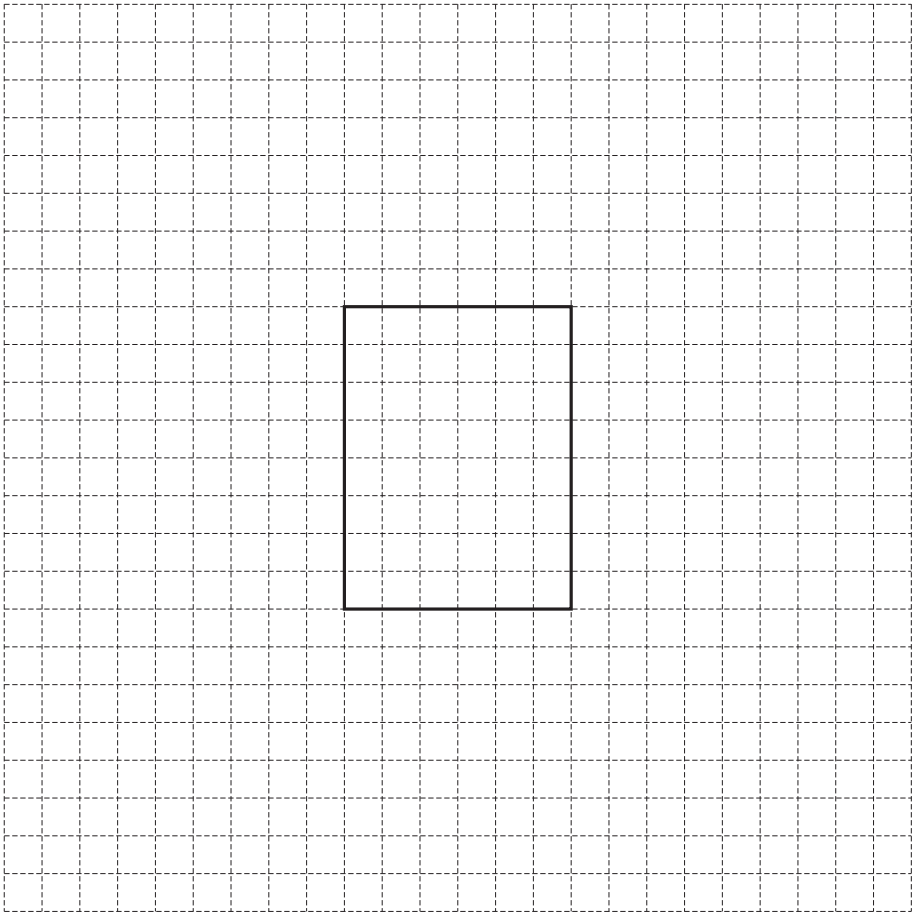
..... cm^3 [3]

2 **(a)** A cuboid has length 4 cm, width 3 cm and height 1.5 cm.

(i) Calculate the volume of the cuboid.

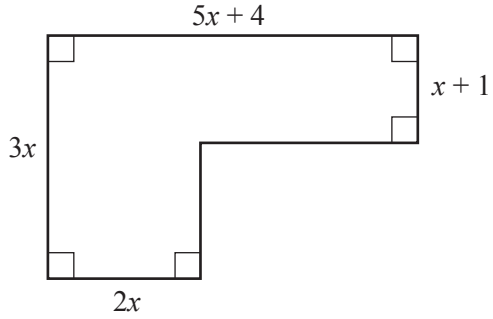
..... cm^3 [2]

(ii) On the grid, draw an accurate net of the cuboid.
One face has been drawn for you.



[3]

(b)



NOT TO SCALE

In the diagram, all lengths are in centimetres.

(i) Find an expression, in terms of x, for the perimeter of the shape.
Give your answer in its simplest form.

..... [2]

(ii) The perimeter of the shape is 72 cm.

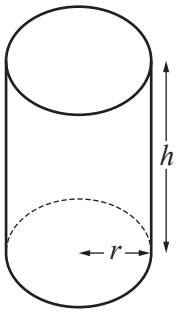
Work out the value of x.

$x =$ ..... [2]

(iii) Calculate the total area of the shape.

..... cm^2 [3]

3 The diagram shows a cylindrical flower vase with radius, r, and height, h.



NOT TO SCALE

The volume, V, of the vase is $V = \pi r^2 h$.

The surface area, A, of the vase is $A = 2\pi rh + \pi r^2$.

(a) The vase has radius 4 cm and height 15 cm.

(i) Calculate the volume of the vase.
Write down the units of your answer.

.... [3]

(ii) Calculate the surface area of the vase.

..... cm^2 [2]

(b) Make h the subject of the formula $A = 2\pi rh + \pi r^2$.

$h =$ ..... [2]

(c) Factorise completely.

$2\pi rh + \pi r^2$

..... [2]

(d) Another cylindrical flower vase has radius 6 cm and height 22.5 cm.

(i) For this vase and the vase in **part (a)** the ratio of the radii is 4 : 6 and the ratio of the heights is 15 : 22.5 .

Write these ratios in their simplest form.

4 : 6 = ... : .....

15 : 22.5 = ... : ..... [2]

(ii) Write down a mathematical word to complete the statement.

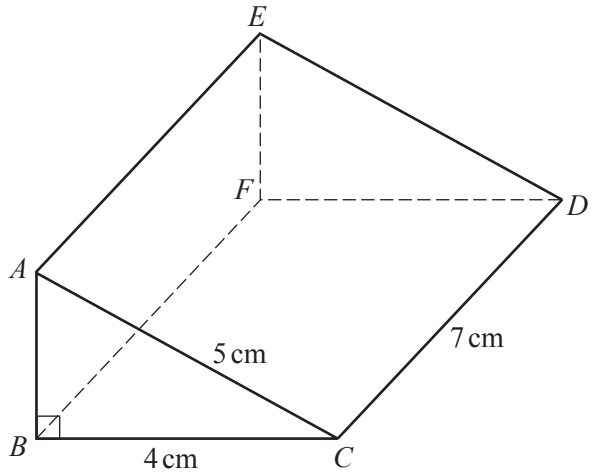
The ratios show that the two vases are ..... [1]

4 A cube has volume 1331 cm^3.

Calculate the length of one edge of the cube.

..... cm [1]

5



NOT TO SCALE

The diagram shows a solid in the shape of a triangular prism.
$AC = 5$ cm, $BC = 4$ cm and $CD = 7$ cm.
Angle $ABC = 90°$.

(a) What does the word *prism* tell you about the solid in the diagram?

..... [1]

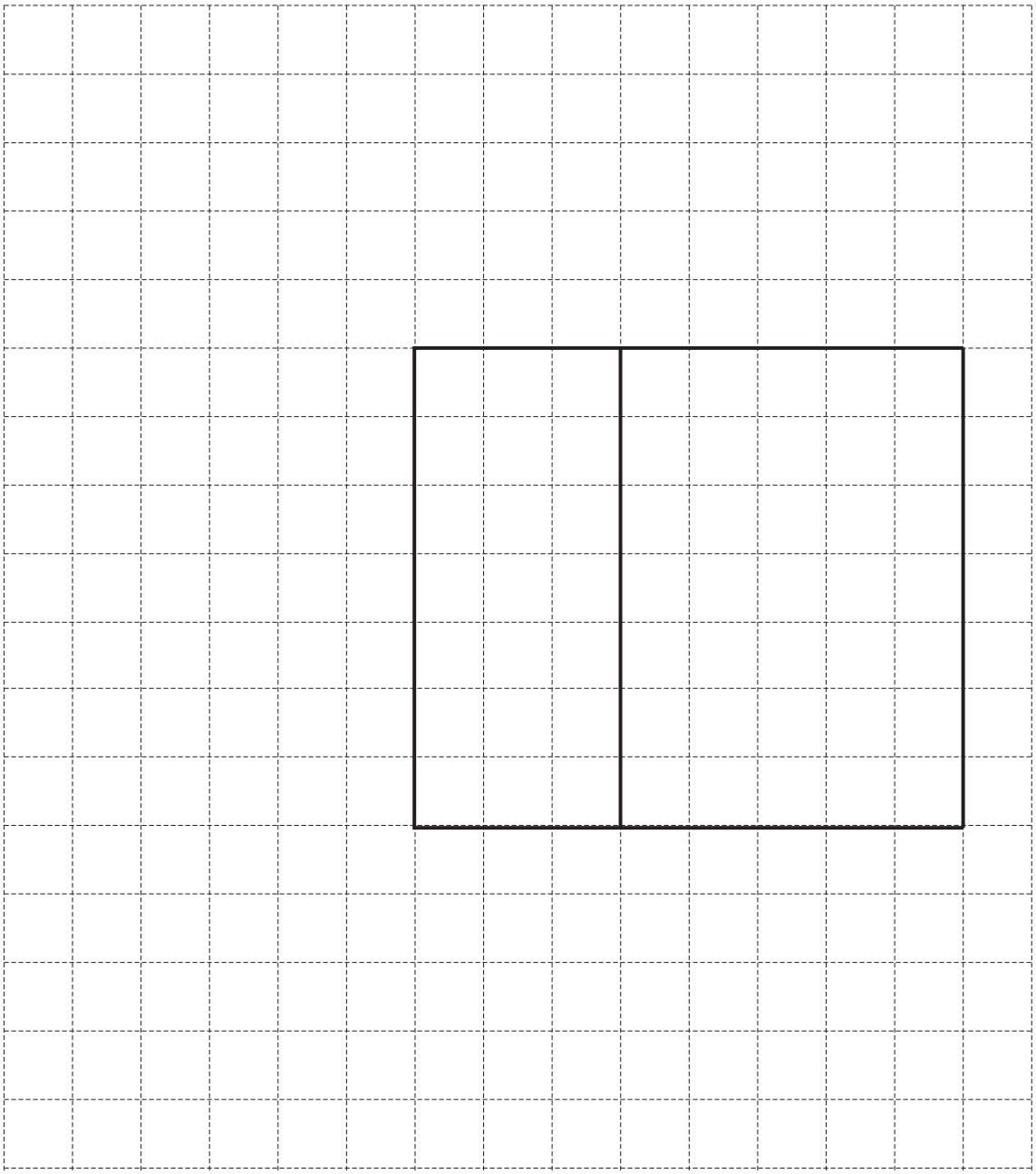
(b) Show that $AB = 3$ cm.

[2]

(c) Calculate the volume of the prism.
Give the units of your answer.

.... [4]

(d) On the 1 cm^2 grid, complete the net of the prism.
Two faces have been drawn for you.



[3]

(e) Calculate the surface area of the prism.

..... cm^2 [2]

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6 A cuboid has volume 288 cm^3.

(a) The cuboid has length 12 cm and width 5 cm.

Calculate the height of the cuboid.

Answer(a) ..... cm [2]

(b) 1 cm^3 of the cuboid has a mass of 4 g.

Work out the mass of the cuboid.

Answer(b) ..... g [1]
