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Topical Worksheets for Cambridge O LEVEL Mathematics D (4024)

Mensuration

1st edition, for examination until 2025

1 A cone has radius 4.5 cm and height 10.4 cm.

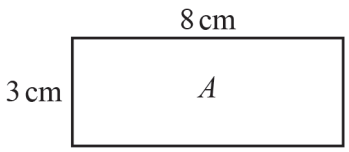
Calculate, in terms of π, the volume of the cone.

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

..... cm^3 [2]

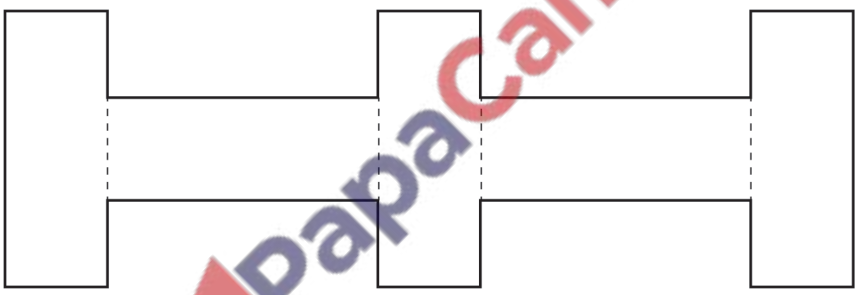
[Total: 2]

2 Rectangle A measures 3 cm by 8 cm.



NOT TO SCALE

Five rectangles congruent to A are joined to make a shape.



NOT TO SCALE

Work out the perimeter of this shape.

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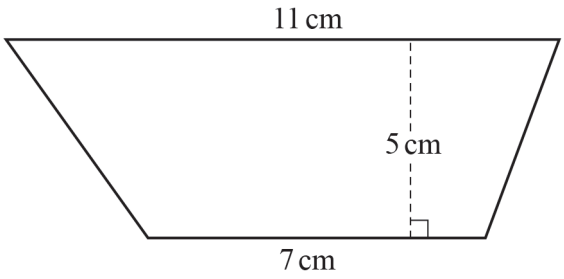
..... cm [2]

[Total: 2]

3



NOT TO SCALE

Calculate the area of the trapezium.

..... cm^2 [2]

[Total: 2]

4 Change 5.3 kilometres into metres.

..... m [1]

[Total: 1]

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5 A solid cylinder has radius 3 cm and height 4.5 cm.

Calculate the total surface area of the cylinder.

..... cm^2 [4]

[Total: 4]

6 The total perimeter of a semicircle is 19.02 cm.

Calculate the radius of the semicircle.

..... cm [3]

[Total: 3]

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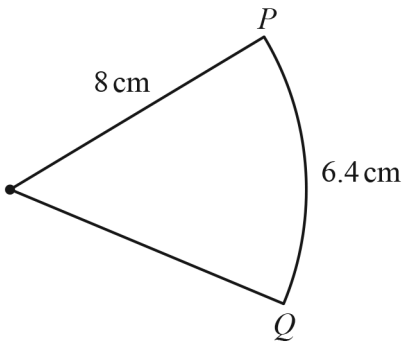
7



NOT TO SCALE

The diagram shows a sector of a circle of radius 8 cm.
The length of the arc PQ is 6.4 cm.

Find the area of the sector.

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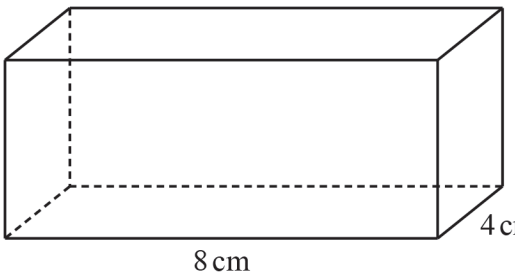
..... cm^2 [4]

[Total: 4]

8



NOT TO SCALE

The diagram shows a cuboid.

Calculate the volume of the cuboid.

..... cm^3 [1]

[Total: 1]

9 Calculate the area of the sector of a circle with radius 65 mm and sector angle 42°.
Give your answer in square centimetres.

..... cm^2 [3]

[Total: 3]

10 The diagram shows the net of a triangular prism on a 1 cm^2 grid.

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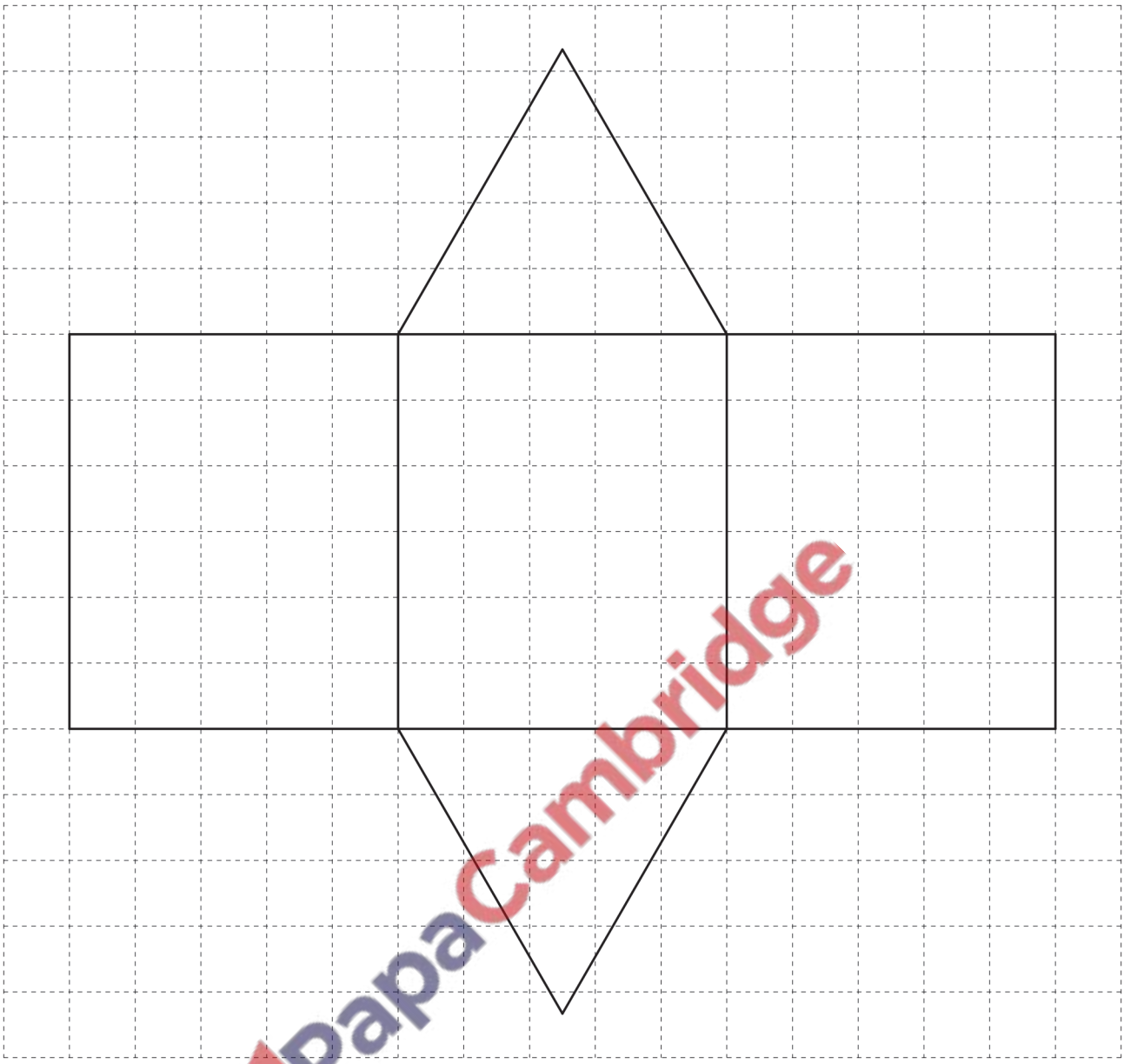

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(a) Write down the mathematical name for the type of triangle shown on the grid.

..... [1]

(b) **(i)** Measure the perpendicular height of the triangle.

..... cm [1]

(ii) Calculate the area of the triangle.

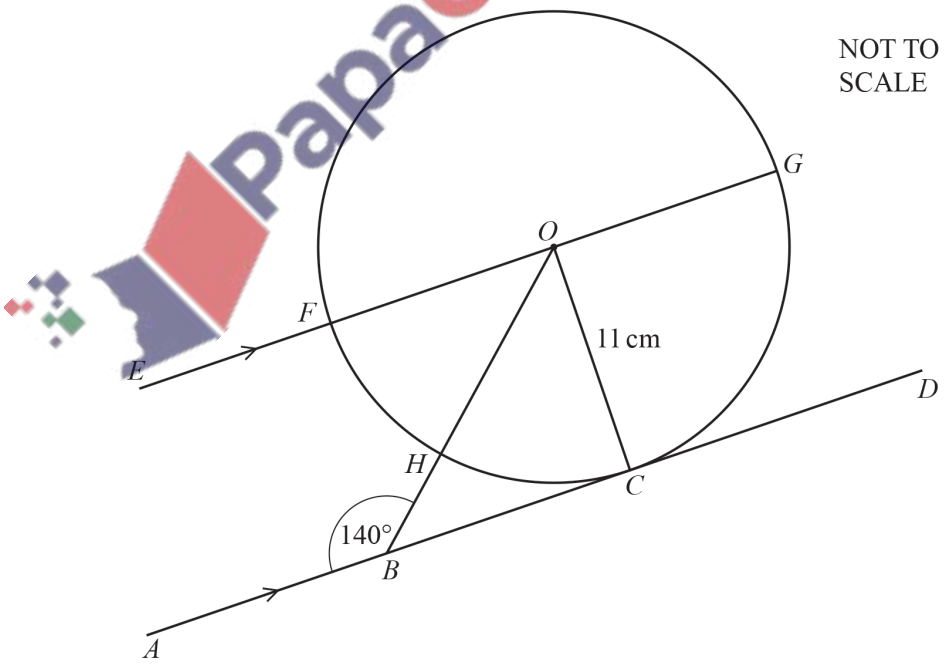
..... cm^2 [2]

(iii) Calculate the volume of the triangular prism.

..... cm^3 [2]

[Total: 6]

11



The diagram shows a circle, centre O, radius 11 cm.
C, F, G and H are points on the circumference of the circle.
The line AD touches the circle at C and is parallel to the line EG.

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B is a point on AD and angle $ABO = 140°$.

(a) Write down the mathematical name of the straight line AD.

..... [1]

(b) **(i)** Find, in terms of π, the circumference of the circle.

..... cm [2]

(ii) Work out angle FOH.

Angle FOH = ... [2]

(iii) Calculate the length of the minor arc FH.

..... cm [2]

(c) **(i)** Give a reason why angle BCO is 90°.

..... [1]

(ii) Show that $BC = 13.11$ cm, correct to 2 decimal places.

[3]

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(iii) Calculate BH.

$BH =$ ..... cm [3]

[Total: 14]

12 A cube has a surface area of 384 cm^2.

Find the length of one of its sides.

..... cm [3]

[Total: 3]

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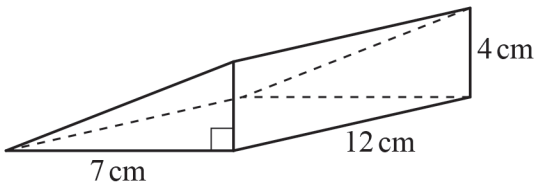
13



NOT TO SCALE

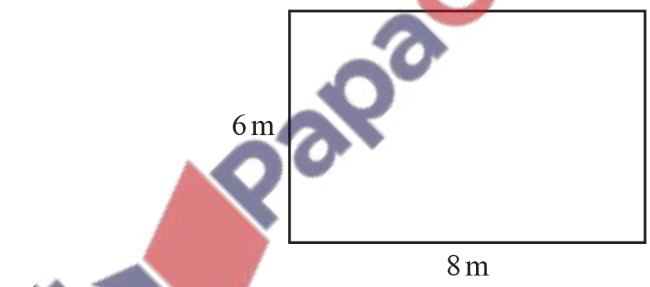
The diagram shows a right-angled triangular prism.

Work out the volume of the prism.

..... cm^3 [3]

[Total: 3]

14



NOT TO SCALE

The diagram shows a rectangular patio with sides 6 m and 8 m.

(a) Work out the perimeter of the patio.

..... m [1]

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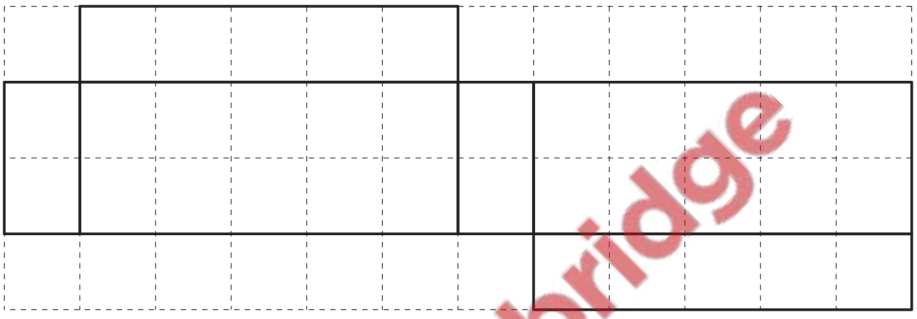
(b) Henri covers the patio floor with square tiles.
The tiles are 0.5 m by 0.5 m.

Work out the number of tiles he needs.

..... [2]

[Total: 3]

15 The diagram shows the net of a solid on a 1 cm^2 grid.



(a) Write down the mathematical name for the solid.

..... [1]

(b) Work out the volume of the solid.

..... cm^3 [2]

[Total: 3]

16 The diagram shows a line AB on a 1 cm^2 grid.

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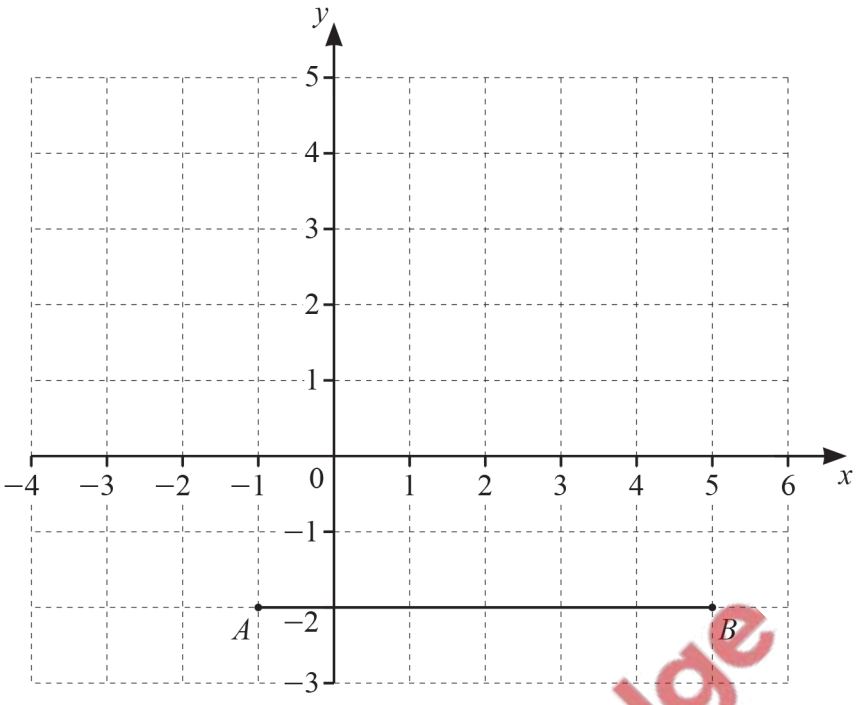

(a) Write down the coordinates of point A.

(..... , ...) [1]

(b) Write down the vector $\overrightarrow{AB}$.

$\begin{pmatrix} \quad \\ \quad \end{pmatrix}$ [1]

(c) $\overrightarrow{BC} = \begin{pmatrix} -2 \\ 5 \end{pmatrix}$

Mark point C on the grid. [1]

(d) **(i)** Work out $\overrightarrow{AB} + \overrightarrow{BC}$.

$\begin{pmatrix} \quad \\ \quad \end{pmatrix}$ [1]

(ii) Complete this statement.

$\overrightarrow{AB} + \overrightarrow{BC} =$ $\longrightarrow$ .....

[1]

(e) A, B and C are three vertices of a parallelogram, $ABCD$.

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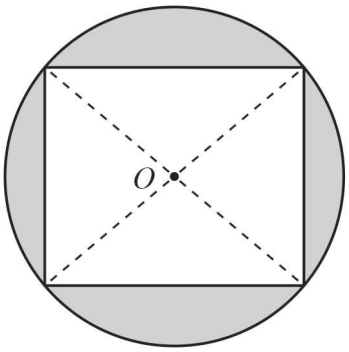
(i) Mark point D on the diagram and draw the parallelogram $ABCD$. [1]

(ii) Work out the area of the parallelogram.
Give the units of your answer.

.... [2]

[Total: 8]

17



NOT TO SCALE

The diagram shows a square with vertices on the circumference of a circle, centre O.
The radius of the circle is 6 cm.

Work out the shaded area.

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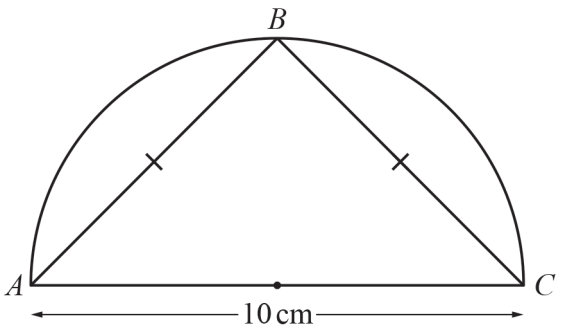
..... cm^2 [5]

[Total: 5]

18



NOT TO SCALE

The diagram shows a semicircle with diameter AC.
B is a point on the circumference and $AB = BC$.

Work out the area of triangle ABC.

..... cm^2 [3]

[Total: 3]

19 A square has perimeter $12x$.

Find an expression, in terms of x, for the area of the square.
Give your answer in its simplest form.

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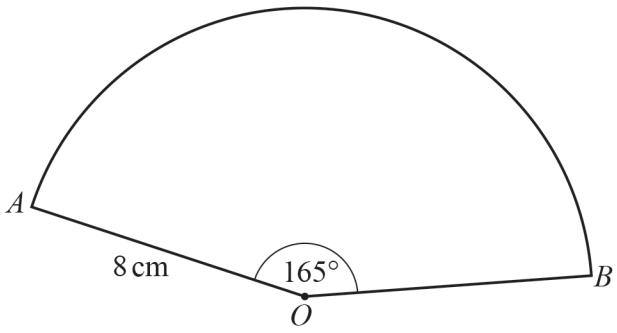
..... [3]

[Total: 3]

20



NOT TO SCALE

The diagram shows a sector of a circle with centre O, radius 8 cm and sector angle 165°.

(a) Calculate the total perimeter of the sector.

..... cm [3]

(b) The surface area of a sphere is the same as the area of the sector.

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

..... cm [4]

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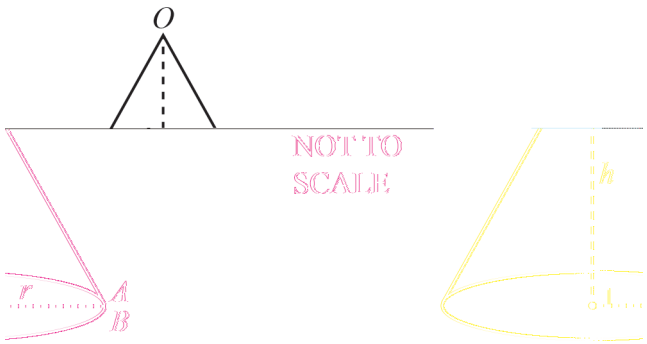
(c)



A cone is made from the sector by joining OA to OB.

(i) Calculate the radius, r, of the cone.

$r =$ ..... cm [2]

(ii) Calculate the volume of the cone.

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

..... cm^3 [4]

[Total: 13]

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21 A cylinder with radius 6 cm and height h cm has the same volume as a sphere with radius 4.5 cm.

Find the value of h.

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

$h =$ ..... [3]

[Total: 3]

22 A solid metal cube of side 20 cm is melted down and made into 40 solid spheres, each of radius r cm.

Find the value of r.

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

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$r =$ ..... [3]

[Total: 3]

23 A solid cylinder has radius x cm and height $\frac{7x}{2}$ cm.
The surface area of a sphere with radius R cm is equal to the total surface area of the cylinder.

Find an expression for R in terms of x.
[The surface area, A, of a sphere with radius r is $A = 4\pi r^2$.]

$R =$ ..... [3]

[Total: 3]

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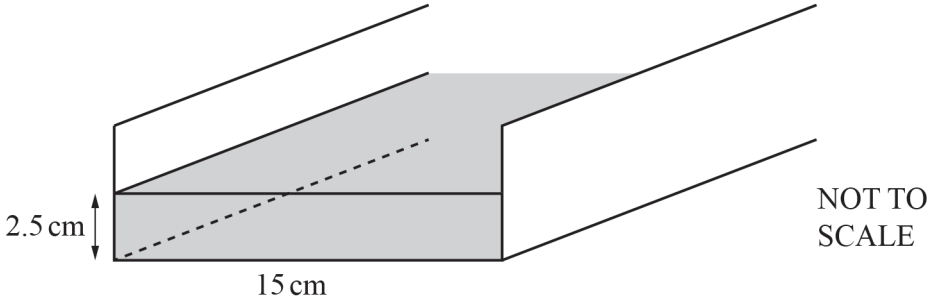
24



Water flows at a speed of 20 cm/s along a rectangular channel into a lake.
The width of the channel is 15 cm.
The depth of the water is 2.5 cm.

Calculate the amount of water that flows from the channel into the lake in 1 hour.
Give your answer in litres.

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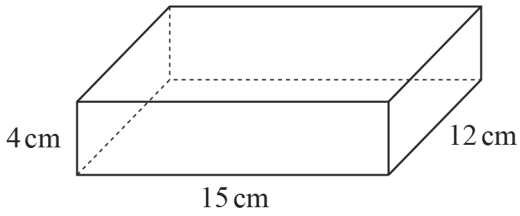
..... litres [4]

[Total: 4]

25



NOT TO SCALE

The diagram shows a cuboid measuring 15 cm by 12 cm by 4 cm.

Calculate the surface area of the cuboid.

..... cm^2 [3]

[Total: 3]

26 Calculate the area of a circle with radius 12 cm.

..... cm^2 [2]

[Total: 2]

27 Change 4.6 metres to centimetres.

..... cm [1]

[Total: 1]

28 Complete the statements.

3.5 kg = ... g

1.4 m^2 = ... cm^2 [2]

[Total: 2]

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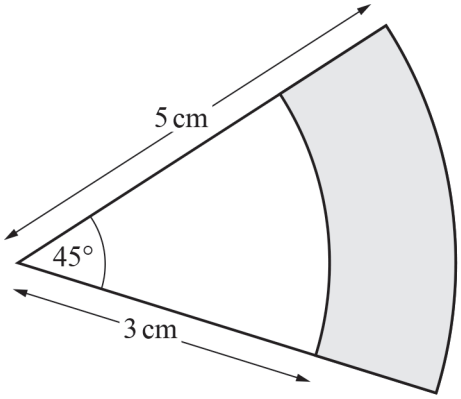
29



NOT TO SCALE

The diagram shows two sectors of circles with the same centre.

Calculate the shaded area.

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..... cm^2 [3]

[Total: 3]

30 A pipe is completely full of water.
Water flows through the pipe at a speed of 1.2 m/s into a tank.
The cross-section of the pipe has an area of 6 cm^2.

Calculate the number of litres of water flowing into the tank in 1 hour.

..... litres [4]

[Total: 4]

31 Soraya makes rectangular flags.

(a) On the rectangle, draw the lines of symmetry. [2]

(b) Each flag measures 1.2 m by 1.8 m.

Calculate the area of one flag.

..... m^2 [2]

[Total: 4]

32 A cuboid measures 5 cm by 4 cm by 2 cm.

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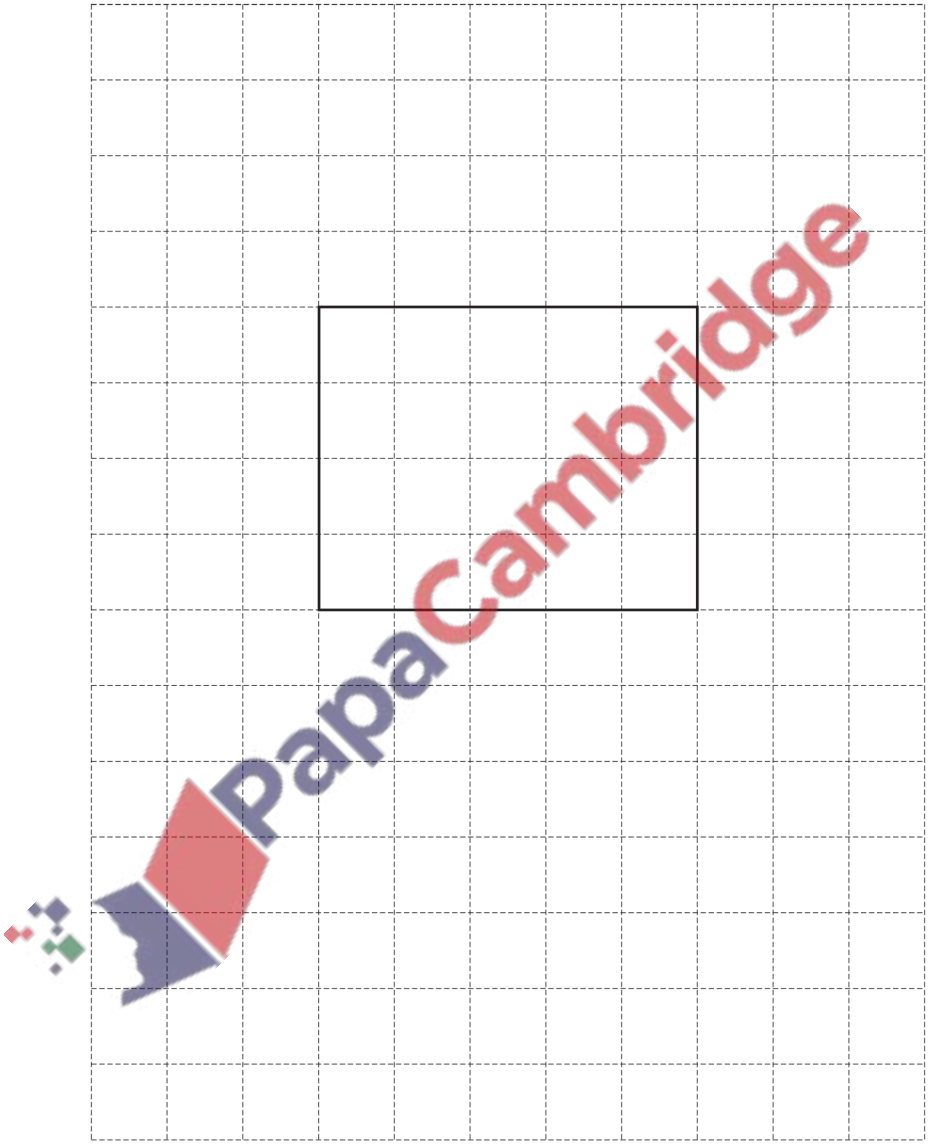
(a) Calculate the volume of this cuboid.
Give the units of your answer.

.... [3]

(b) On the 1 cm^2 grid, draw an accurate net of this cuboid.
One face has been drawn for you.



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[3]

[Total: 6]

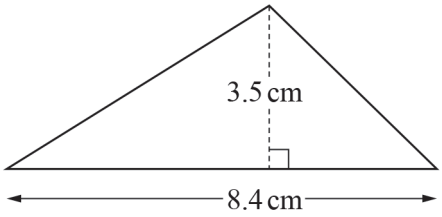
33 The length of the edge of a cube is 8 cm.

Calculate the surface area of this cube.

..... cm^2 [2]

[Total: 2]

34



NOT TO SCALE

Calculate the area of this triangle.

..... cm^2 [2]

[Total: 2]

35 Change 4365 metres into centimetres.

..... cm [1]

[Total: 1]

36 Change 3670 centimetres to metres.

..... m [1]

[Total: 1]

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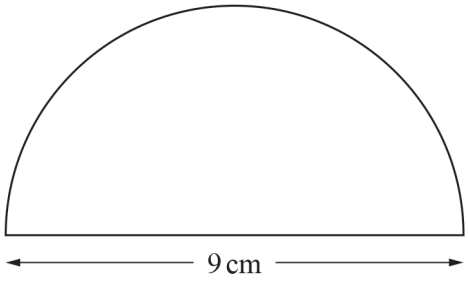
37 The volume of a cuboid is $180\,cm^3$.
The base is a square of side length 6 cm.

Calculate the height of this cuboid.

..... cm [2]

[Total: 2]

38



NOT TO SCALE

The diagram shows a semicircle with diameter 9 cm.

Calculate the total perimeter of this semicircle.

..... cm [3]

[Total: 3]

39 A closed box in the shape of a cuboid has length 5 cm, width 4 cm and height 2 cm.

Calculate the volume of the box.

..... cm^3 [2]

[Total: 2]

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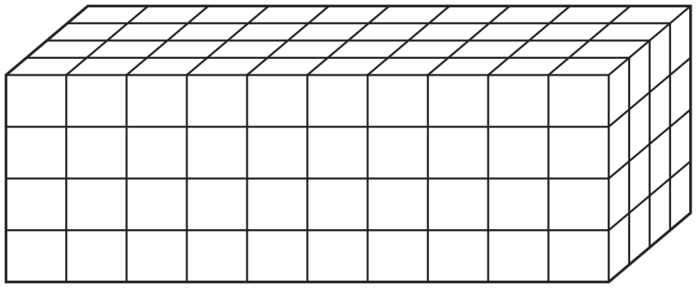
40 The diagram shows a solid cuboid made of identical cubes.



NOT TO SCALE

Work out the number of cubes in the cuboid.

..... [1]

[Total: 1]

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