# 2D Perimeters & Areas
# Difficulty: Easy

## Question Paper 1

| | |
|---|---|
| Level | IGCSE |
| Subject | Maths (0580/0980) |
| Exam Board | CIE |
| Topic | Mensuration (Perimeters, Areas & Volumes) |
| Sub-Topic | 2D Perimeters & Areas |
| Paper | Paper 2 |
| Difficulty | Easy |
| Booklet | Question Paper 1 |

**Time allowed:** **30 minutes**

**Score:** **/23**

**Percentage:** **/100**

**Grade Boundaries:**

**CIE IGCSE Maths (0580)**

| A* | A | B | C | D | E |
|---|---|---|---|---|---|
| >88% | 76% | 63% | 51% | 40% | 30% |

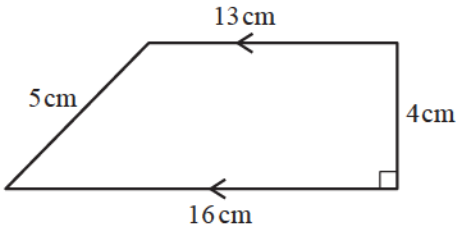
**CIE IGCSE Maths (0980)**

| 9 | 8 | 7 | 6 | 5 | 4 | 3 |
|---|---|---|---|---|---|---|
| >94% | 85% | 77% | 67% | 57% | 47% | 35% |

The area of a triangle is $528\text{cm}^2$.
The length of its base is 33 cm.

Calculate the perpendicular height of the triangle. [2]

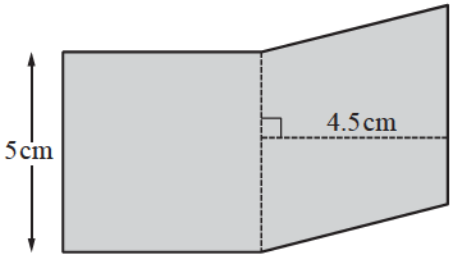
## Question 2




NOT TO SCALE

Calculate the area of this trapezium. [2]

The shaded shape is made by joining a square and a rhombus.




NOT TO SCALE

Work out

**(a)** the perimeter of the shaded shape,

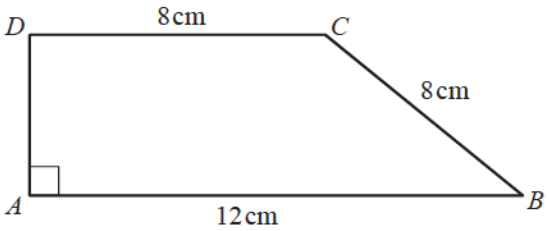
[1]

**(b)** the area of the shaded shape.

[2]

## Question 4



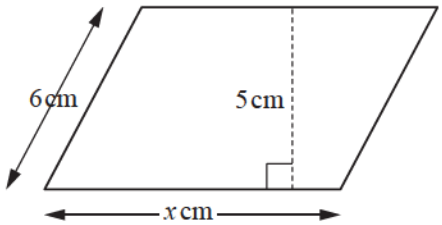



NOT TO SCALE

Calculate the area of this trapezium.

[4]

## Question 5

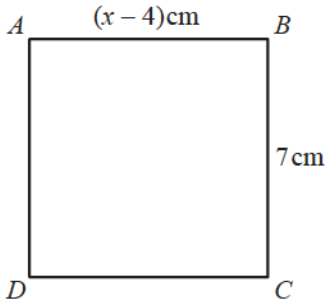


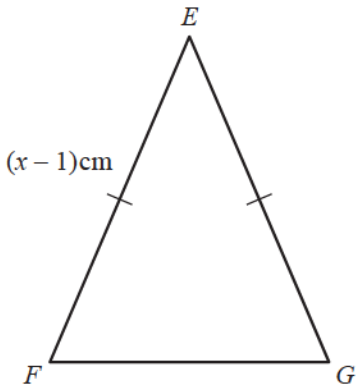

NOT TO SCALE

The area of this parallelogram is 51.5 $cm^2$.

Work out the value of $x$.

[2]




NOT TO SCALE

**(a)** $ABCD$ is a square.

Find the value of $x$.

[1]

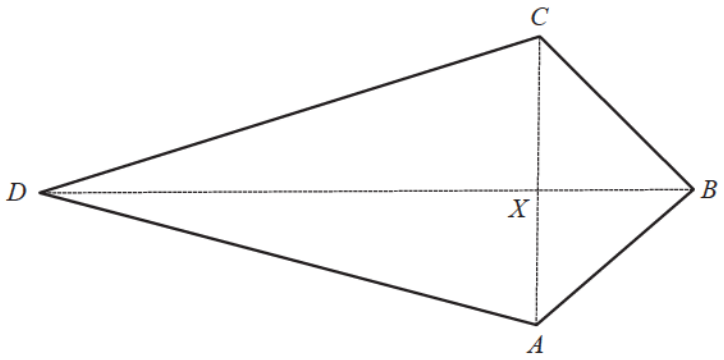
**(b)** Square $ABCD$ and isosceles triangle $EFG$ have the same perimeter.

Work out the length of $FG$.

[2]

An equilateral triangle has sides of length 6.2 cm, correct to the nearest millimetre.

Complete the statement about the perimeter, $P$ cm, of the triangle. [2]




NOT TO SCALE

$ABCD$ is a kite.
The diagonals $AC$ and $BD$ intersect at $X$.
$AC = 12$ cm, $BD = 20$ cm and $DX : XB = 3 : 2$ .

**(a)** Calculate angle $ABC$.

[3]

[2]

**(b)** Calculate the area of the kite.

# 2D Perimeters & Areas
# Difficulty: Easy

## Question Paper 2

| | |
|---|---|
| Level | IGCSE |
| Subject | Maths (0580/0980) |
| Exam Board | CIE |
| Topic | Mensuration (Perimeters, Areas & Volumes) |
| Sub-Topic | 2D Perimeters & Areas |
| Paper | Paper 2 |
| Difficulty | Easy |
| Booklet | Question Paper 2 |

**Time allowed:** **31 minutes**

**Score:** **/24**

**Percentage:** **/100**

**Grade Boundaries:**

**CIE IGCSE Maths (0580)**

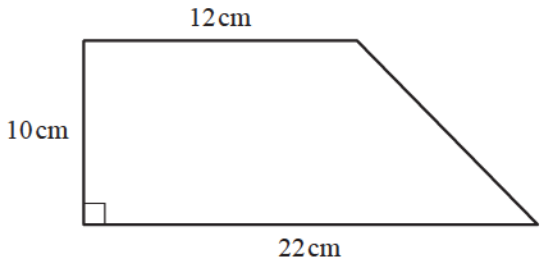
| A* | A | B | C | D | E |
|---|---|---|---|---|---|
| >88% | 76% | 63% | 51% | 40% | 30% |

**CIE IGCSE Maths (0980)**

| 9 | 8 | 7 | 6 | 5 | 4 | 3 |
|---|---|---|---|---|---|---|
| >94% | 85% | 77% | 67% | 57% | 47% | 35% |

## Question 1

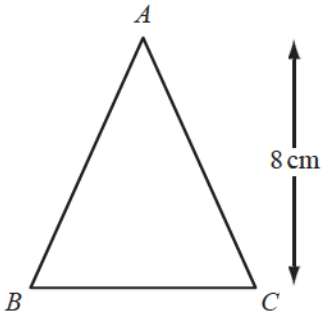





NOT TO SCALE

Find the area of the trapezium. [2]

## Question 2



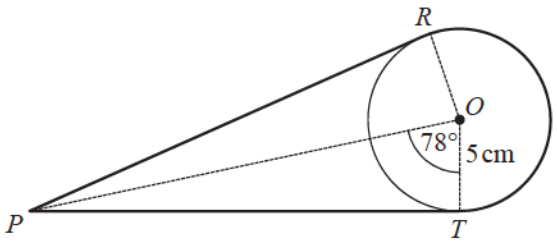

NOT TO SCALE

Triangle $ABC$ has a height of 8 cm and an area of 42 cm$^2$.

Calculate the length of $BC$. [2]

## Question 3






NOT TO SCALE

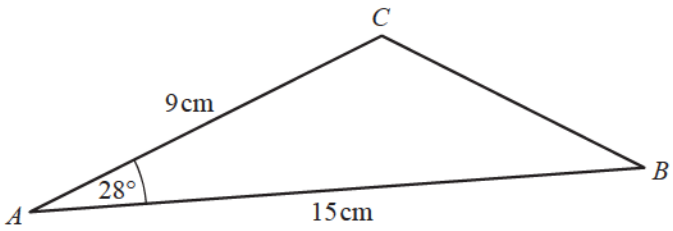
$R$ and $T$ are points on a circle, centre $O$, with radius 5 cm.
$PR$ and $PT$ are tangents to the circle and angle $POT = 78°$.

A thin rope goes from $P$ to $R$, around the major arc $RT$ and then from $T$ to $P$.

Calculate the length of the rope.

[6]

## Question 4




NOT TO SCALE

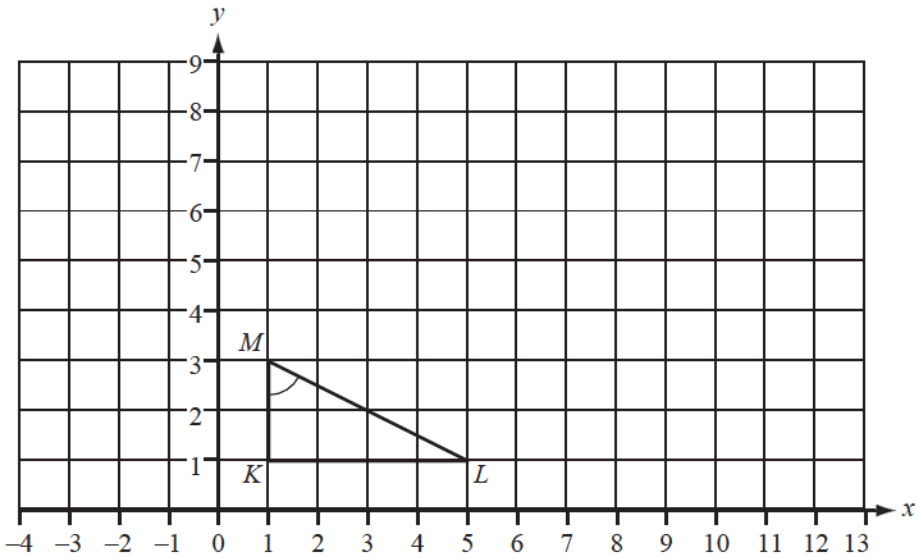
Calculate the area of triangle $ABC$.

[2]

## Question 5



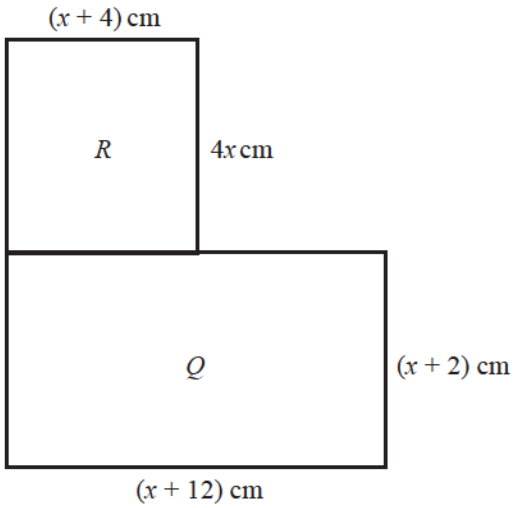
A large rectangular card measures 80 centimetres by 90 centimetres.
Maria uses **all** this card to make small rectangular cards measuring 40 **millimetres** by 15 **millimetres**.
Calculate the number of small cards. [2]




The triangle $KLM$ is shown on the grid.

(a) Calculate angle $KML$. [2]

(b) On the grid, draw the shear of triangle $KLM$, with a shear factor of 3 and the $x$-axis invariant. [2]




NOT TO SCALE

(a) (i) Write down an expression for the area of rectangle $R$. [1]

(ii) Show that the total area of rectangles $R$ and $Q$ is $5x^2 + 30x + 24$ square centimetres. [1]

(b) The total area of rectangles $R$ and $Q$ is 64 $cm^2$.
Calculate the value of $x$ correct to 1 decimal place. [4]

# 2D Perimeters & Areas
# Difficulty: Hard

## Question Paper 1

| | |
|---|---|
| Level | IGCSE |
| Subject | Maths (0580/0980) |
| Exam Board | CIE |
| Topic | Mensuration (Perimeters, Areas & Volumes) |
| Sub-Topic | 2D Perimeters & Areas |
| Paper | Paper 2 |
| Difficulty | Hard |
| Booklet | Question Paper 1 |

**Time allowed:** **32 minutes**

**Score:** **/25**

**Percentage:** **/100**

**Grade Boundaries:**

**CIE IGCSE Maths (0580)**

| A* | A | B | C | D | E |
|---|---|---|---|---|---|
| >88% | 76% | 63% | 51% | 40% | 30% |

**CIE IGCSE Maths (0980)**

| 9 | 8 | 7 | 6 | 5 | 4 | 3 |
|---|---|---|---|---|---|---|
| >94% | 85% | 77% | 67% | 57% | 47% | 35% |

The base of a triangle is 9 cm correct to the nearest cm.
The area of this triangle is 40 $cm^2$ correct to the nearest 5 $cm^2$.

Calculate the upper bound for the perpendicular height of this triangle. [3]

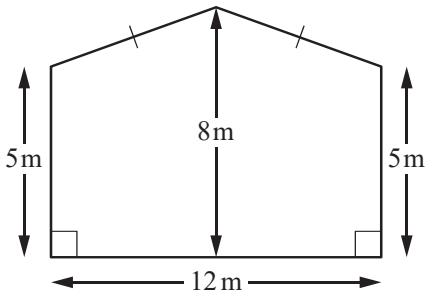
## Question 2

The scale on a map is 1 : 20 000.
The area of a lake on the map is 1.6 square centimetres.

Calculate the actual area of the lake.
Give your answer in square metres. [3]

## Question 3





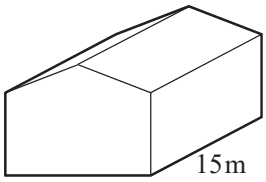

NOT TO SCALE

The diagram shows the front face of a barn.
The width of the barn is 12 m.
The height of the barn is 8 m.
The sides of the barn are both of height 5 m.

**(a)** Work out the area of the front face of the barn. [3]

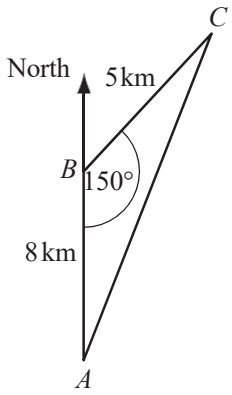
**(b)** The length of the barn is 15 m.

Work out the volume of the barn.




NOT TO SCALE

[1]

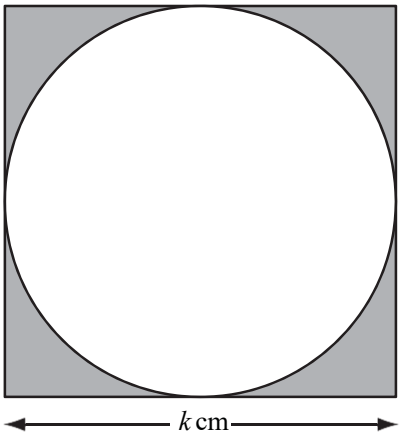



NOT TO SCALE

A helicopter flies 8 km due north from $A$ to $B$. It then flies 5 km from $B$ to $C$ and returns to $A$. Angle $ABC = 150°$.

(a) Calculate the area of triangle $ABC$. [2]

(b) Find the bearing of $B$ from $C$. [2]



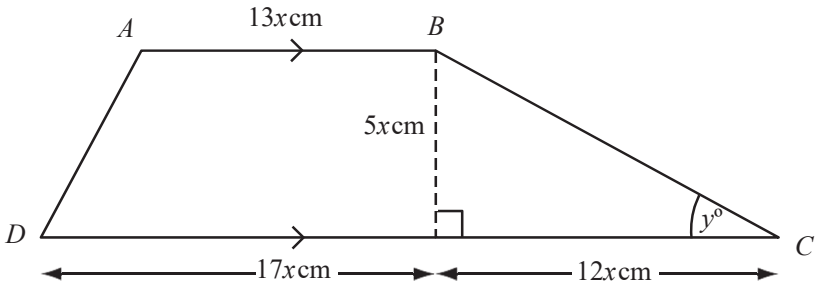

The diagram shows a square of side $k$ cm.

The circle inside the square touches all four sides of the square.

(a) The shaded area is $A$ cm$^2$.

Show that $4A = 4k^2 - \pi k^2$. [2]

(b) Make $k$ the subject of the formula $4A = 4k^2 - \pi k^2$. [3]




NOT TO SCALE

*ABCD* is a trapezium.

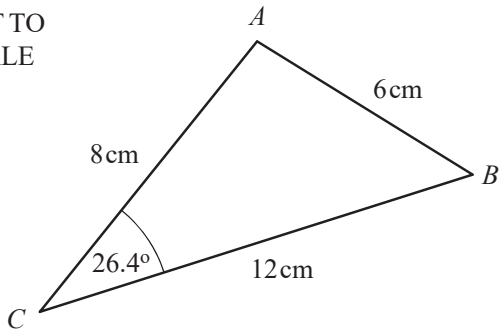
(a) Find the area of the trapezium in terms of $x$ and simplify your answer. [2]

(b) Angle $BCD = y°$. Calculate the value of $y$. [2]

In triangle $ABC$, $AB = 6$ cm, $AC = 8$ cm and $BC = 12$ cm. Angle $ACB = 26.4°$.
Calculate the area of the triangle $ABC$.

[2]

NOT TO SCALE



# Circle Problems
# Difficulty: Easy

## Question Paper 1

| | |
|---|---|
| Level | IGCSE |
| Subject | Maths (0580/0980) |
| Exam Board | CIE |
| Topic | Mensuration |
| Sub-Topic | Circle Problems |
| Paper | Paper 2 |
| Difficulty | Easy |
| Booklet | Question Paper 1 |

**Time allowed:** **37 minutes**

**Score:** **/29**

**Percentage:** **/100**

**Grade Boundaries:**

**CIE IGCSE Maths (0580)**

| A* | A | B | C | D | E |
|---|---|---|---|---|---|
| >88% | 76% | 63% | 51% | 40% | 30% |

**CIE IGCSE Maths (0980)**

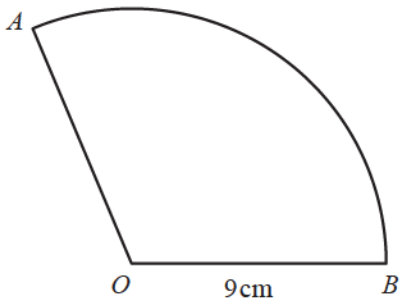
| 9 | 8 | 7 | 6 | 5 | 4 | 3 |
|---|---|---|---|---|---|---|
| >94% | 85% | 77% | 67% | 57% | 47% | 35% |

## Question 1



$AB$ is an arc of a circle, centre $O$, radius 9 cm.
The length of the arc $AB$ is $6\pi$ cm.
The area of the sector $AOB$ is $k\pi$ cm$^2$.

Find the value of $k$.

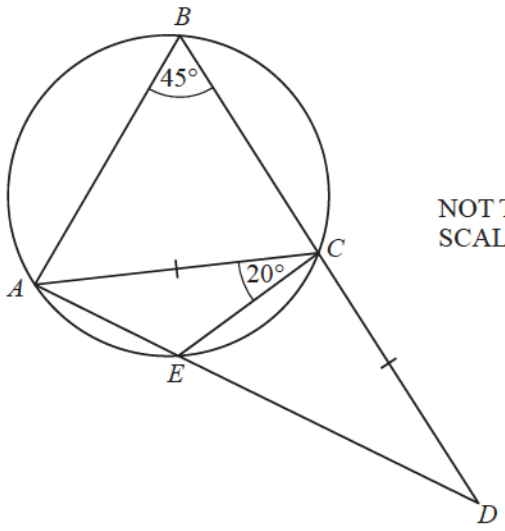



NOT TO SCALE

[3]

## Question 2






NOT TO SCALE

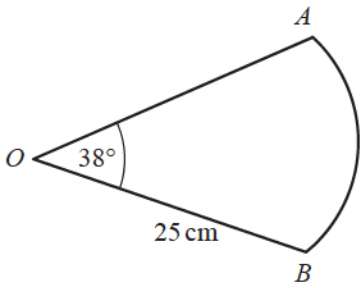
$ABCE$ is a cyclic quadrilateral.
$AED$ and $BCD$ are straight lines.
$AC = CD$, angle $ABC = 45°$ and angle $ACE = 20°$.

Work out angle $ECD$.

[3]

## Question 3





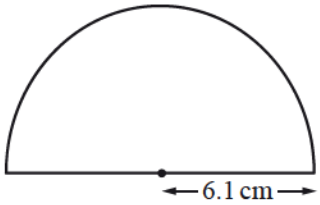

NOT TO SCALE

The diagram shows a sector of a circle, centre $O$, radius 25 cm.
The sector angle is 38°.

Calculate the length of the arc $AB$.
Give your answer correct to 4 significant figures.

[3]

## Question 4




NOT TO SCALE

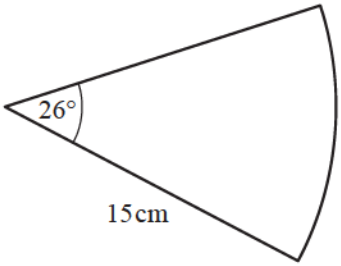
A protractor is a semi-circle of radius 6.1 cm.

Calculate the **perimeter** of the protractor.

[3]

## Question 5






NOT TO SCALE

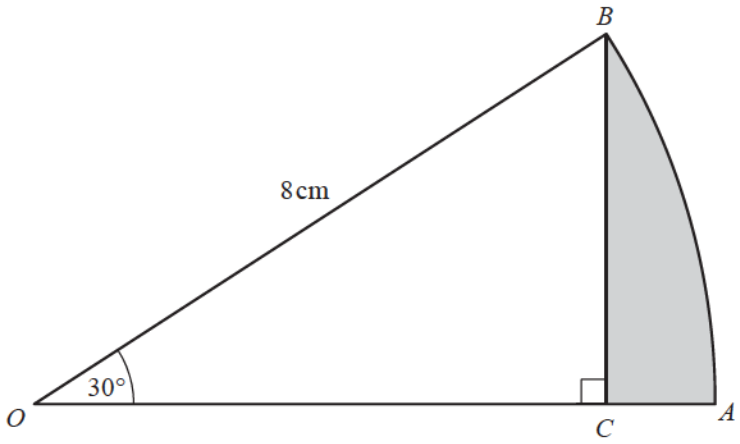
The diagram shows a sector of a circle with radius 15 cm.

Calculate the perimeter of this sector.

[3]

## Question 6






NOT TO SCALE

$OAB$ is the sector of a circle, centre $O$, with radius 8cm and sector angle 30°.
$BC$ is perpendicular to $OA$.

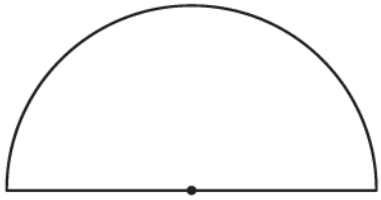
Calculate the area of the region shaded on the diagram.

[5]

The circumference of a circle is 30 cm

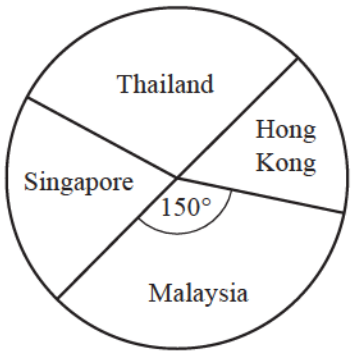
(a) Calculate the radius of the circle. [2]

**(b)**



The length of the arc of the semi-circle is 15 cm.

Calculate the area of the semi-circle. [2]




NOT TO SCALE

A travel brochure has 72 holidays in four different countries.
The pie chart shows this information.

**(a)** There are 24 holidays in Thailand.

Show that the sector angle for Thailand is 120°. [2]

**(b)** The sector angle for Malaysia is 150°.
The sector angle for Singapore is twice the sector angle for Hong Kong.

Calculate the number of holidays in Hong Kong. [3]

# Circle Problems
# Difficulty: Easy

## Question Paper 2

| | |
|---|---|
| Level | IGCSE |
| Subject | Maths (0580/0980) |
| Exam Board | CIE |
| Topic | Mensuration |
| Sub-Topic | Circle Problems |
| Paper | Paper 2 |
| Difficulty | Easy |
| Booklet | Question Paper 2 |

**Time allowed:** **40 minutes**

**Score:** **/31**

**Percentage:** **/100**

**Grade Boundaries:**

**CIE IGCSE Maths (0580)**

| A* | A | B | C | D | E |
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| >88% | 76% | 63% | 51% | 40% | 30% |

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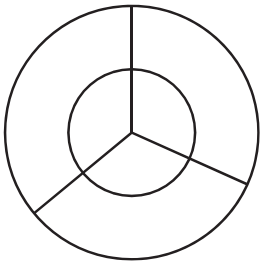
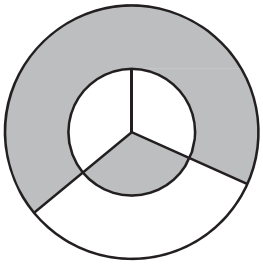


NOT TO SCALE

The diagram shows two concentric circles and three radii.
The diagram has rotational symmetry of order 3.

A club uses the diagram for its badge with some sections shaded.
The radius of the large circle is 6 cm and the radius of the small circle is 4 cm.

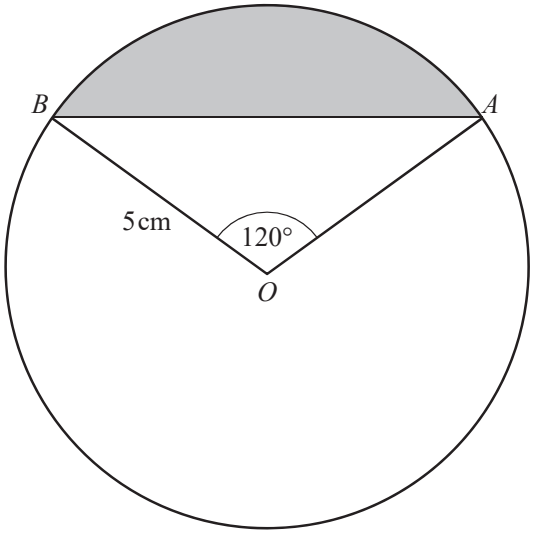


NOT TO SCALE

Calculate the total perimeter of the shaded area. [5]

Find the circumference of a circle of radius 2.5 cm. [2]

## Question 3



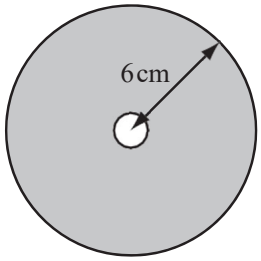

NOT TO SCALE

$A$ and $B$ lie on a circle centre $O$, radius 5 cm.
Angle $AOB = 120°$.

Find the area of the shaded segment. [4]

## Question 4



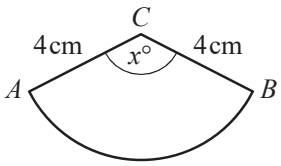



NOT TO SCALE

The diagram shows a circular disc with radius 6 cm.
In the centre of the disc there is a circular hole with radius 0.5 cm.

Calculate the area of the shaded section. [3]

## Question 5



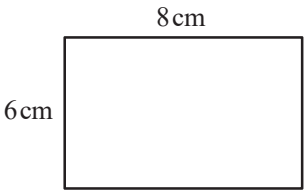

NOT TO SCALE

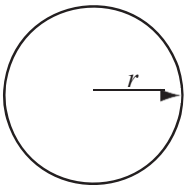
$ABC$ is a sector of a circle, radius 4 cm and centre $C$. [3]
The length of the arc $AB$ is 8 cm and angle $ACB = x°$.

Calculate the value of $x$.

## Question 6






NOT TO SCALE

The perimeter of the rectangle is the same length as the circumference of the circle.

Calculate the radius, $r$, of the circle. [3]

## Question 7

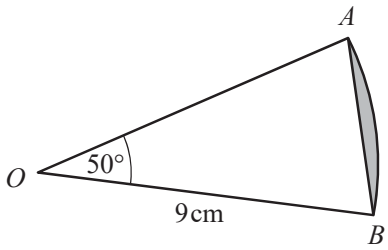
A circle has a radius of 50 cm.

(a) Calculate the area of the circle in $cm^2$. [2]

(b) Write your answer to part (a) in $m^2$. [1]

## Question 8



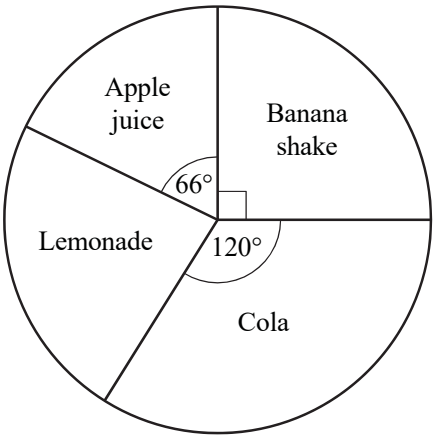



NOT TO SCALE

The diagram shows a sector $AOB$ of a circle, centre $O$, radius 9 cm with angle $AOB = 50°$.

Calculate the area of the segment shaded in the diagram. [4]

60 students recorded their favourite drink.
The results are shown in the pie chart.




NOT TO SCALE

(a) **Calculate** the angle for the sector labelled Lemonade. [1]

(b) Calculate the number of students who chose Banana shake. [1]

(c) The pie chart has a radius of 3 cm.
Calculate the arc length of the sector representing Cola. [2]

# Circle Problems
# Difficulty: Easy

## Question Paper 3

| | |
|---|---|
| Level | IGCSE |
| Subject | Maths (0580/0980) |
| Exam Board | CIE |
| Topic | Mensuration |
| Sub-Topic | Circle Problems |
| Paper | Paper 2 |
| Difficulty | Easy |
| Booklet | Question Paper 3 |

**Time allowed:** **40 minutes**

**Score:** **/31**

**Percentage:** **/100**

**Grade Boundaries:**

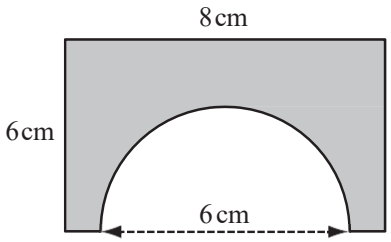
**CIE IGCSE Maths (0580)**

| A* | A | B | C | D | E |
|---|---|---|---|---|---|
| >88% | 76% | 63% | 51% | 40% | 30% |

**CIE IGCSE Maths (0980)**

| 9 | 8 | 7 | 6 | 5 | 4 | 3 |
|---|---|---|---|---|---|---|
| >94% | 85% | 77% | 67% | 57% | 47% | 35% |

## Question 1

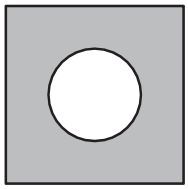



NOT TO SCALE

A semicircle of diameter 6 cm is cut from a rectangle with sides 6 cm and 8 cm.

Calculate the perimeter of the shaded shape, correct to 1 decimal place. [3]

## Question 2



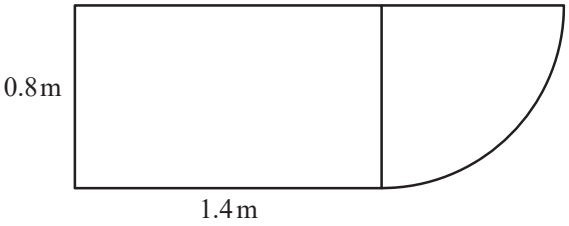
NOT TO SCALE

The diagram shows a circle of radius 5cm in a square of side 18cm.

Calculate the shaded area. [3]

## Question 3

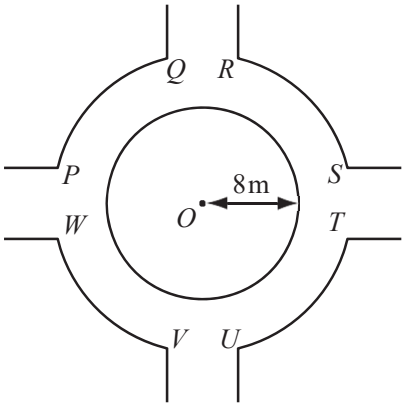





NOT TO SCALE

The top of a desk is made from a rectangle and a quarter circle.
The rectangle measures 0.8m by 1.4m.

Calculate the surface area of the top of the desk. [3]




NOT TO SCALE

The diagram shows the junction of four paths.
In the junction there is a circular area covered in grass.
This circle has centre $O$ and radius 8 m.

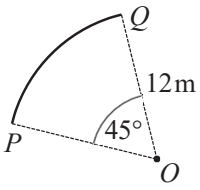
(a) Calculate the area of grass. [2]

$A = \pi r^2$

$= 64\pi$

$= \mathbf{201}$

(b)




NOT TO SCALE

The arc $PQ$ and the other three identical arcs, $RS$, $TU$ and $VW$ are each part of a circle, centre $O$, radius 12m.
The angle $POQ$ is 45°.
The arcs $PQ$, $RS$, $TU$, $VW$ and the circumference of the circle in part(a) are painted white. [4]
Calculate the total length painted white.

## Question 5



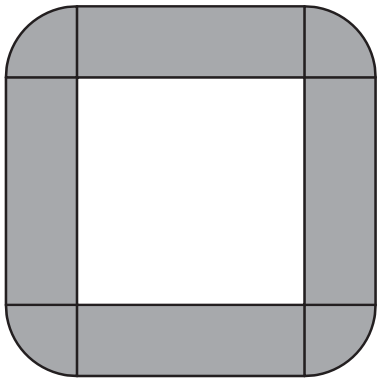
A spacecraft made 58 376 orbits of the Earth and travelled a distance of $2.656 \times 10^9$ kilometres.

(a) Calculate the distance travelled in 1 orbit correct to the nearest kilometre. [2]

(b) The orbit of the spacecraft is a circle.

Calculate the radius of the orbit. [2]

A large conference table is made from four rectangular sections and four corner sections.
Each rectangular section is 4 m long and 1.2 m wide.
Each corner section is a quarter circle, radius 1.2 m.

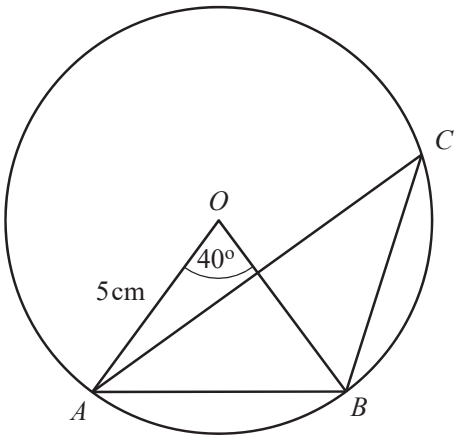


NOT TO SCALE

Each person sitting at the conference table requires one metre of its outside perimeter.
Calculate the greatest number of people who can sit around the **outside** of the table.
Show all your working. [3]

## Question 7






NOT TO SCALE

$A$, $B$ and $C$ are points on a circle, centre $O$.
Angle $AOB = 40^{\circ}$.

(a) (i) Write down the size of angle $ACB$. [1]

(ii) Find the size of angle $OAB$. [1]

(b) The radius of the circle is 5 cm.

(i) Calculate the length of the minor arc $AB$. [2]

(ii) Calculate the area of the minor sector $OAB$. [2]

The radius of the Earth at the equator is approximately $6.4 \times 10^6$ metres.
Calculate the circumference of the Earth at the equator. Give your answer in standard form, correct to 2 significant figures. [3]

# Circle Problems
# Difficulty: Hard

## Question Paper 1

| | |
|---|---|
| Level | IGCSE |
| Subject | Maths (0580/0980) |
| Exam Board | CIE |
| Topic | Mensuration |
| Sub-Topic | Cirlce Problems |
| Paper | Paper 2 |
| Difficulty | Hard |
| Booklet | Question Paper 1 |

**Time allowed:** **41 minutes**

**Score:** **/32**

**Percentage:** **/100**

**Grade Boundaries:**

**CIE IGCSE Maths (0580)**

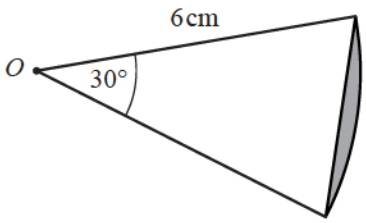
| A* | A | B | C | D | E |
|---|---|---|---|---|---|
| >88% | 76% | 63% | 51% | 40% | 30% |

**CIE IGCSE Maths (0980)**

| 9 | 8 | 7 | 6 | 5 | 4 | 3 |
|---|---|---|---|---|---|---|
| >94% | 85% | 77% | 67% | 57% | 47% | 35% |

## Question 1



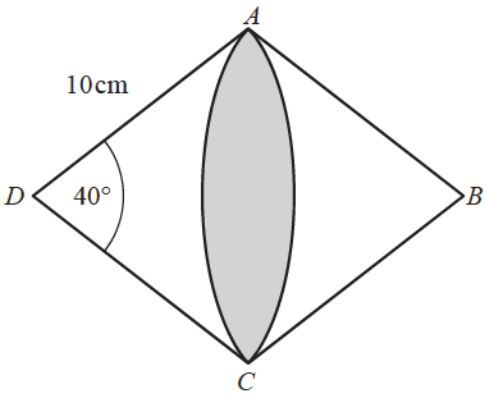



NOT TO SCALE

The diagram shows a sector of a circle, centre $O$ and radius 6 cm.
The sector angle is 30°.
The area of the shaded segment is $(k\pi - c)$ cm$^2$, where $k$ and $c$ are integers.

Find the value of $k$ and the value of $c$. [3]

$ABCD$ is a rhombus with side length 10cm.



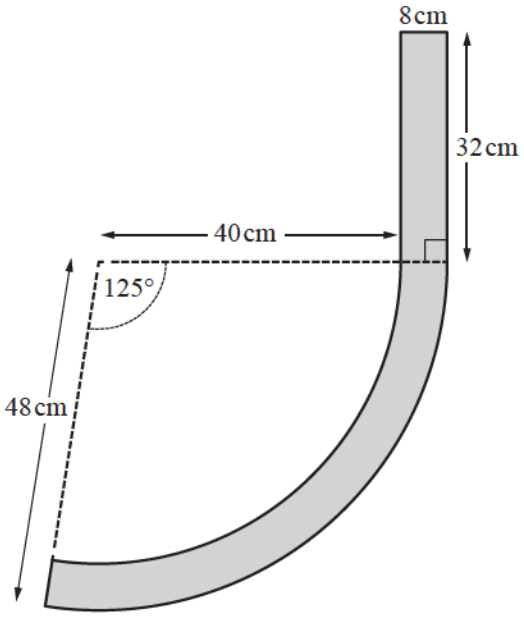

NOT TO SCALE

Angle $ADC = 40°$.
$DAC$ is a sector of a circle with centre $D$.
$BAC$ is a sector of a circle with centre $B$.

Calculate the shaded area. [4]

## Question 3

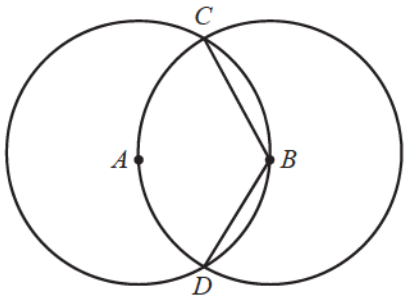





NOT TO SCALE

The diagram shows the cross section of part of a park bench.
It is made from a rectangle of length 32 cm and width 8 cm and a curved section.
The curved section is made from two concentric arcs with sector angle 125°.
The inner arc has radius 40 cm and the outer arc has radius 48 cm.

Calculate the area of the cross section correct to the nearest square centimetre. [5]

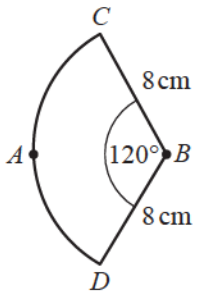



NOT TO SCALE

Two circles, centres $A$ and $B$, are each of radius 8 cm and intersect at $C$ and $D$.
Each circle passes through the centre of the other circle.

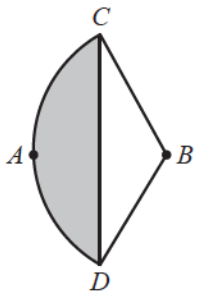
**(a)** Explain why angle $CBD$ is 120°. [1]

**(b)** For the circle, centre $B$, find the area of the sector $BCD$. [2]




NOT TO SCALE

**(c)** **(i)** Find the area of the shaded segment $CAD$. [3]

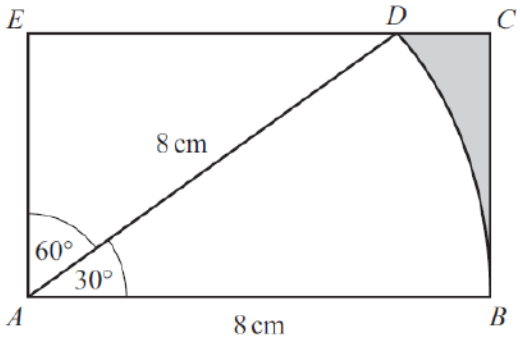



NOT TO SCALE

**(ii)** Find the area of overlap of the two circles. [1]

## Question 5





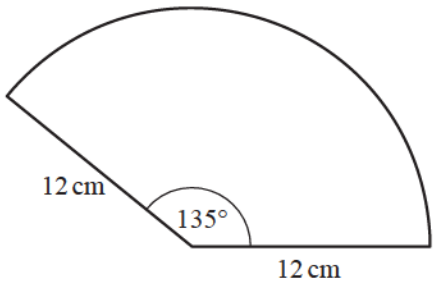

NOT TO SCALE

The diagram shows a rectangle $ABCE$.
$D$ lies on $EC$.
$DAB$ is a sector of a circle radius 8 cm and sector angle 30°.

Calculate the area of the shaded region. [7]

## Question 6





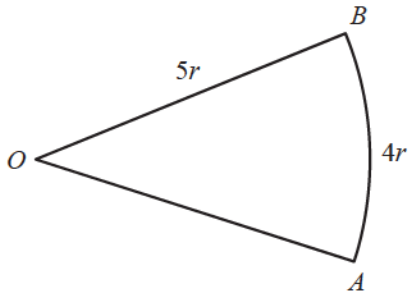

NOT TO SCALE

The diagram shows a sector of a circle of radius 12 cm with an angle of 135°.

Calculate the perimeter of the sector. [3]

## Question 7






NOT TO SCALE

The diagram shows a sector of a circle, centre $O$, radius $5r$.
The length of the arc $AB$ is $4r$.

Find the area of the sector in terms of $r$, giving your answer in its simplest form.

[3]

# Circle Problems
# Difficulty: Hard

## Question Paper 2

| | |
|---|---|
| Level | IGCSE |
| Subject | Maths (0580/0980) |
| Exam Board | CIE |
| Topic | Mensuration |
| Sub-Topic | Cirlce Problems |
| Paper | Paper 2 |
| Difficulty | Hard |
| Booklet | Question Paper 2 |

**Time allowed:** **40 minutes**

**Score:** **/31**

**Percentage:** **/100**

**Grade Boundaries:**

**CIE IGCSE Maths (0580)**

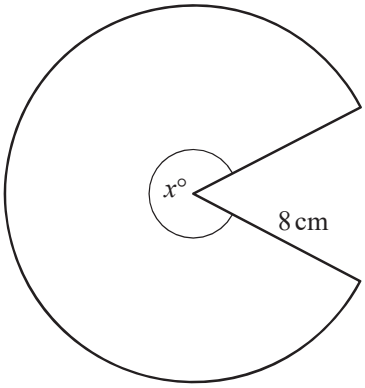
| A* | A | B | C | D | E |
|---|---|---|---|---|---|
| >88% | 76% | 63% | 51% | 40% | 30% |

**CIE IGCSE Maths (0980)**

| 9 | 8 | 7 | 6 | 5 | 4 | 3 |
|---|---|---|---|---|---|---|
| >94% | 85% | 77% | 67% | 57% | 47% | 35% |

## Question 1





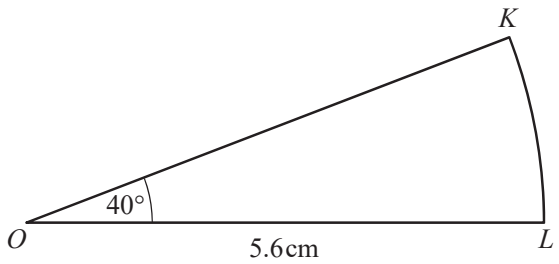

NOT TO SCALE

The diagram shows a sector of a circle of radius 8 cm.
The angle of the sector is $x°$.
The perimeter of the sector is $(16 + 14\pi)$ cm.

Find the value of $x$. [3]

## Question 2





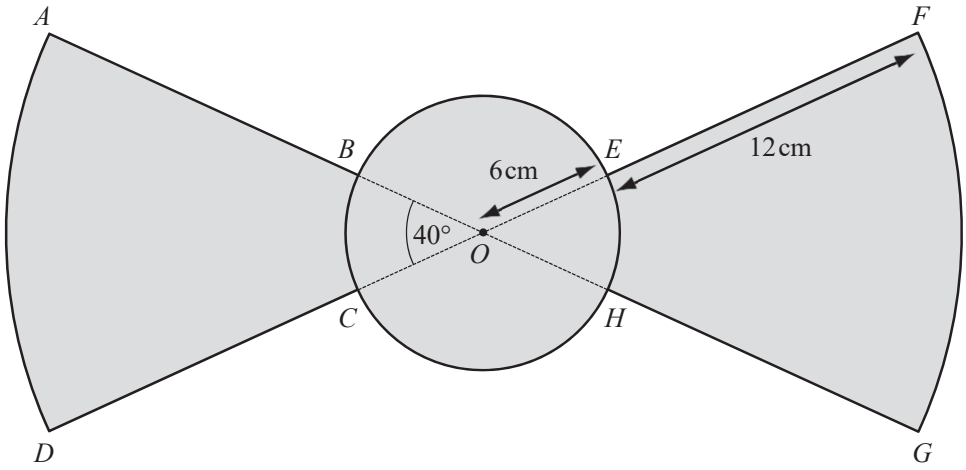

NOT TO SCALE

*OKL* is a sector of a circle, centre *O*, radius 5.6 cm.
Angle *KOL* = 40°.

Calculate

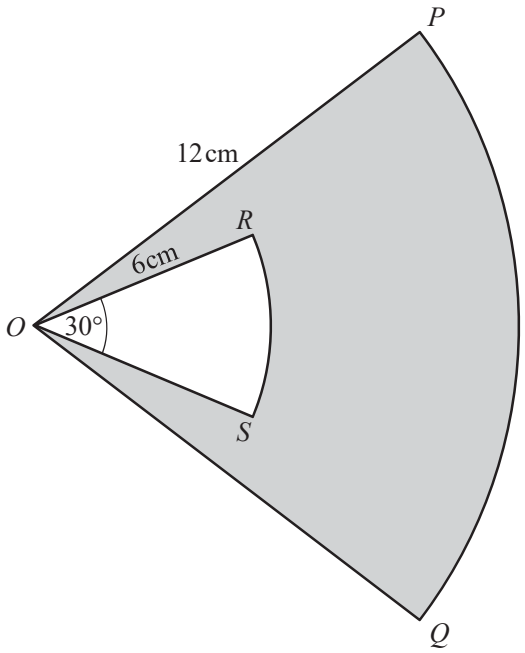
(a) the area of the sector, [2]

(b) the perimeter of the sector. [2]




NOT TO SCALE

The diagram shows part of a fan.
*OFG* and *OAD* are sectors, centre *O*, with radius 18 cm and sector angle 40°.
*B*, *C*, *H* and *E* lie on a circle, centre *O* and radius 6 cm.
Calculate the shaded area. [4]




NOT TO SCALE

*OPQ* is a sector of a circle, radius 12 cm, centre *O*. Angle *POQ* = 50°.

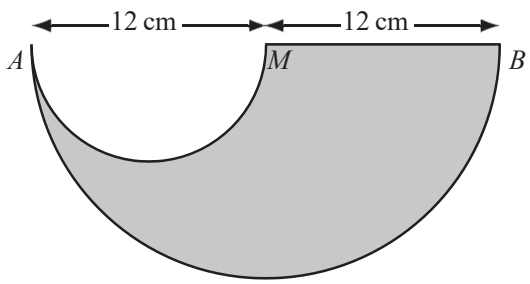
*ORS* is a sector of a circle, radius 6 cm, also centre *O*. Angle *ROS* = 30°.

(a) Calculate the shaded area. [3]

(b) Calculate the perimeter of the shaded area, *PORSOQP*. [3]

## Question 5

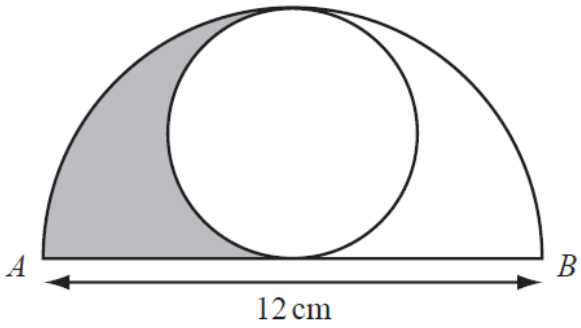





The shape above is made by removing a small semi-circle from a large semi-circle.
$AM = MB = 12$ cm
Calculate the area of the shape. [3]

## Question 6



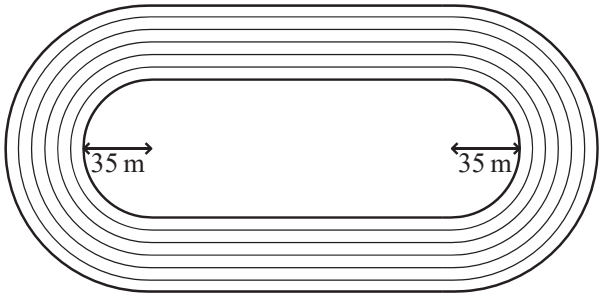



NOT TO SCALE

The largest possible circle is drawn inside a semicircle, as shown in the diagram.
The distance $AB$ is 12 centimetres.

(a) Find the shaded area. [4]

(b) Find the perimeter of the shaded area. [2]




NOT TO SCALE

The diagram shows an athletics track with six lanes.
The distance around the inside of the inner lane is 400 metres.
The radius of each semicircular section of the inside of the inner lane is 35 metres.

(a) Calculate the total length of the two straight sections at the inside of the inner lane. [3]

(b) Each lane is one metre wide.
Calculate the difference in the distances around the outside of the outer lane and the inside of the inner lane. [2]

# 3D Areas & Volume
# Difficulty: Easy

## Question Paper 1

| | |
|---|---|
| Level | IGCSE |
| Subject | Maths (0580/0980) |
| Exam Board | CIE |
| Topic | Mensuration (Perimeters, Areas & volumes) |
| Sub-Topic | 3D Areas & Volume |
| Paper | Paper 2 |
| Difficulty | Easy |
| Booklet | Question Paper 1 |

**Time allowed:** **44 minutes**

**Score:** **/34**

**Percentage:** **/100**

**Grade Boundaries:**

**CIE IGCSE Maths (0580)**

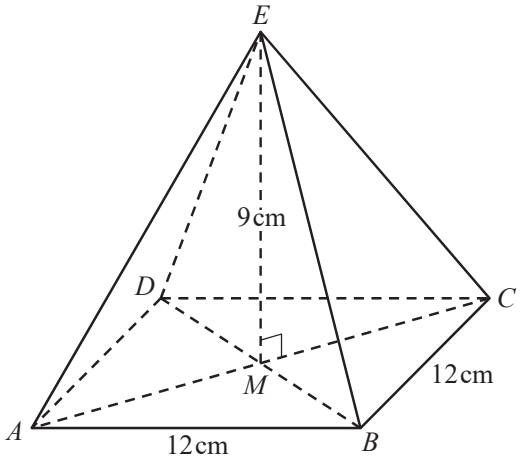
| A* | A | B | C | D | E |
|---|---|---|---|---|---|
| >88% | 76% | 63% | 51% | 40% | 30% |

**CIE IGCSE Maths (0980)**

| 9 | 8 | 7 | 6 | 5 | 4 | 3 |
|---|---|---|---|---|---|---|
| >94% | 85% | 77% | 67% | 57% | 47% | 35% |

## Question 1






NOT TO SCALE

The diagram shows a square-based pyramid $ABCDE$.
The diagonals of the square meet at $M$.
$E$ is vertically above $M$.
$AB = BC = 12$ cm and $EM = 9$ cm.

Calculate the angle between the edge $EC$ and the base, $ABCD$, of the pyramid. [4]

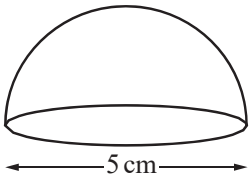
## Question 2



Calculate the volume of a **hemisphere** with radius 3.2 cm.

[The volume, $V$, of a sphere with radius $r$ is $V = \frac{4}{3}\pi r^3$.] [2]

## Question 3



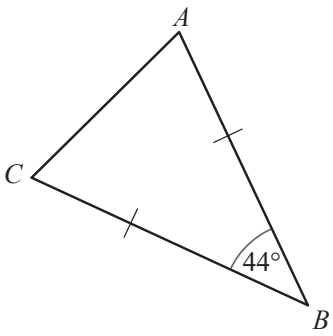

NOT TO SCALE

The diagram shows a hemisphere with diameter 5 cm.

Calculate the volume of this hemisphere.

[The volume, $V$, of a sphere with radius $r$ is $V = \frac{4}{3}\pi r^3$.] [2]

(a)




NOT TO SCALE

Triangle $ABC$ is an isosceles triangle with $AB = CB$.
Angle $ABC = 44°$.

Find angle $ACB$. [1]

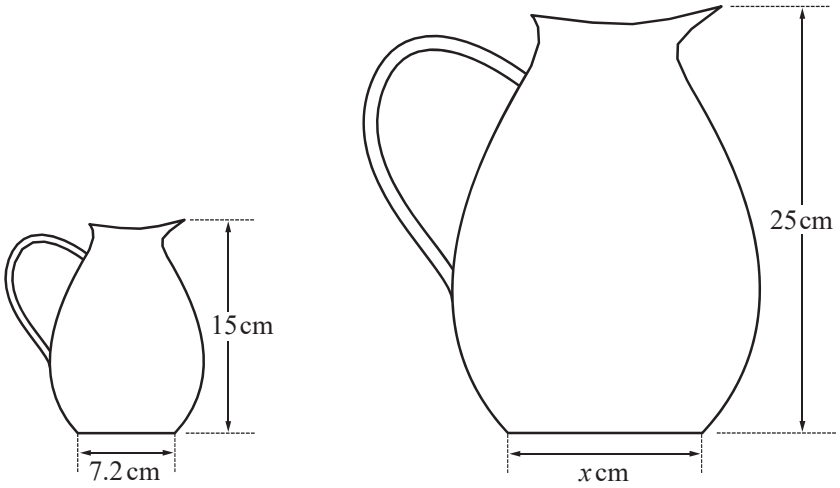
(b) A regular polygon has an exterior angle of 40°.

Work out the number of sides of this polygon. [2]

Calculate the volume of a hemisphere with radius 5 cm.

[The volume, $V$, of a sphere with radius $r$ is $V = \frac{4}{3}\pi r^3$.] [2]

(a)

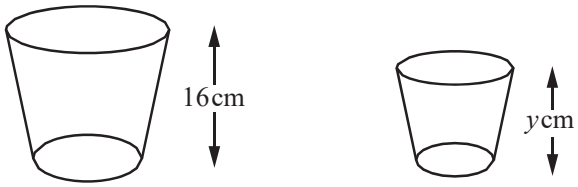



NOT TO SCALE

The diagram shows two jugs that are mathematically similar.

Find the value of $x$. [2]

(b)



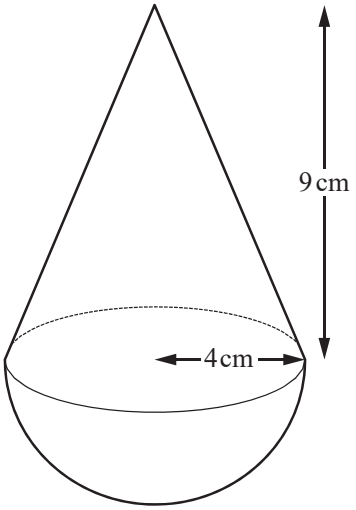

NOT TO SCALE

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 $y$ cm and its volume is 192 $cm^3$.

Find the value of $y$. [3]

## Question 7






NOT TO SCALE

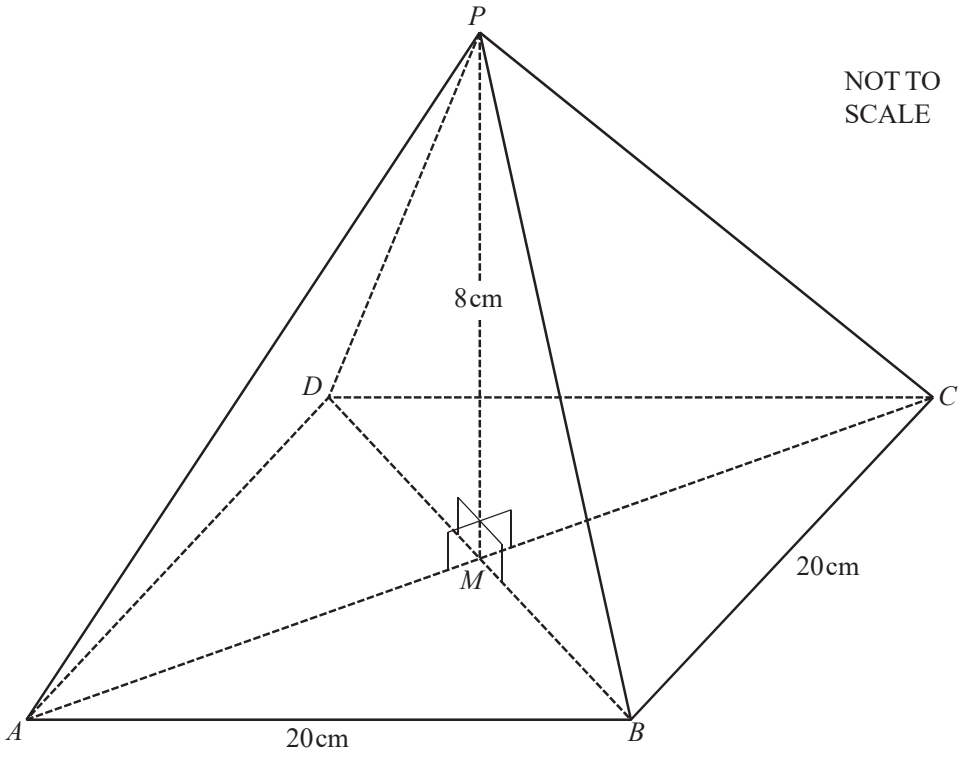
The diagram shows a toy.
The shape of the toy is a cone, with radius 4 cm and height 9 cm, on top of a hemisphere with radius 4 cm.

Calculate the volume of the toy.
Give your answer correct to the nearest cubic centimetre.

[The volume, $V$, of a cone with radius $r$ and height $h$ is $V = \frac{1}{3}\pi r^2 h$.]
[The volume, $V$, of a sphere with radius $r$ is $V = \frac{4}{3}\pi r^3$.] [4]

## Question 8






The diagram shows a solid pyramid on a square horizontal base $ABCD$.
The diagonals $AC$ and $BD$ intersect at $M$.
$P$ is vertically above $M$.
$AB = 20$ cm and $PM = 8$ cm.

Calculate the total surface area of the pyramid. [5]

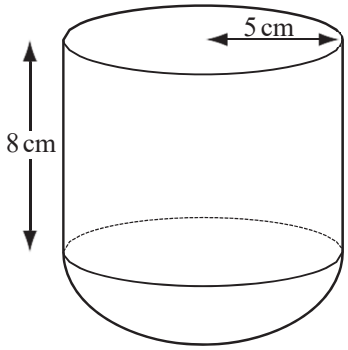
## Question 9



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. [2]

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 $V = \frac{4}{3}\pi r^3$.]

[5]

# 3D Areas & Volume
# Difficulty: Easy

## Question Paper 2

| | |
|---|---|
| Level | IGCSE |
| Subject | Maths (0580/0980) |
| Exam Board | CIE |
| Topic | Mensuration (Perimeters, Areas & volumes) |
| Sub-Topic | 3D Areas & Volume |
| Paper | Paper 2 |
| Difficulty | Easy |
| Booklet | Question Paper 2 |

**Time allowed:** **46 minutes**

**Score:** **/36**

**Percentage:** **/100**

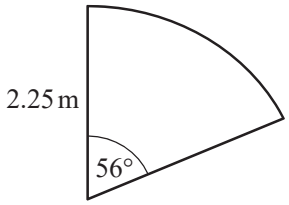
**Grade Boundaries:**

**CIE IGCSE Maths (0580)**

| A* | A | B | C | D | E |
|---|---|---|---|---|---|
| >88% | 76% | 63% | 51% | 40% | 30% |

**CIE IGCSE Maths (0980)**

| 9 | 8 | 7 | 6 | 5 | 4 | 3 |
|---|---|---|---|---|---|---|
| >94% | 85% | 77% | 67% | 57% | 47% | 35% |




NOT TO SCALE

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°.

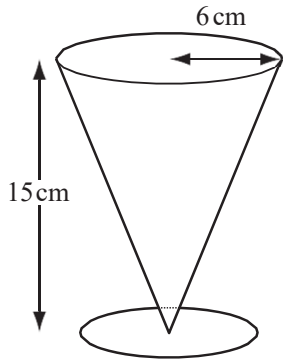
**(a)** Calculate the area of the sand pit. [2]

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

Calculate the volume of sand in the sand pit. [1]

## Question 2






NOT TO SCALE

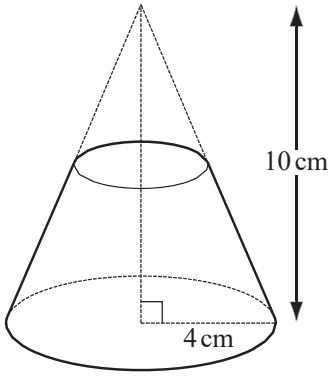
The diagram shows a glass, in the shape of a cone, for drinking milk.
The cone has a radius of 6 cm and height 15 cm.
A bottle of milk holds 2 litres.

**(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 $V = \frac{1}{3}\pi r^2 h$.] [4]

**(b)** Calculate the volume of milk left in the bottle.

Give your answer in $cm^3$. [3]




NOT TO SCALE

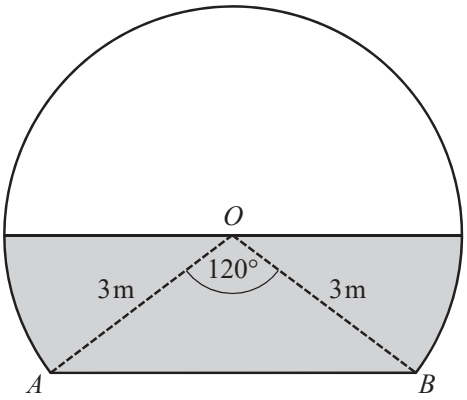
A **solid** cone has base radius 4 cm and height 10 cm.
A mathematically similar cone is removed from the top as shown in the diagram.
The volume of the cone that is removed is $\frac{1}{8}$ of the volume of the original cone.

**(a)** Explain why the cone that is removed has radius 2 cm and height 5 cm. [2]

**(b)** Calculate the volume of the remaining solid.

[The volume, $V$, of a cone with radius $r$ and height $h$ is $V = \frac{1}{3}\pi r^2 h$.] [4]

The diagram shows the entrance to a tunnel.
The circular arc has a radius of 3m and centre $O$.
$AB$ is horizontal and angle $AOB = 120°$.




NOT TO SCALE

During a storm the tunnel filled with water, to the level shown by the shaded area in the diagram.

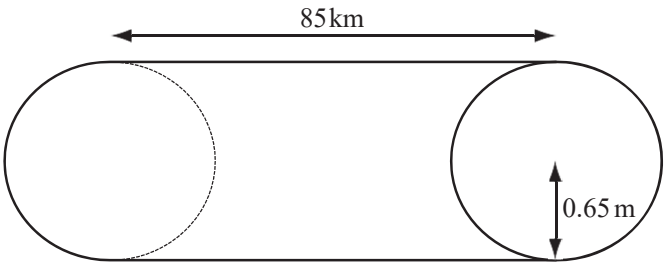
**(a)** Calculate the shaded area. [4]

**(b)** The tunnel is 50 m long.

Calculate the volume of water in the tunnel. [1]

## Question 5






NOT TO SCALE

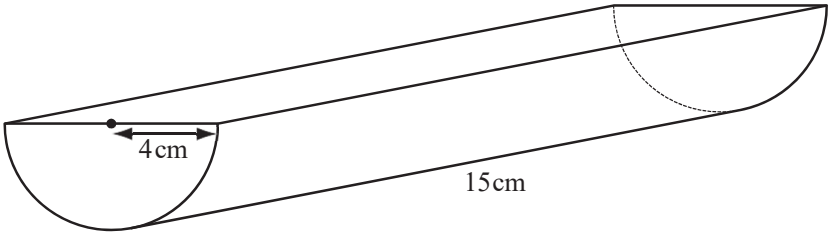
A water pipeline in Australia is a cylinder with **radius** 0.65 **metres** and length 85 **kilometres**.

Calculate the volume of water the pipeline contains when it is full.
Give your answer in cubic metres.

[3]

## Question 6






NOT TO SCALE

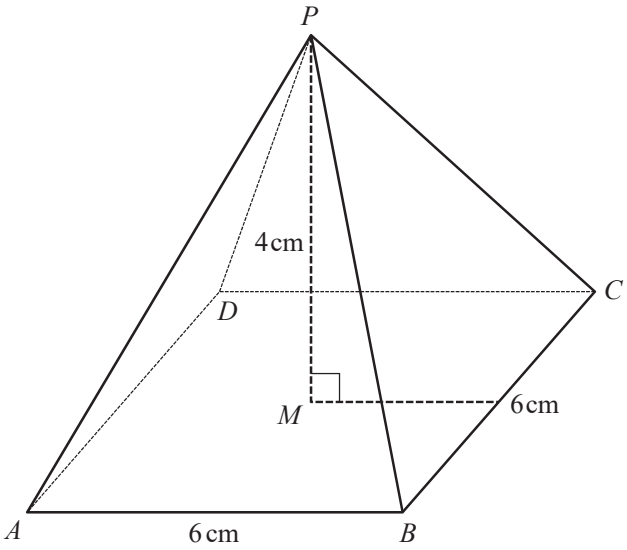
The diagram shows a solid prism of length 15 cm.
The cross-section of the prism is a semi-circle of radius 4 cm.

Calculate the total surface area of the prism.

[4]

A cylinder has a height of 12 cm and a volume of $920 cm^3$.

Calculate the radius of the base of the cylinder. [3]




NOT TO SCALE

The diagram shows a pyramid with a square base $ABCD$ of side 6 cm.

The height of the pyramid, $PM$, is 4 cm, where $M$ is the centre of the base.

Calculate the total surface area of the pyramid. [5]

# 3D Areas & Volume
# Difficulty: Hard

## Question Paper 1

| | |
|---|---|
| Level | IGCSE |
| Subject | Maths (0580/0980) |
| Exam Board | CIE |
| Topic | Mensuration (Perimeters, Areas & volumes) |
| Sub-Topic | 3D Areas & Volume |
| Paper | Paper 2 |
| Difficulty | Hard |
| Booklet | Question Paper 1 |

**Time allowed:** **32 minutes**

**Score:** **/25**

**Percentage:** **/100**

**Grade Boundaries:**

**CIE IGCSE Maths (0580)**

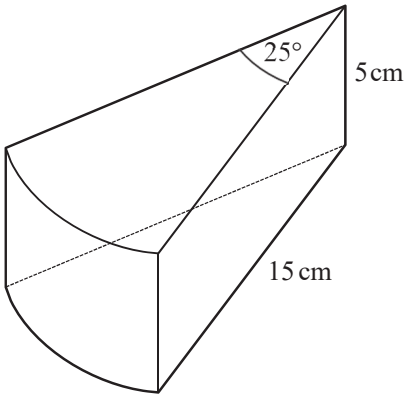
| A* | A | B | C | D | E |
|---|---|---|---|---|---|
| >88% | 76% | 63% | 51% | 40% | 30% |

**CIE IGCSE Maths (0980)**

| 9 | 8 | 7 | 6 | 5 | 4 | 3 |
|---|---|---|---|---|---|---|
| >94% | 85% | 77% | 67% | 57% | 47% | 35% |

## Question 1






NOT TO SCALE

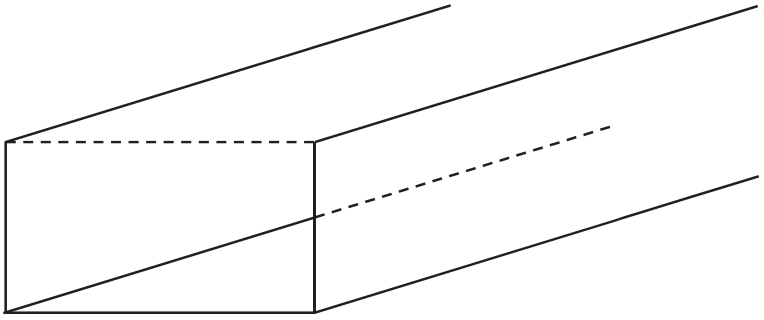
The diagram shows a wooden prism of height 5 cm.
The cross section of the prism is a sector of a circle with sector angle 25°.
The radius of the sector is 15 cm.

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

[5]

## Question 2



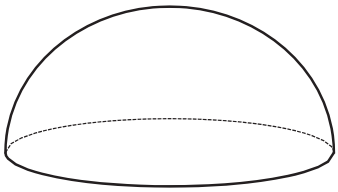


The diagram shows a channel for water.
The channel lies on horizontal ground.
This channel has a constant rectangular cross section with area 0.95 $m^2$.
The channel is full and the water flows through the channel at a rate of 4 metres/**minute**.

Calculate the number of cubic metres of water that flow along the channel in 3 **hours**.

[3]

The diagram shows a solid hemisphere.

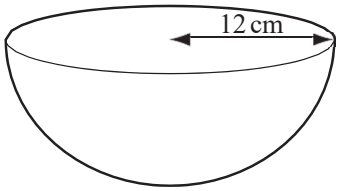


The **total** surface area of this hemisphere is $243\pi$.
The volume of the hemisphere is $k\pi$.

Find the value of $k$.

[The surface area, $A$, of a sphere with radius $r$ is $A = 4\pi r^2$.]
[The volume, $V$, of a sphere with radius $r$ is $V = \frac{4}{3}\pi r^3$.] [4]

A **hemisphere** has a radius of 12 cm.




Calculate its volume.

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

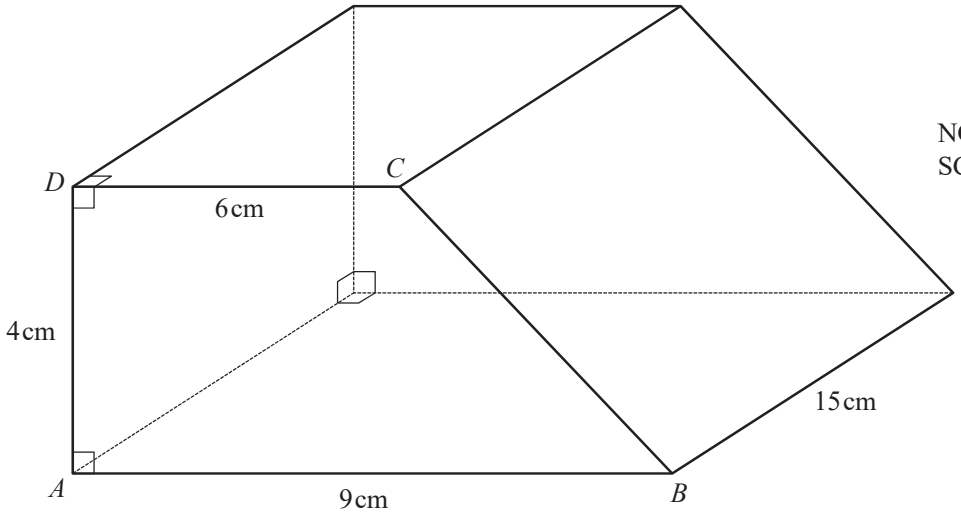
[2]

## Question 5



A water pipe has a circular cross section of radius 0.75 cm.
Water flows through the pipe at a rate of 16 cm/s.

Calculate the time taken for 1 litre of water to flow through the pipe. [3]



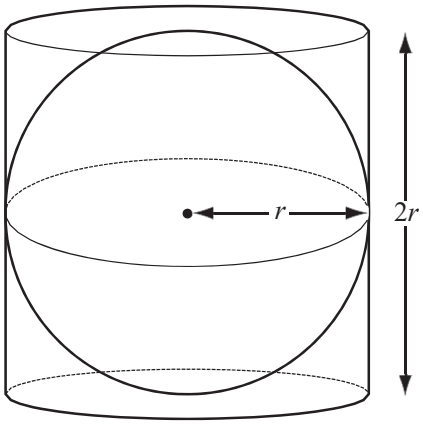

NOT TO SCALE

The diagram shows a solid prism of length 15 cm.
The cross section of the prism is the trapezium $ABCD$.
Angle $DAB$ = angle $CDA$ = 90°.
$AB$ = 9 cm, $DC$ = 6 cm and $AD$ = 4 cm.

Calculate the **total** surface area of the prism. [5]

## Question 7






NOT TO SCALE

The sphere of radius $r$ fits exactly inside the cylinder of radius $r$ and height $2r$.
Calculate the percentage of the cylinder occupied by the sphere.

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