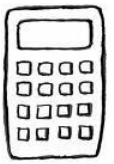
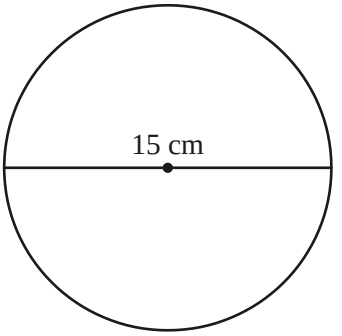
Name:	Teacher Assessment



Section A Circumference and Area of Circles Grade D / C

1. The diameter of a circle is 15 cm.

Calculate the circumference of the circle.



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Answer ..... cm

(Total 2 marks)

2. A circular pond has a diameter of 6 m. Calculate its circumference.

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Answer ..... m

(Total 2 marks)

3. A circular dish has a diameter of 9 cm. Calculate the circumference of the dish.

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Answer ..... cm

(Total 2 marks)

4. A circular pond has a radius of 2.2 m.

(a) Calculate the circumference of the pond.

.....

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Answer ..... m

(2)

(b) Calculate the area of the pond.

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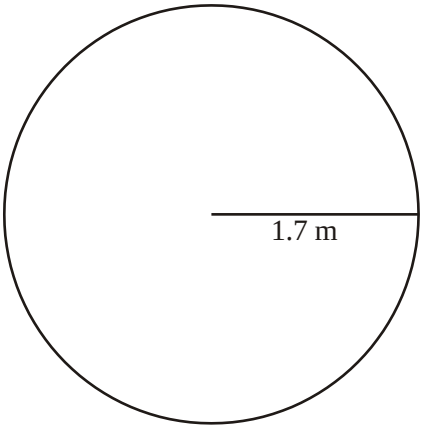
Answer .....

(3)(Total 5 marks)

5. A circular flowerbed has a radius of 1.7 m.



Calculate the area of the flowerbed.
State the units of your answer.

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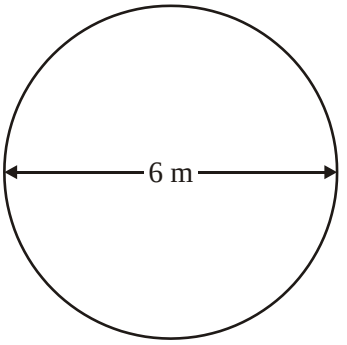
Answer .....

(Total 3 marks)

6. Jasmin has a pond in her garden.
The surface of the pond is a circle of diameter 6 metres.



Calculate the area of a circle of diameter 6 metres.
Give your answer in terms of π

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Answer .....m^2

(Total 2 marks)

7. (a) Calculate the area of a circle of radius 8 cm.

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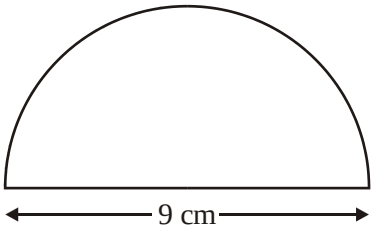
Answer .....

(3)

(b) A semi-circular protractor has a diameter of 9 cm.



Not drawn accurately

Calculate the perimeter.

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Answer ..... cm

(3)

(Total 6 marks)

8. The radius of the wheel of Ellie's bicycle is 0.3 m.

(a) Calculate the circumference of the wheel.

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Answer ..... m

(2)

(b) Ellie cycles 100 m.

How many revolutions does the wheel make?

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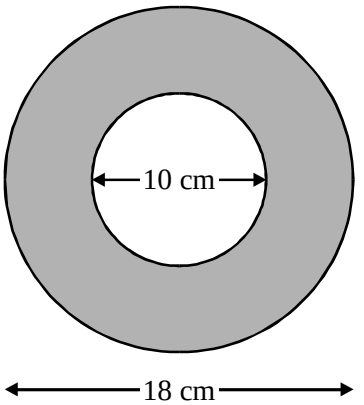
Answer .....

(2)(Total 4 marks)

9. A circular photo frame is shown below.

The diameter of the photo is 10 cm and the outer diameter of the frame is 18 cm.



Calculate the area of the frame.

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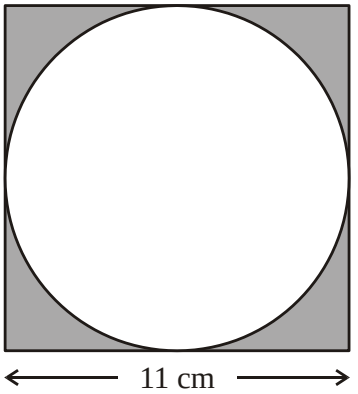
Answer .....

(Total 5 marks)

10. The diagram shows a circle which touches all four sides of a square.
The diameter of the circle is 11 cm.



Calculate the total area of the shaded parts of the square.
Give your Answer to a suitable degree of accuracy.

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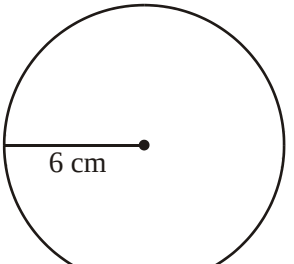
Answer ..... cm^2

(Total 4 marks)

11. The diagram shows a circle of radius 6 cm.



(a) Work out the area of the circle.
Give your answer in terms of π.

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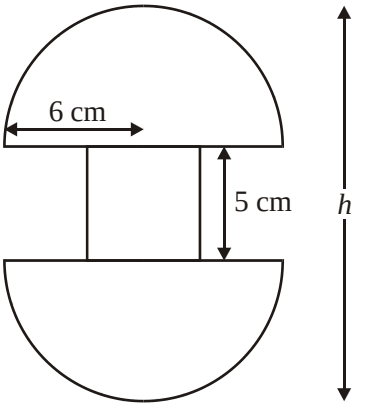
Answer .....

(3)

(b) A badge is made out of 2 semicircles and a square, as shown.
The radius of the semicircle is 6 cm.
The square has side 5 cm.



Not to scale

(i) Write down the area of the badge.
Give your answer in terms of π.

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Answer .....

(1)

(ii) Write down the height of the badge, marked *h* on the diagram.

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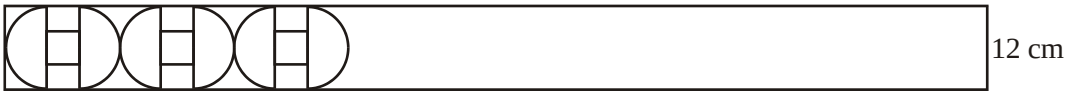
Answer ..... cm

(1)

(iii) The badges are made from a strip of metal 2 metres long and 12 cm wide as shown.



2 metres

How many badges can be made from the strip of metal? Show your working.

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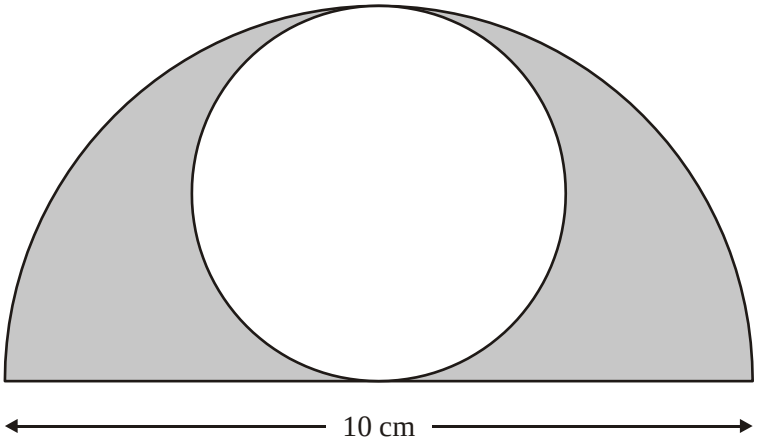
Answer .....

(3)(Total 8 marks)

12. A circle fits inside a semicircle of diameter 10 cm as shown.



Calculate the shaded area.

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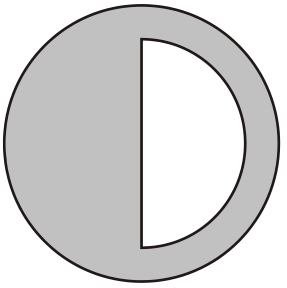
Answer …… cm^2

(Total 3 marks)

13. A semi-circle is cut from a circle.

The circle has a diameter of 30 cm.
The semi-circle has a diameter of 20 cm.



Not drawn accurately

Calculate the shaded area.
Give your answer in terms of π.
State the units of your answer.

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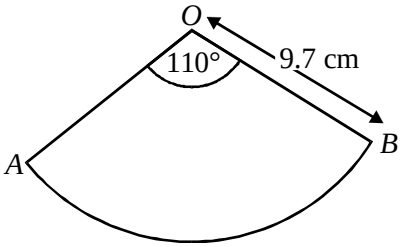
Answer ……

(Total 4 marks)

Success:	Target:

Section B Arc Length and Sector Area Grade A / A*

1. *A*B is an arc of a circle, centre *O*,with radius 9.7cm.
Angle *AOB* = 110°.



not drawn accurately

Calculate the area of the sector *OAB.*

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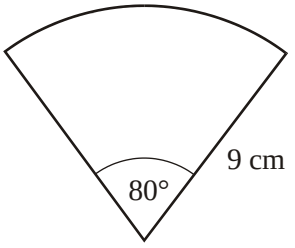
Answer.....cm^2

(Total 3 marks)

2. The diagram shows a sector of a circle of radius 9 centimetres.



Not drawn accurately

Find the perimeter of the sector. Give your answer in terms of π.

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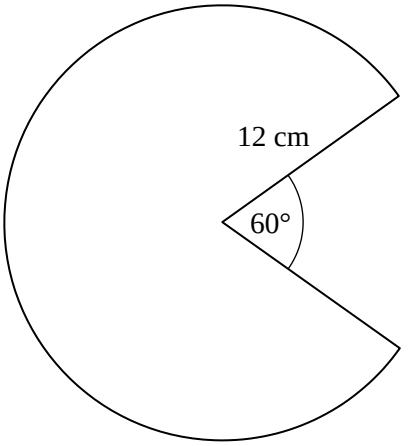
Answer ..... cm

(Total 3 marks)

3. A sector of 60° is cut out of a circle of radius 12 cm.
The diagram shows the remaining shape.



(a) Calculate the area of the remaining shape.
Give your answer in terms of π.

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Answer ..... cm^2

(2)

(b) Calculate the perimeter of the remaining shape.
Give your answer in terms of π.

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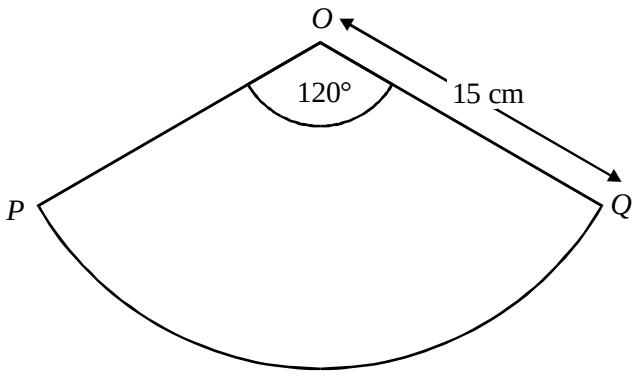
Answer ..... cm

(3)
(Total 5 marks)

4. *OQP* is a sector of a circle of radius 15 cm.

The angle of the sector is 120°.



Not drawn accurately

(a) Show that the length of the arc *PQ* is 10π cm.

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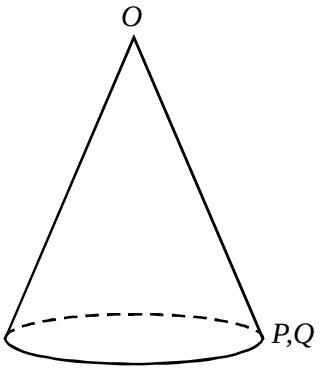
(2)

The sector is folded to form a cone.



Not to scale

(b) Calculate the radius of the base of the cone.

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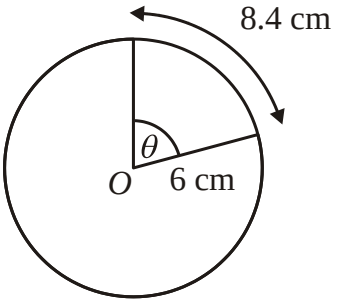
Answer ..... cm

(2)

(Total 4 marks)

5. A circle has a radius of 6 cm.
A sector has an arc length of 8.4 cm.
The angle at the centre of the sector is θ.



Not drawn accurately

Calculate the value of θ.

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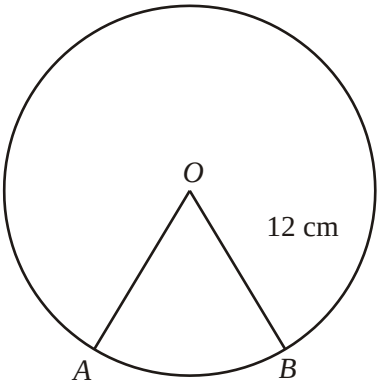
Answer .....degrees

(Total 3 marks)

6. *AOB* is a sector of a circle of radius 12 cm.
The area of the minor sector *AOB* is 98 cm^2.



Not drawn accurately

Calculate the size of angle *AOB*.

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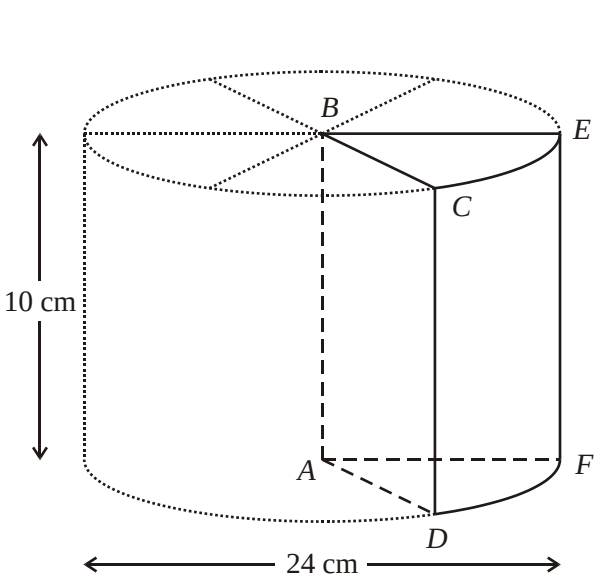
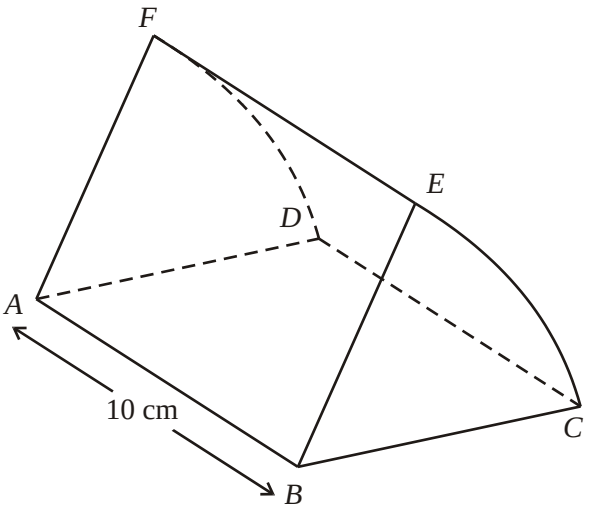
Answer ..... degrees

(Total 3 marks)

7. The first diagram shows a cylindrical block of wood of diameter 24 cm and height 10 cm.
It is cut into six equal prisms as shown.
One of the prisms is shown in the second diagram.





Not to scale

(a) Calculate the area of sector *BEC*, the cross-section of the prism.
Give your answer in terms of π.

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Answer .....cm^2

(2)

(b) Calculate the area of *CDFE*, the curved surface of the prism.
Give your answer in terms of π.

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Answer .....cm^2

(3)

(c) Calculate the volume of the prism.
Give your answer in terms of π.

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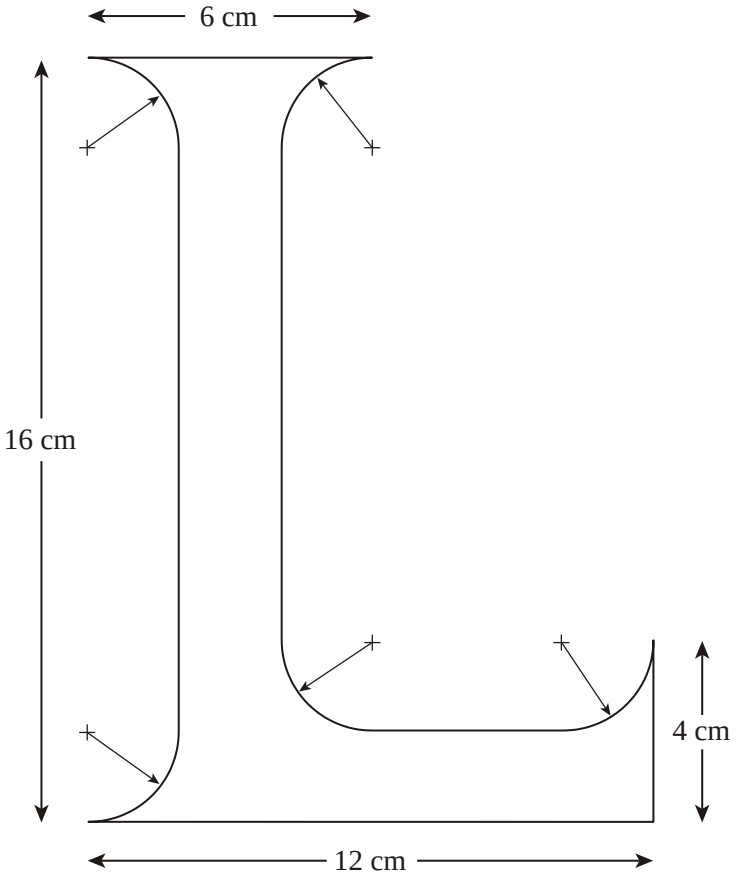
Answer .....

(3)

(Total 8 marks)

8. A sign maker designs a letter L.
All arcs are quarter circles of radius 2 cm.



Not drawn accurately

Calculate the area of the L.

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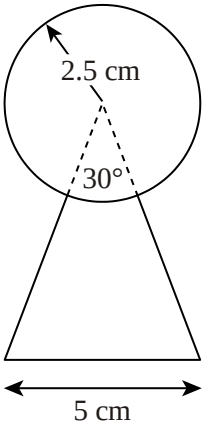
Answer …… cm^2

(Total 4 marks)

9. A keyhole is made from a circle of radius 2.5 cm and an isosceles triangle with a base of 5 cm.
The top vertex of the triangle is at the centre of the circle.
The angle at the top vertex of the triangle is 30°.



Not drawn accurately

Calculate the area of the keyhole.

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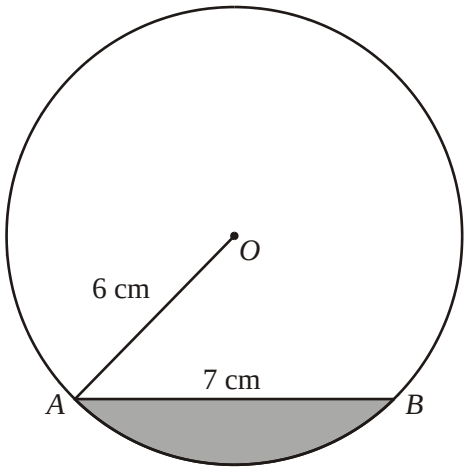
Answer …… cm^2

(Total 6 marks)

10. *AB* is a chord of a circle, centre *O*, radius 6 cm.
AB = 7 cm



Not drawn accurately

Calculate the area of the shaded segment.

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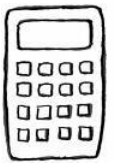
Answer ..... cm^2

(Total 6 marks)

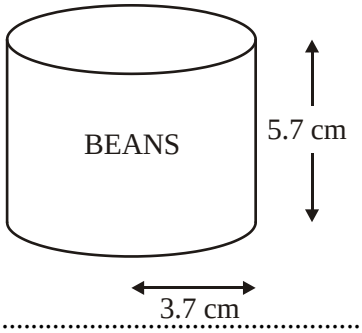
Success:	Target:

Teacher Assessment



Section C Cylinders Grade C → A

1. The diagram shows a cylindrical can of beans.
The height is 5.7 cm.
The radius of the base is 3.7 cm.



Not to scale

Calculate the volume of the can.

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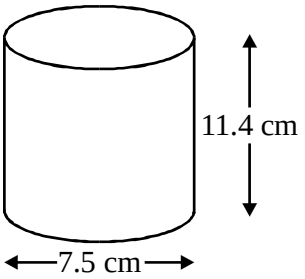
Answer ..... cm^3

(Total 5 marks)

2. A cylindrical can of soup has a diameter of 7.5 cm.
It is 11.4 cm high.



not to scale

Calculate the volume of the can.

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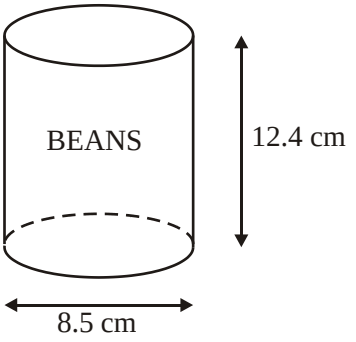
Answer.....

(Total 4 marks)

3. The diagram shows a cylindrical tin of beans of diameter 8.5 cm and height 12.4 cm.



Calculate the volume of the cylinder.
State the units of your answer.

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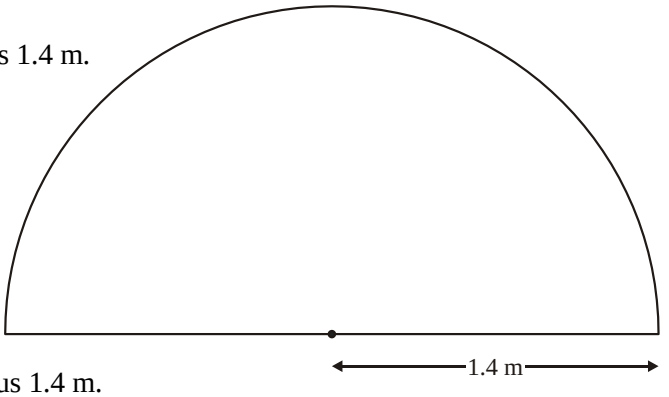
Answer .....

(Total 4 marks)

4. Jasmin has a pond in her garden.
The surface of the pond is a semicircle of radius 1.4 m.



(a) Calculate the area of a semicircle of radius 1.4 m.
You **must** show your working.
State the units of your answer.

.....

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Answer .....

(3)

(b) The pond is 50 cm deep.
The sides of the pond are vertical.

Calculate the volume of the pond.
Give your answer in cubic metres.

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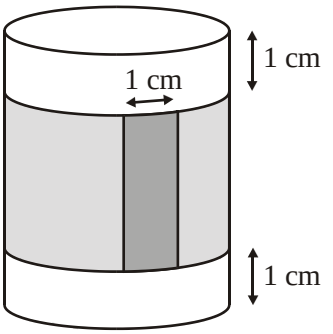
Answer ..... m^3

(2)

(Total 5 marks)

5. A tin of diameter 7 cm and height 12 cm has a label around it.
The label is glued together using a 1 cm overlap.
There is a 1 cm gap between the label and the top and the bottom of the tin.



Not to scale

Find the length and the height of the label.

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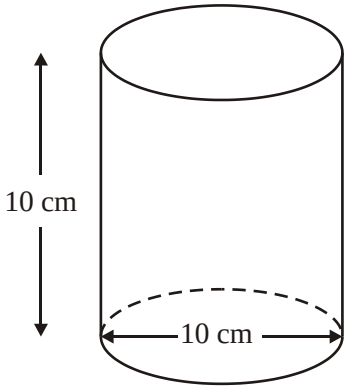
Answer Length = ... cm

Height = ... cm
(Total 4 marks)

6. The diagram shows a cylinder.
The diameter of the cylinder is 10 cm.
The height of the cylinder is 10 cm.



Not drawn accurately

(a) Work out the volume of the cylinder. Give your answer in terms of π.

……

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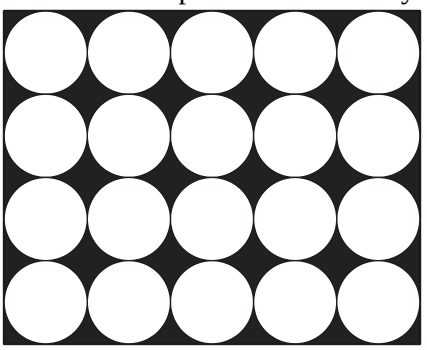
Answer ..... cm^3

(3)

(b) Twenty of the cylinders are packed in a box of height 10 cm.
The diagram shows how the cylinders are arranged inside the box.
The shaded area is the space between the cylinders.



Not drawn accurately

Work out the volume inside the box that is **not** filled by the cylinders.
Give your answer in terms of π.

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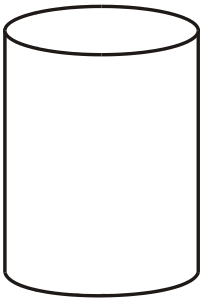
Answer ..... cm^3

(4)
(Total 7 marks)

7. The diagram shows a cylinder.
The volume of the cylinder is 320π cm^3.
The height of the cylinder is 3.2 cm.



Not to scale

Calculate the radius of the base of the cylinder.

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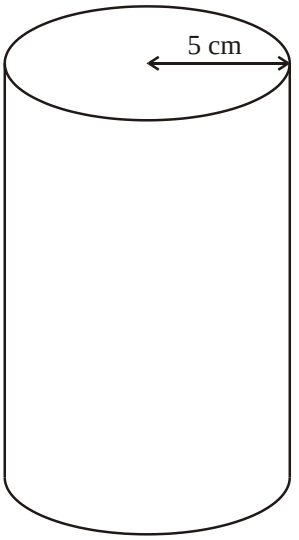
Answer ..... cm

(Total 3 marks)

8. A cylinder has a radius of 5 cm.



(a) Calculate the circumference of a circular end of the cylinder.

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Answer .....cm

(2)

(b) The cylinder has a volume of 250 cm^3 . Calculate the height of the cylinder.

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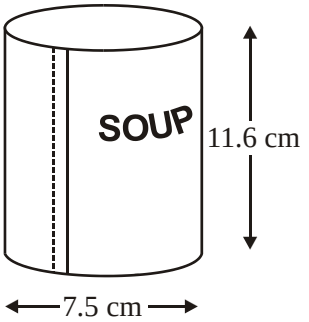
Answer .....cm

(3)

(Total 5 marks)

9. The diagram shows a cylindrical tin of soup of diameter 7.5 cm and height 11.6 cm.



Not to scale

(a) Calculate the volume of the cylinder.

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.....

Answer ..... cm^3

(3)

(b) A sheet of paper is wrapped around the curved surface of the tin with a 1 cm overlap along the dotted line shown in the diagram.

Calculate the area of the paper.

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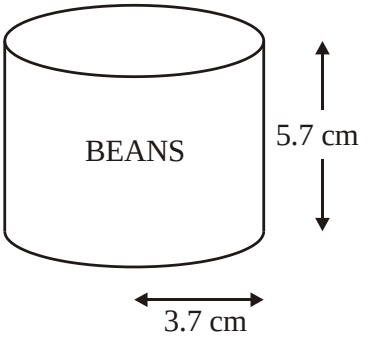
Answer ..... cm^2

(4)

(Total 7 marks)

10. The diagram shows a cylindrical can of beans.
The height is 5.7 cm.
The radius of the base is 3.7 cm.



Not to scale

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

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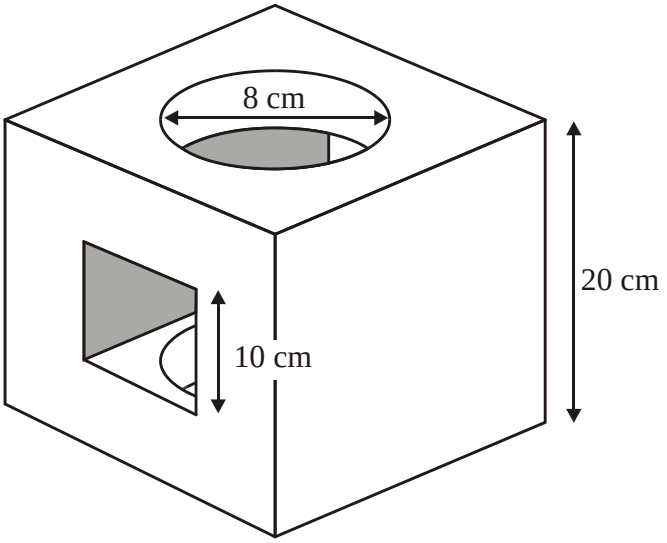
Answer ..... cm^2

(Total 5 marks)

11. A solid cube has a square hole cut through horizontally and a circular hole cut through vertically.

Both holes are cut centrally in the appropriate faces.

The dimensions of the cube and the holes are as shown in the diagram.



Not to scale

Calculate the volume remaining after the holes have been cut.

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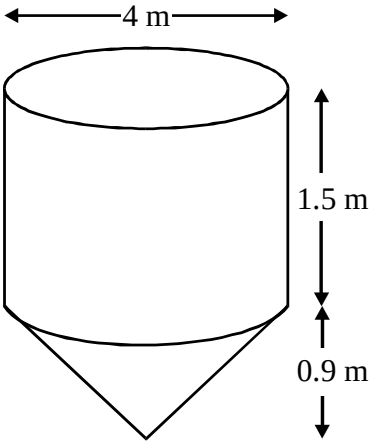
Answer .....

(Total 5 marks)

Success:	Target:

Section D — Cones — Grade A / A*

1. A container consists of a cylinder on top of a cone.
The container is full of oil.



The diameter of both the cylinder and the cone is 4 m.
The height of the cone is 0.9 m and the height of the cylinder is 1.5 m.

Calculate the volume of oil in the container.
Give your answer in terms of π.

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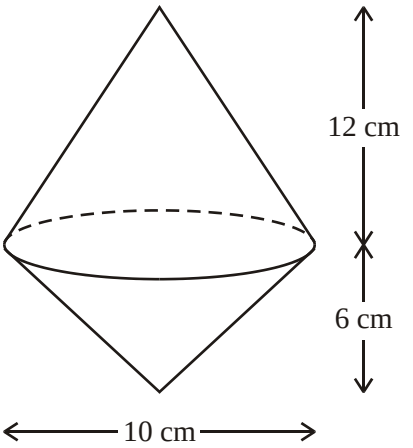
Answer ..... m^3

(Total 3 marks)

2. The diagram shows a float made from two cones with dimensions as shown.



Not to scale

(a) Calculate the volume of the float.

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Answer ..... cm^3

(4)

(b) Calculate the total surface area of the float.

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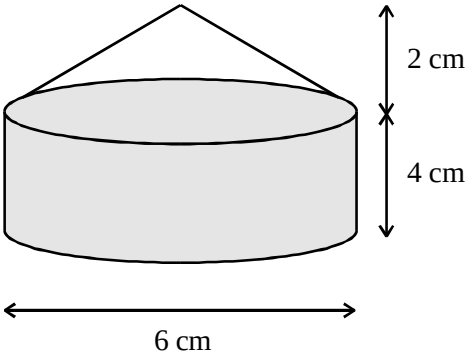
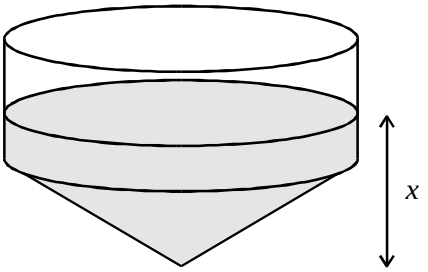
Answer ..... cm^2

(5)
(Total 9 marks)

3. A thin-walled glass paperweight consists of a hollow cylinder with a hollow cone on top as shown.
The paperweight contains just enough sand to fill the cylinder.



The paperweight is now turned upside down.



Calculate the depth of the sand, (marked *x* in the diagram).

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Answer ..... cm

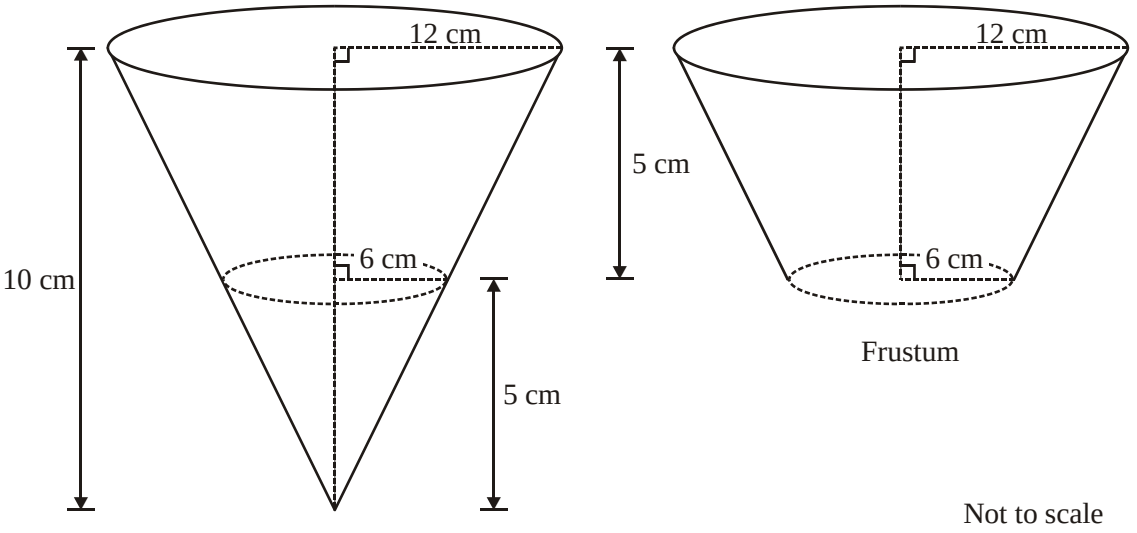
(Total 5 marks)

Success:	Target:

4. The first diagram shows a cone of base radius 12 cm and perpendicular height 10 cm.

A small cone of base radius 6 cm and perpendicular height 5 cm is cut off the bottom to leave a frustum.

The frustum has a lower radius of 6 cm, an upper radius of 12 cm and a perpendicular height of 5 cm (see second diagram).



(a) Find the volume of the frustum, giving your answer in terms of π.

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Answer ..... cm^3

(4)

(b) The frustum has the same volume as another cone of perpendicular height 35 cm.

Calculate the radius of this cone.

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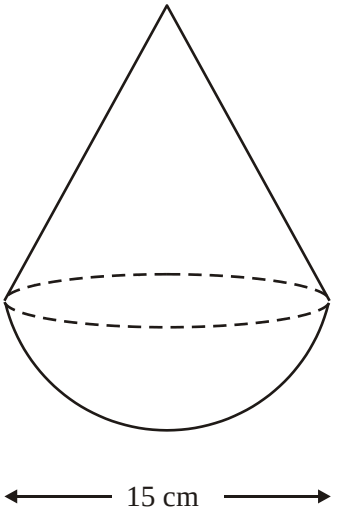
Answer ..... cm

(3)(Total 7 marks)

Teacher Assessment

Section E Spheres Grade A / A*

1. A child's toy is in the shape of a cone on top of a hemisphere.
The diameter of the hemisphere is 15 cm and the overall height of the toy is 26 cm.



Not to scale

Calculate the volume of this toy.

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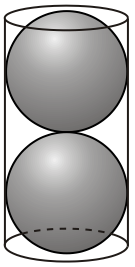
Answer ..... cm^3

(Total 5 marks)

2. Two spheres of radius 5 cm just fit inside a tube.



Calculate the volume inside the tube not filled by the spheres.

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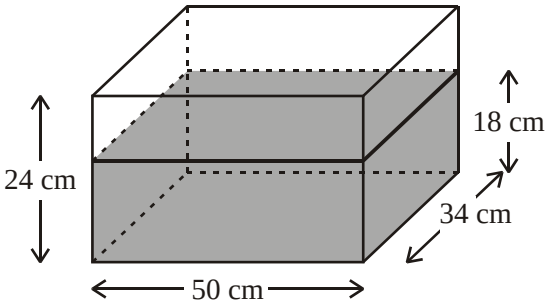
Answer …….. cm^3

(Total 5 marks)

3. A water tank is 50 cm long, 34 cm wide and 24 cm high.
It contains water to a depth of 18 cm.



Not to scale

Four identical spheres are placed in the tank and are fully submerged.
The water level rises by 4.5 cm.

Calculate the radius of the spheres.

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Answer ..... cm

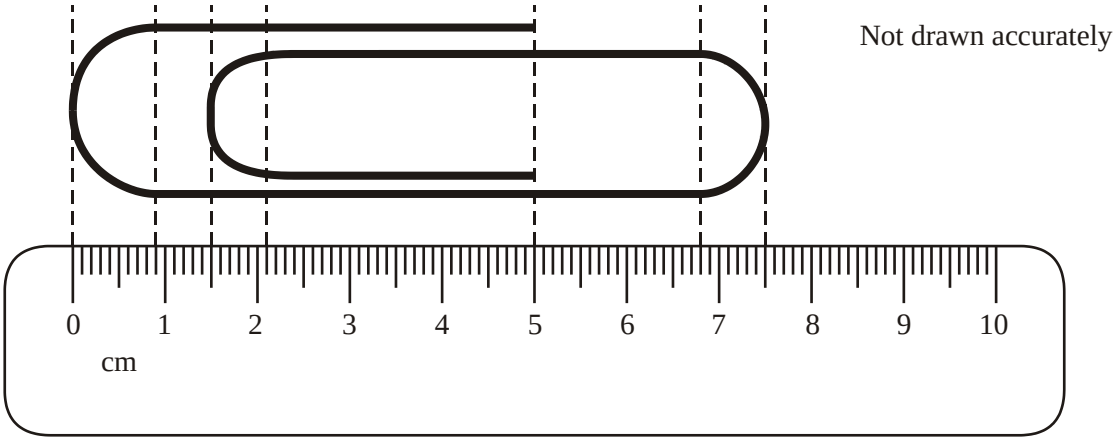
(Total 5 marks)

Success:	Target:

Teacher Assessment

Section F Problem Solving Grade A / A*

1. A giant paper clip is placed alongside a centimetre ruler.
The curved ends are semicircles.



Calculate the length of wire used to make the clip.

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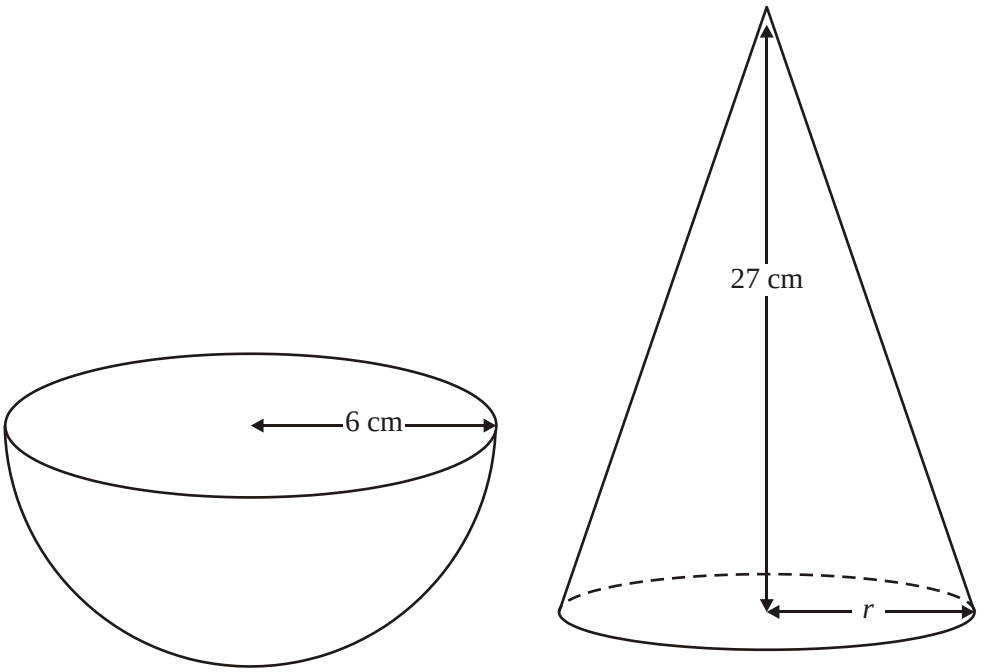
Answer ..... cm

(Total 5 marks)

2. A hemispherical bowl of radius 6 cm has the same volume as a cone of perpendicular height 27 cm.

Not drawn accurately



Calculate the base radius, *r*, of the cone.

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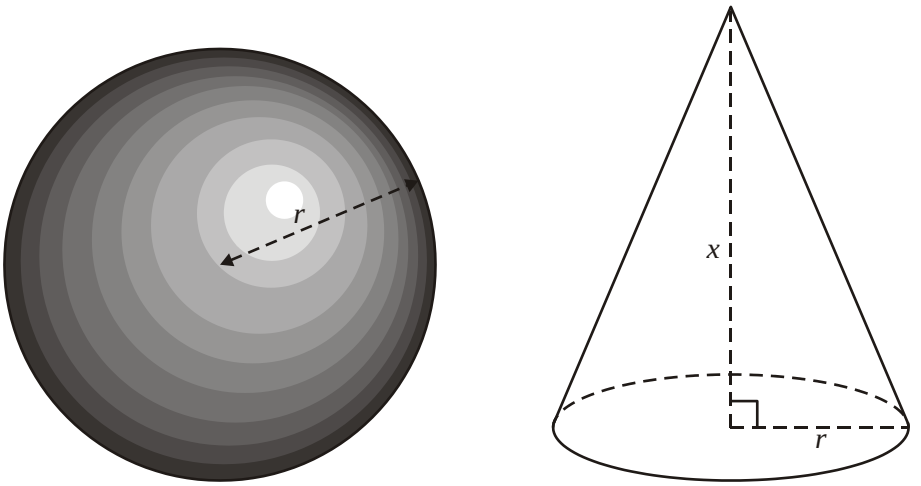
Answer ..... cm

(Total 4 marks)

3. A sphere has radius r.
A cone has base radius r and perpendicular height x.
The volume of the sphere is double the volume of the cone.

Not drawn accurately



(a) Show that $x = 2r$

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(2)

(b) Calculate the ratio of the surface area of the sphere to the curved surface area of the cone.
Give your answer in surd form.

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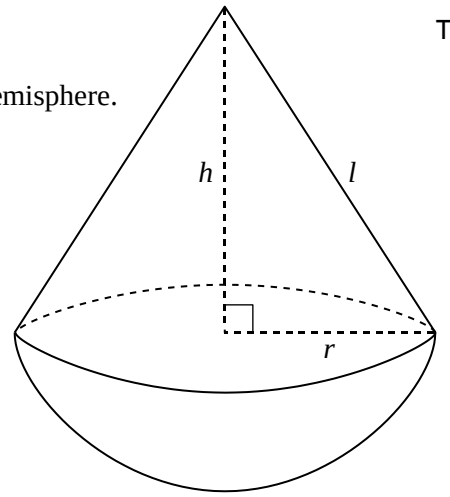
Answer .....

(4)
(Total 6 marks)

4. The diagram shows a solid made from a cone and a hemisphere.
The radius of both shapes is r.
The slant height of the cone is l.
The perpendicular height of the cone is h.



The curved surface area of the cone and the curved surface area of the hemisphere are equal.

(a) Show that $l = 2r$

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(2)

(b) Find the perpendicular height, h, of the cone in terms of r.

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Answer h = ...

(2)

(c) Find the ratio of the volumes of the cone and the hemisphere.
Give your answer in surd form.

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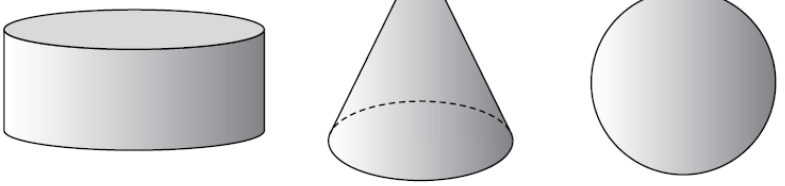
Answer .....

(2)
(Total 6 marks)

5. The diagram shows three solid shapes, a cylinder, a cone and a sphere.
All measurements are given in centimetres.

The radius of the base of the cylinder is $4y$.
The radius of the base of the cone is $2y$.
The radius of the sphere is $3y$.

The height of the cylinder is $2y$.
The height of the cone is $12y$.



Put these shapes in order of size by volume from smallest to largest.
Write your volumes as simply as possible in terms of π.

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Answer Smallest ..... Volume ..... cm^3

Middle ..... Volume ..... cm^3

Largest ..... Volume ..... cm^3

(6 marks)

Success:	Target: