1.   **[4 marks]**

Maxicool!!

The new ice cream
sensation
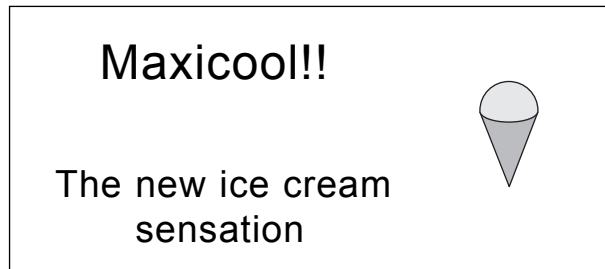
A Maxicool consists of a cone full of ice cream with a hemisphere of ice cream on top.
The radius of the hemisphere is 3 cm.
The radius of the base of the cone is 3 cm.
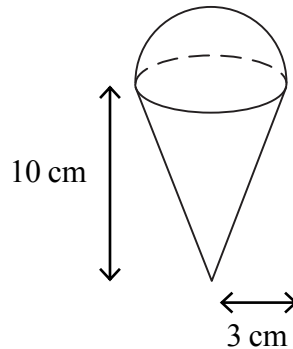The height of the cone is 10 cm.

10 cm

3 cm

Diagram **NOT**
accurately drawn

Calculate the total volume of ice cream in a Maxicool.
Give your answer correct to 3 significant figures.

2.   **[5 marks]**

A solid is made from a cylinder and a hemisphere.
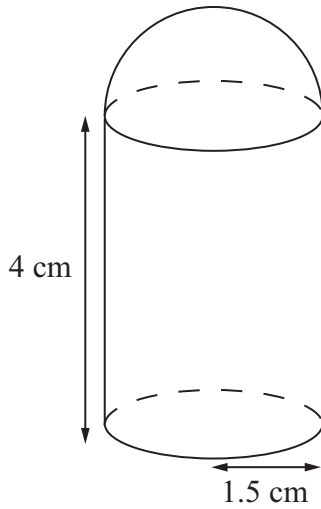The cylinder has radius 1.5 cm and height 4 cm.
The hemisphere has radius 1.5 cm.

Diagram **NOT**
accurately drawn

4 cm

1.5 cm

Work out the total volume of the solid.
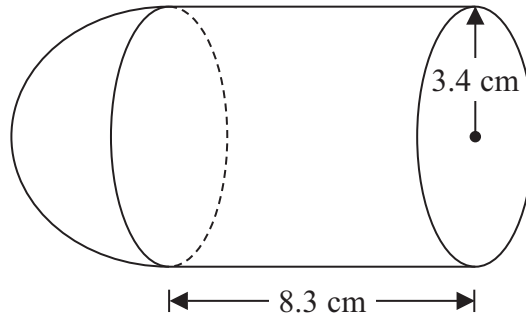Give your answer correct to 3 significant figures.

.... cm³

3. **[4 marks]**

Diagram **NOT** accurately drawn

3.4 cm

8.3 cm

The diagram shows a shape made from a solid cylinder and a solid hemisphere.
The cylinder has a radius of 3.4 cm and a length of 8.3 cm.
The hemisphere has a radius of 3.4 cm.

Calculate the total surface area of the solid shape.
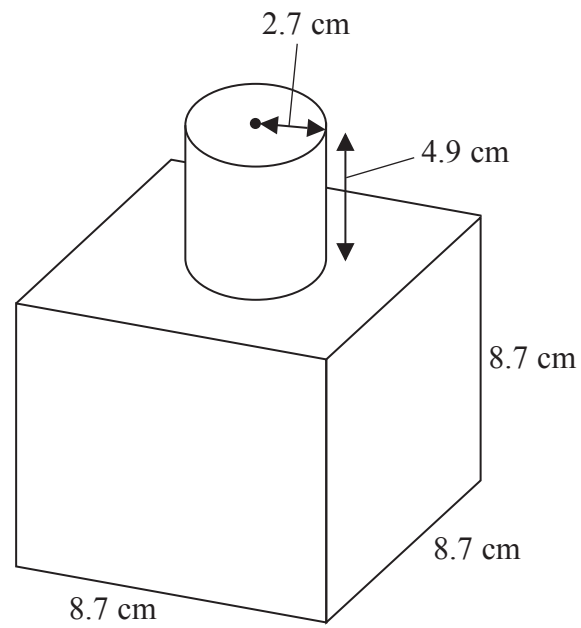Give your answer correct to 3 significant figures.

.... cm^2

4.   **[3 marks]**

2.7 cm

Diagram **NOT**
accurately drawn

4.9 cm

8.7 cm

8.7 cm

8.7 cm

The diagram shows a shape made from a solid cube and a solid cylinder.
The cube has sides of length 8.7 cm.
The cylinder has a radius of 2.7 cm and a height of 4.9 cm.

Calculate the total surface area of the solid shape.
Give your answer correct to 3 significant figures.

.... cm^2

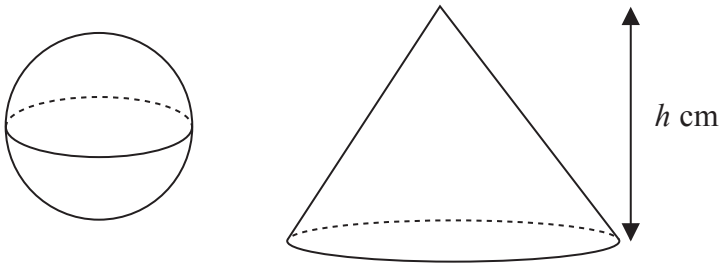The diagram shows a sphere and a cone.

Diagram **NOT** accurately drawn

h cm

The cone has height h cm.
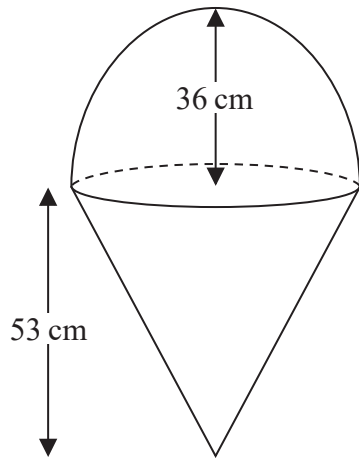The radius of the base of the cone is 3 times the radius of the sphere.

Given that the volume of the sphere is equal to the volume of the cone,
find an expression for the radius of the sphere in terms of h.
Give your expression in its simplest form.

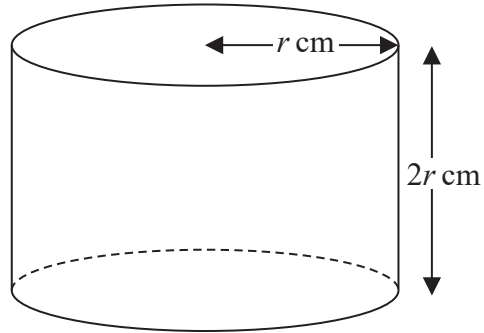The diagram shows two solid shapes, shape **A** and shape **B**.
Shape **A** is made of a hemisphere and a cone.
Shape **B** is a cylinder.

Diagram **NOT** accurately drawn

36 cm

53 cm

r cm

$2r$ cm

A   **B**

For shape **A**

      radius of the hemisphere is 36 cm
      radius of the base of the cone is 36 cm
      height of the cone is 53 cm

For shape **B**

      radius of the cylinder is r cm
      height of the cylinder is $2r$ cm

The volume of shape **A** = the volume of shape **B**
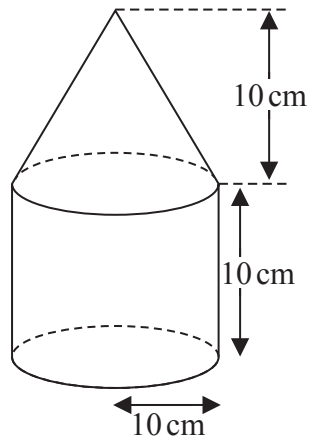
Calculate the height of shape **B**.

10 cm

Diagram **NOT** accurately drawn

10 cm

10 cm

The diagram shows a solid shape made from a cone on top of a cylinder.

The cone has a radius of 10 cm and a height of 10 cm.
The cylinder has a radius of 10 cm and a height of 10 cm.
The centre of the base of the cone coincides with the centre of the top face of the cylinder.

The total surface area of the solid is A cm^2

Show that $A = (300 + 100\sqrt{2})\pi$

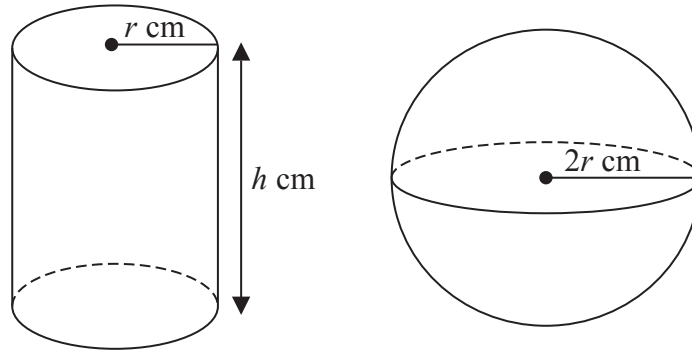The diagram shows a cylinder and a sphere.

Diagram **NOT** accurately drawn

The cylinder has radius r cm and height h cm.
The sphere has radius $2r$ cm.

The volume of the cylinder is equal to the volume of the sphere.
Find an expression for h in terms of r.
Give your answer in its simplest form.

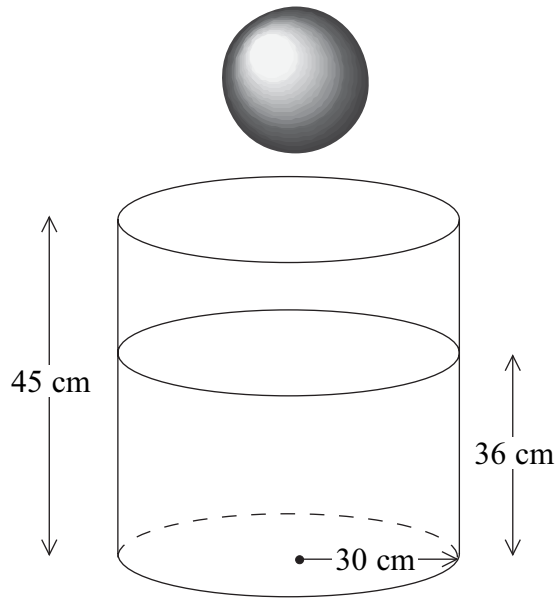...

Diagram **NOT** accurately drawn

A cylindrical tank has a radius of 30 cm and a height of 45 cm.
The tank contains water to a depth of 36 cm.

A metal sphere is dropped into the water and is completely covered.
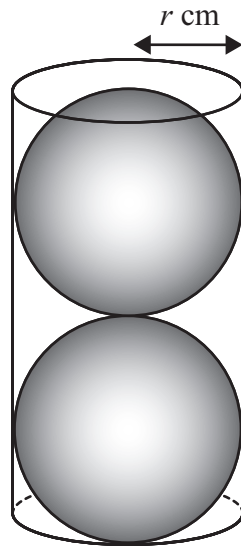The water level rises by 5 cm.

Calculate the radius of the sphere.

.... cm

r cm

Diagram **NOT**
accurately drawn

Two solid spheres, each of radius *r* cm, fit exactly inside a hollow cylinder.
The radius of the cylinder is *r* cm.
The height of the cylinder is equal to 4*r* cm.

The volume of the space inside the cylinder, not occupied by the spheres, is $\frac{125}{6}\pi$ cm³

Calculate the value of *r*.

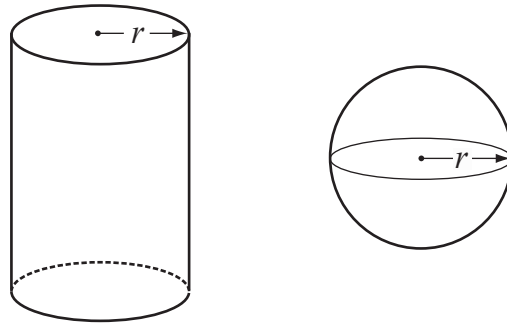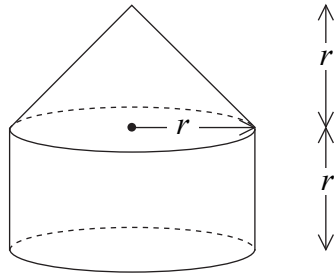Show your working clearly.

r = ...

Diagram **NOT**
accurately drawn

The diagram shows a solid cylinder and a solid sphere.
The cylinder has radius r.
The sphere has radius r.

Given that $\dfrac{\textbf{Total} \text{ surface area of cylinder}}{\text{Surface area of sphere}} = 2$

find the value of $\dfrac{\text{Volume of cylinder}}{\text{Volume of sphere}}$

....

The diagram shows a solid made from a cone and a cylinder.
The cylinder has radius r and height r.
The cone has base radius r and height r.

(a) Show that the total volume of the solid is equal to the volume of a sphere of radius r.

(2)

The curved surface area of a cylinder with base radius r and height h is $2\pi rh$.
The curved surface area of a cone with base radius r and slant height l is πrl.

(b) Show that the **total** surface area of the above solid is greater than the surface area of a sphere of radius r.

(3)