Maths.scot

National 5 Maths Volume

SQA past paper and specimen paper questions and answers by topic

BE GREEN
KEEP IT ON
THE SCREEN

An ornament is in the shape of a cone with diameter 8 centimetres and height 15 centimetres.

The bottom contains a hemisphere made of copper with diameter 7·4 centimetres. The rest is made of glass, as shown in the diagram below.

glass

15 cm

copper

7·4 cm

8 cm
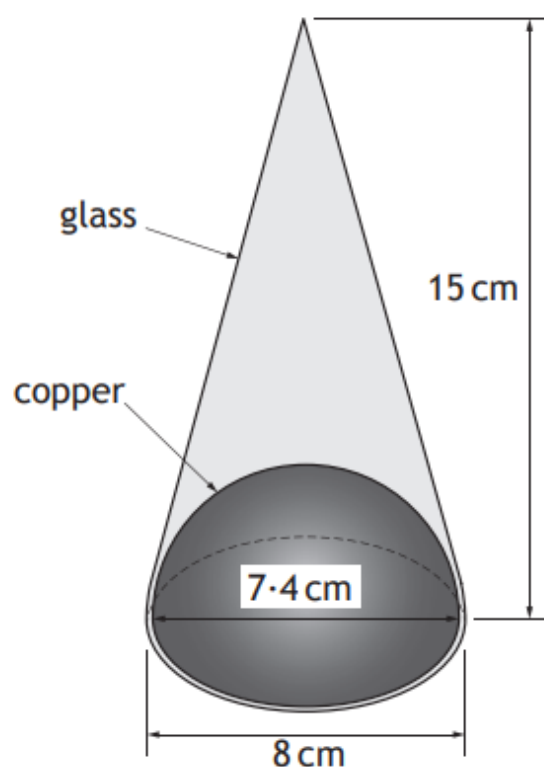
Calculate the volume of the glass part of the ornament.

Give your answer correct to 2 significant figures.   **5**

Answer:

150 cm^3

(a) The Earth is approximately spherical with a radius of 6400 kilometres.

Calculate the volume of the Earth giving your answer in scientific notation, correct to 2 significant figures.

3

(b) The approximate volume of the Moon is $2 \cdot 2 \times 10^{10}$ cubic kilometres.

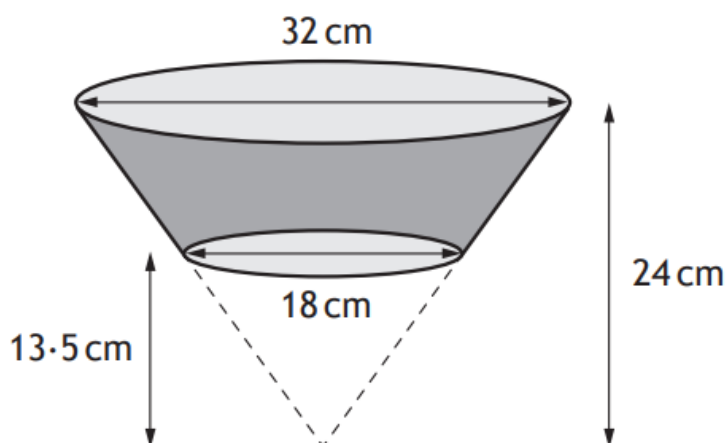Calculate how many times the Earth's volume is greater than the Moon's.

2

Answers:

(a) 1.1×10^{12} km^3

(b) 50

A carton is in the shape of a large cone with a small cone removed.

The large cone has diameter of 32 cm and height 24 cm.

The small cone has diameter of 18 cm and height 13·5 cm.

Calculate the volume of the carton.

Give your answer correct to 2 significant figures.   5
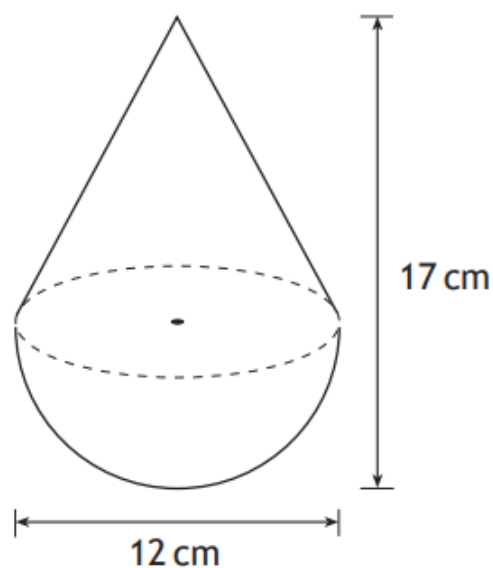
Answer:

5300 cm³

A child's toy is in the shape of a hemisphere with a cone on top, as shown in the diagram.

The toy is 12 centimetres wide and 17 centimetres high.
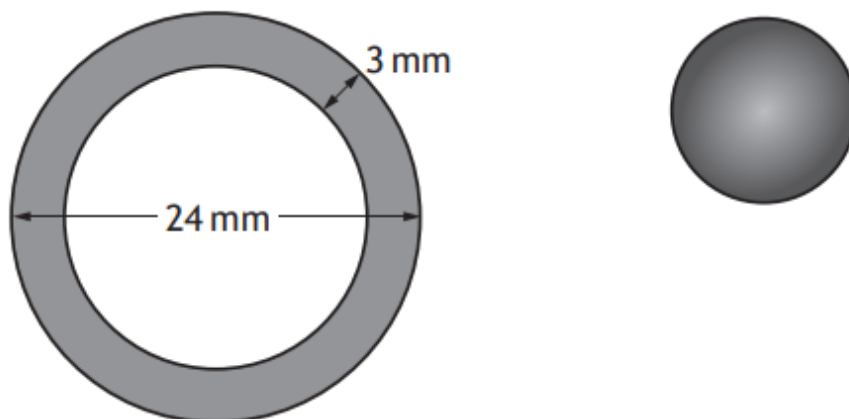
Calculate the volume of the toy.

Give your answer correct to 2 significant figures.   **5**

Answer:

870 cm³

A spherical sweet is made by coating a caramel sphere evenly with chocolate.

A cross-section of the sweet is shown below.

The diameter of the sweet is 24 millimetres and the thickness of the chocolate coating is 3 millimetres.
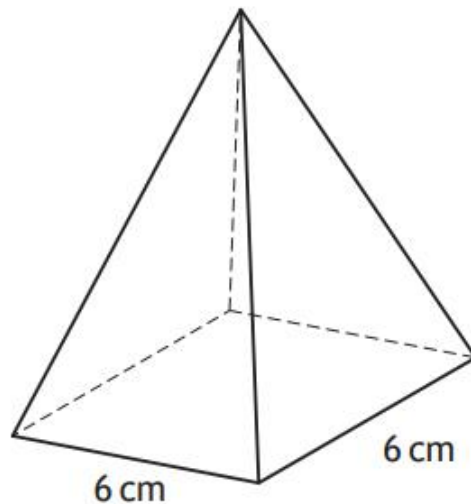
Calculate the volume of the chocolate coating.

5

Give your answer correct to 3 significant figures.

Answer:

4180 mm³

A square based pyramid is shown in the diagram below.

6 cm

6 cm

The square base has length 6 centimetres.

The volume is 138 cubic centimetres.
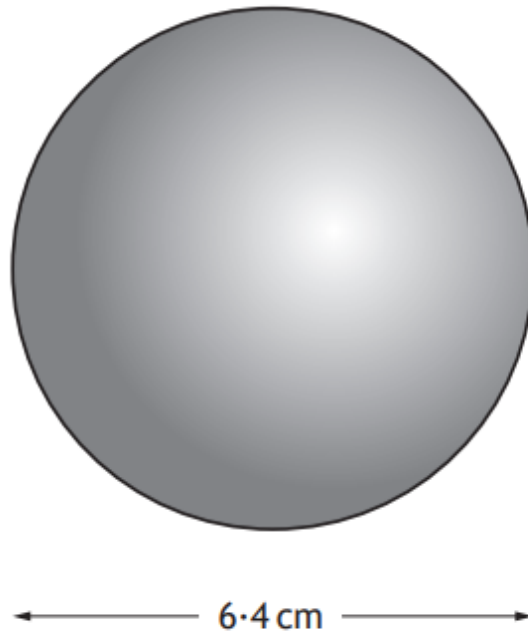
Calculate the height of the pyramid.

3

Answer:

11.5 cm

A toy company makes juggling balls in the shape of a sphere with a diameter of 6·4 centimetres.

6·4 cm

Calculate the volume of one juggling ball.

Give your answer correct to 2 significant figures.   3
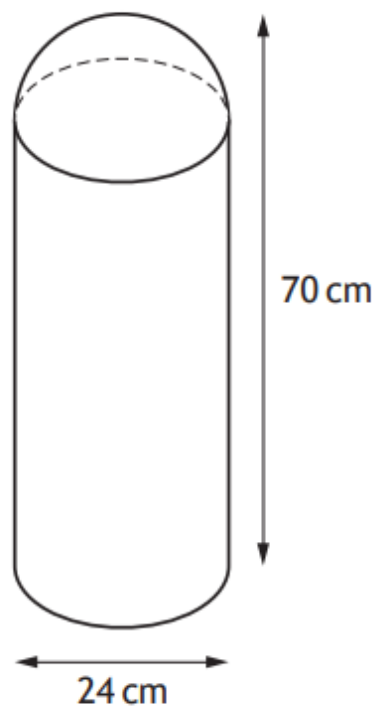
Answer:

140 cm^3

A traffic bollard is in the shape of a cylinder with a hemisphere on top.

The bollard has

- diameter 24 centimetres
- height 70 centimetres.

70 cm

24 cm

Calculate the volume of the bollard.

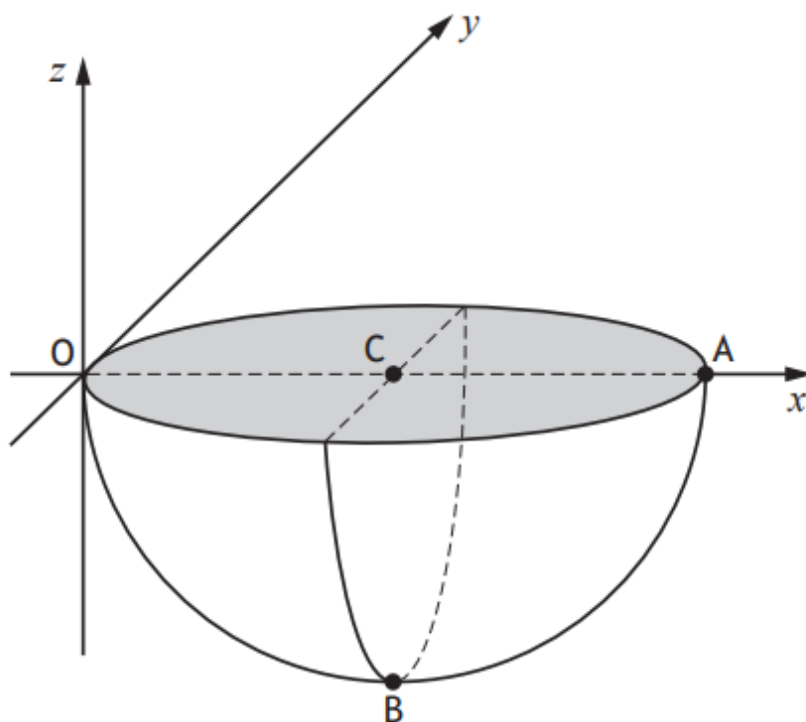Give your answer correct to 3 significant figures.

5

Answer:

29 900 cm³

The diagram shows a hemisphere relative to the coordinate axes.

- A is the point $(6, 0, 0)$
- C is the midpoint of diameter OA
- B is vertically below C

(a) State the coordinates of B. **1**

(b) Calculate the volume of the hemisphere.

Give your answer in its simplest form in terms of π. **2**
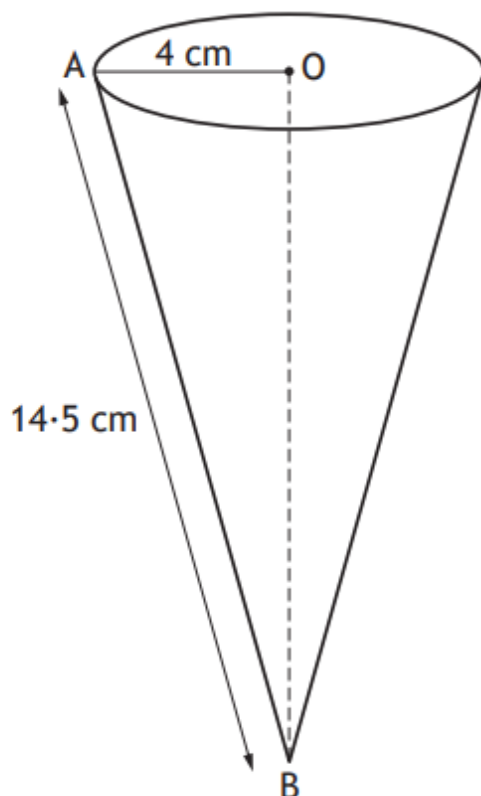
Answers:

(a) $(3, 0, -3)$
(b) 18π

The base of an ice cream cone has centre O and radius 4 centimetres.

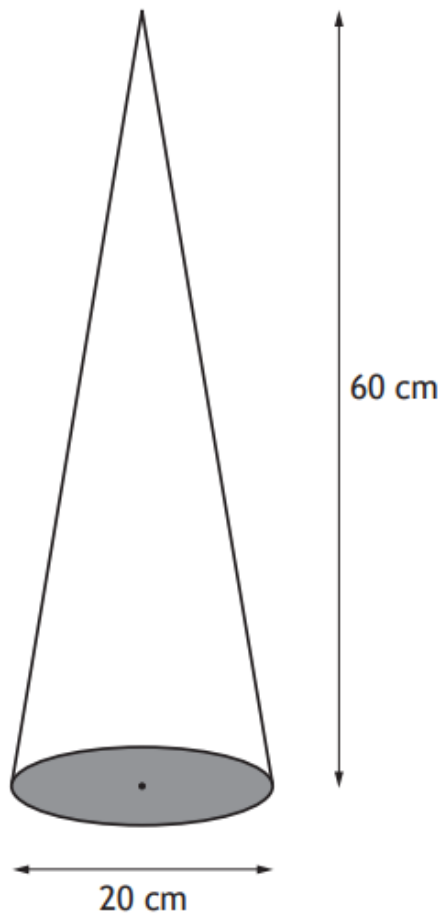The length of AB is 14·5 centimetres.

Calculate the volume of the cone.

Give your answer correct to 2 significant figures.   **5**

Answer:

230 cm^3

The diagram below shows a cone with diameter 20 centimetres and height 60 centimetres.
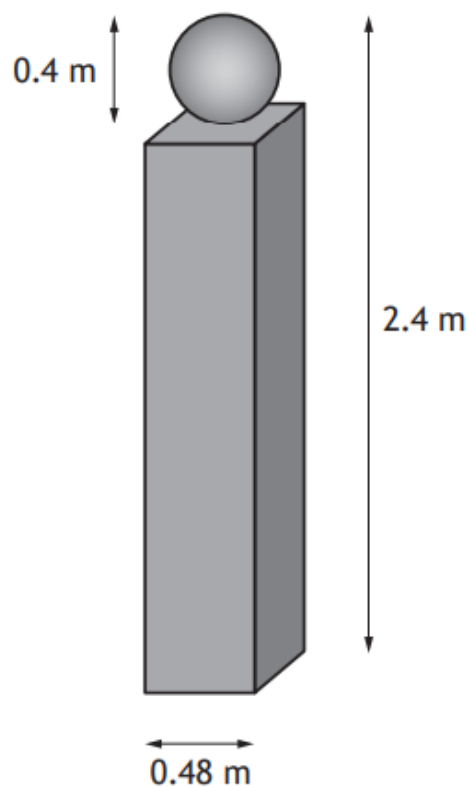

60 cm

20 cm

Calculate the volume of the cone.

Take $\pi = 3.14$.

2

Answer:

6280 cm³

A concrete gatepost is made in the shape of a cuboid with a sphere on top.

The sphere has diameter 0.4 metres.

The cuboid has a square base of length 0.48 metres.

The total height of the gatepost is 2.4 metres.
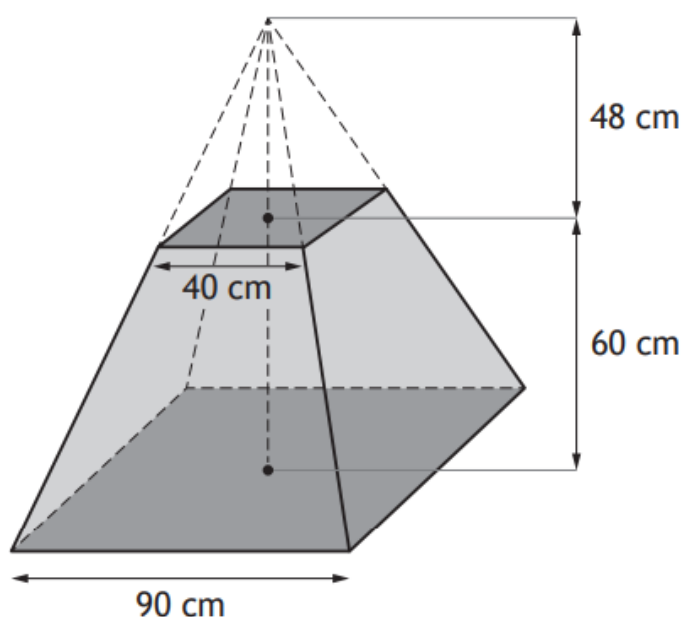
0.4 m

2.4 m

0.48 m

Calculate the volume of concrete needed to make a gatepost.

3

Answer:

0.494 m³

A concrete block is in the shape of a large pyramid with a small pyramid removed.

The large pyramid has a square base of length 90 centimetres.

The small pyramid has a square base of length 40 centimetres and a height of 48 centimetres.

The block has height 60 centimetres.

Calculate the volume of the block.   **4**

Answer:

266 000 cm³