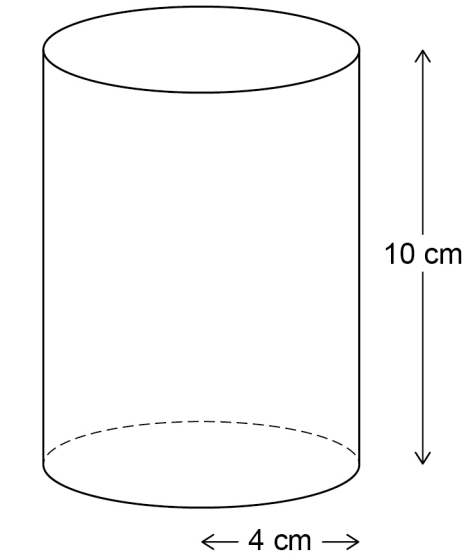
1 Here are two solids.

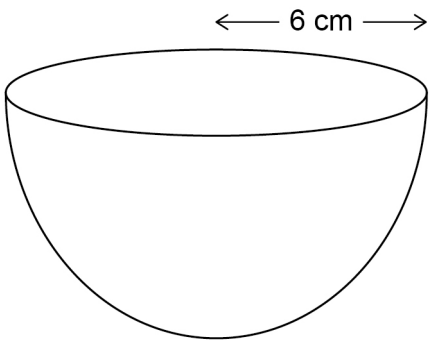
Cylinder

radius 4 cm height 10 cm



Hemisphere

radius 6 cm



volume of a hemisphere $= \frac{2}{3}\pi r^3$ where r is the radius

Which solid has the greater volume?

You **must** show your working.

[4 marks]

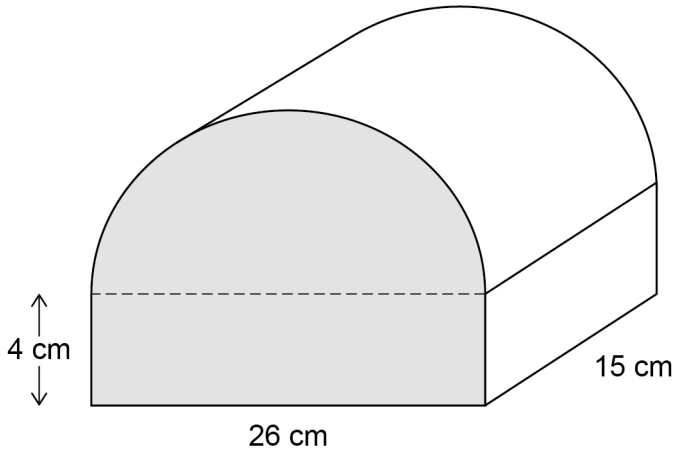
Answer _____

2 Circle the solid that has 7 vertices.

[1 mark]

hexagonal prism	hexagon-based pyramid	pentagonal prism	pentagon-based pyramid

3 A box is the shape of half a cylinder on top of a cuboid.



Work out the volume of the box.

[4 marks]

Answer _____ cm^3

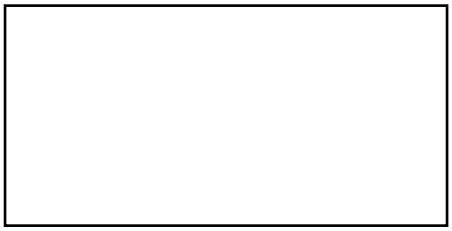
4 The cross section of a prism has n sides.

Circle the expression for the number of faces of the prism.

[1 mark]

n $2n$ $3n$ $n + 2$

5 Here is the plan of a solid.



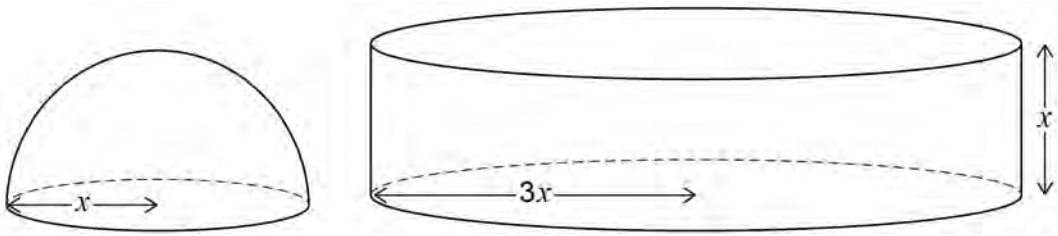
Circle the solid that it could be.

[1 mark]

sphere cone hemisphere cylinder

6 A solid hemisphere has radius x.

A solid cylinder has radius $3x$ and height x.



Surface area of a sphere = $4\pi r^2$
where r is the radius

Work out the ratio

total surface area of the hemisphere : total surface area of the cylinder

Give your answer in its simplest form.

You **must** show your working.

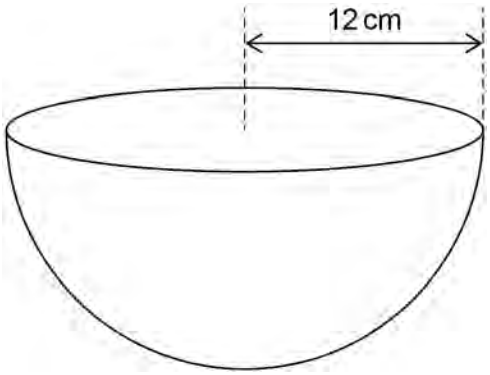
[3 marks]

Answer _____ : _____

7

Volume of a sphere = $\frac{4}{3}\pi r^3$

A bowl is a hemisphere with radius 12 cm



Water is poured into the bowl

at a rate of 325 cm^3 per second

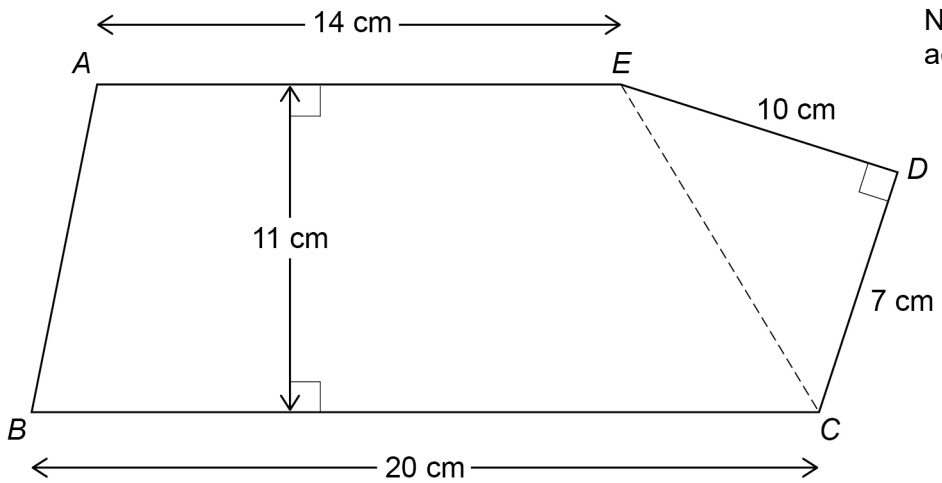
for 8 seconds.

Does the water fill **more than** 70% of the bowl?

You **must** show your working.

[4 marks]

8 *ABCDE* is a pentagon.



Not drawn accurately

Work out the area of the pentagon.

[3 marks]

Answer _____ cm^2

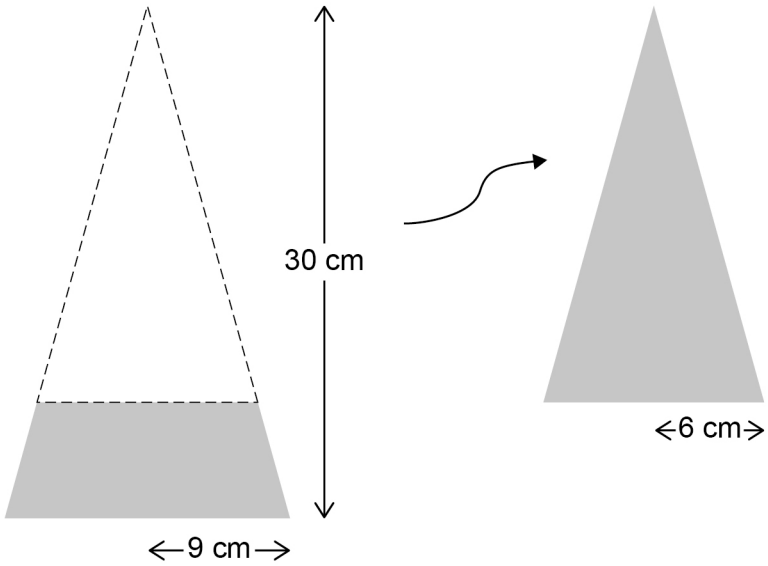
9 Alec makes a bowl for dog food from a solid wooden cone.

The sketches show how the bowl is made.

The cone has radius 9 cm and perpendicular height 30 cm

A smaller cone, with radius 6 cm, is removed.

Not drawn accurately

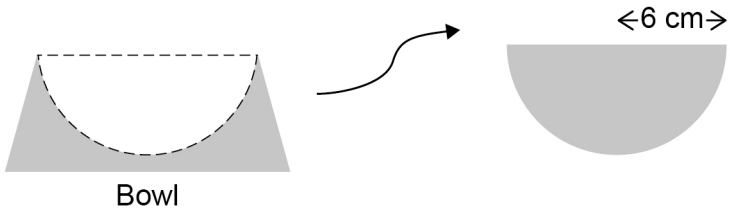


Volume of a cone $= \frac{1}{3}\pi r^2 h$

where r is the radius and h is the perpendicular height

A hemisphere with radius 6 cm is then removed.

Not drawn accurately



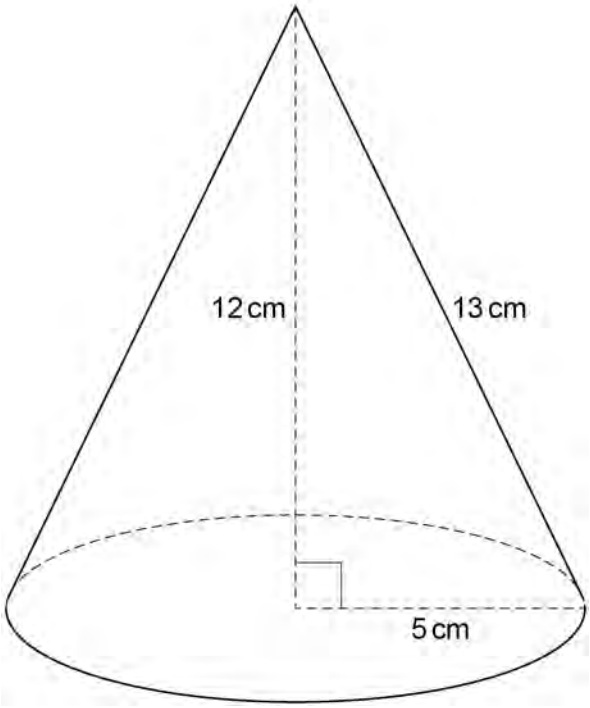
Volume of a hemisphere $= \frac{2}{3}\pi r^3$ where r is the radius

Work out the volume of the remaining wood that forms the bowl.

[5 marks]

Answer _____ cm^3

10 Here is a cone.



10 (a)

Curved surface area of a cone = πrl where r is the radius and l is the slant height

Beth tries to work out the curved surface area in terms of π

Curved surface area of the cone = $\pi \times 5 \times 12$ $= 60\pi \text{ cm}^2$

What mistake has she made?

[1 mark]

10 (b) Adam uses $\pi = 3$ to estimate the area of the **base** of the cone.

Work out his estimate.

[2 marks]

Answer _____ cm^2

10 (c) Beth uses $\pi = 3.14$ to estimate the area of the **base** of the cone.

Is Beth's estimate more than or less than Adam's estimate?

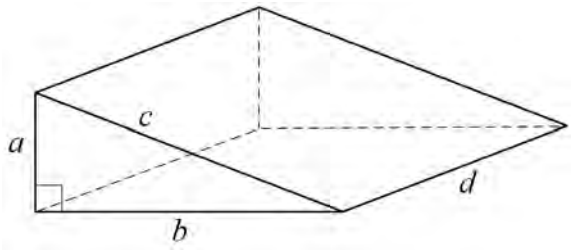
Tick a box.

More than ☐ Less than ☐

Give a reason for your answer.

[1 mark]

11 Here is a right-angled triangular prism.



The ratio of the edges is $a : b : c : d = 3 : 4 : 5 : 12$

The **volume** of the prism is $1125\,\text{cm}^3$

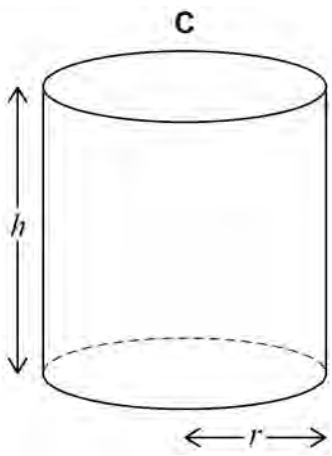
Work out the total length of **all** of the edges of the prism.

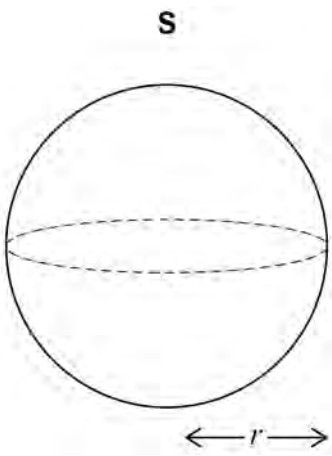
[5 marks]

Answer _____ cm

12 A cylinder, C, and a sphere, S, each have radius r

C has height h





Volume of a sphere = $\frac{4}{3}\pi r^3$

where r is the radius

12 (a) volume of C = volume of S

Work out the ratio r : h

You **must** show your working.

[3 marks]

Answer _____ : _____

12 (b) A **different cylinder** has radius $3r$ and height $2h$.

How many times bigger is the volume of this cylinder than the volume of C?

[2 marks]

Answer _____