1   Here are two solids.

Cylinder

radius 4 cm   height 10 cm

10 cm

$\leftarrow$ 4 cm $\rightarrow$
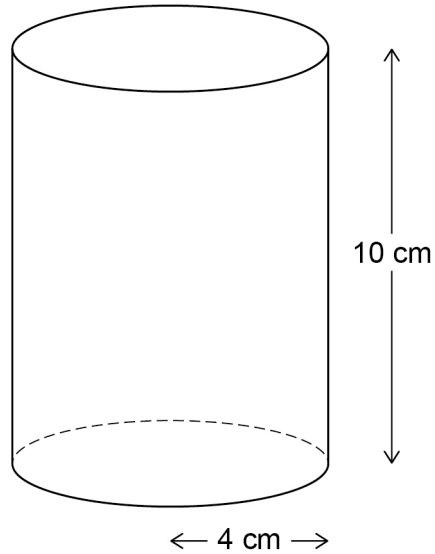
Hemisphere

radius 6 cm

$\longleftarrow$ 6 cm $\longrightarrow$
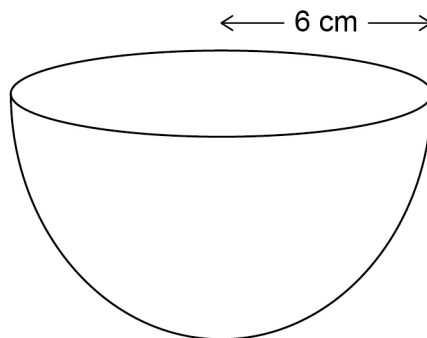
volume of a hemisphere $= \dfrac{2}{3} \pi r^3$ where r is the radius
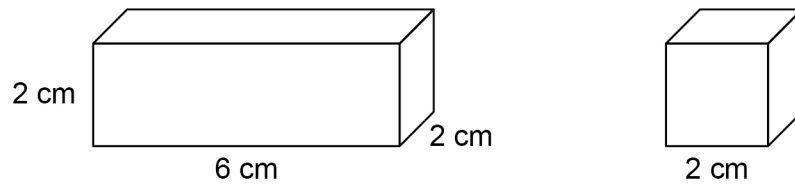
Which solid has the greater volume?
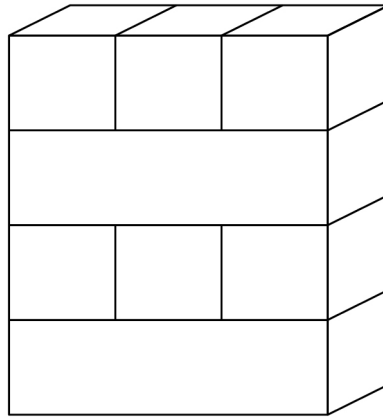
You **must** show your working.

[4 marks]

Answer _____

2   Here is a small cuboid and a cube.

2 cm

6 cm

2 cm

2 cm

Small cuboids and cubes are stacked in layers to make larger cuboids.
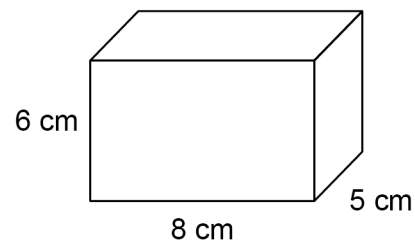
Here is a cuboid made with four layers.

The pattern is continued to make a cuboid with volume 336 cm^3

How many **cubes** are used?

[3 marks]

_____

_____

_____

_____

_____

Answer _____

3   Here is a cuboid.

6 cm

8 cm

5 cm

Work out the volume.

[1 mark]

Answer _____ cm^3

4   A ball contains 5000 cm^3 of air.

More air is pumped into the ball at a rate of 160 cm^3 per second.

The ball is full of air when it becomes a sphere with radius 15 cm

> Volume of a sphere $= \dfrac{4}{3}\pi r^3$ where r is the radius

Does it take **less than** 1 minute to fill the ball?
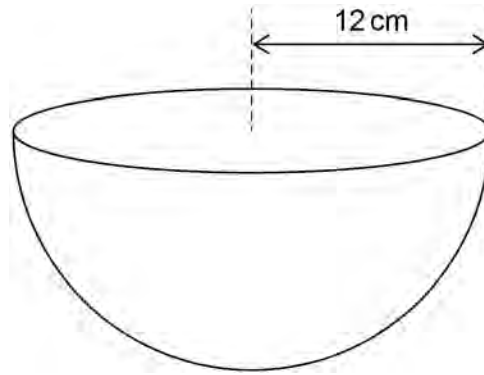
You **must** show your working.

[4 marks]

5

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

A bowl is a hemisphere with radius 12 cm

Water is poured into the bowl
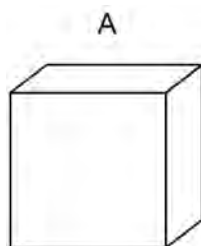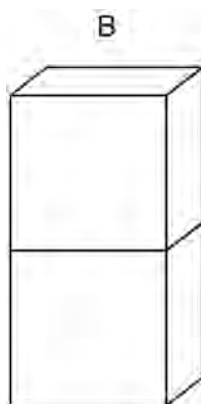
at a rate of 325 cm^3 per second

for 8 seconds.

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

You **must** show your working.

[4 marks]

_____

_____

_____

_____

_____

_____

_____

_____

_____

6   Here is cuboid A.

Cuboid B is made from **two** of cuboid A.

volume of A : volume of B = 1 : 2

Matthew says,

   "surface area of A : surface area of B must be 1 : 2 because B is made of 2 of A."

Is Matthew correct?
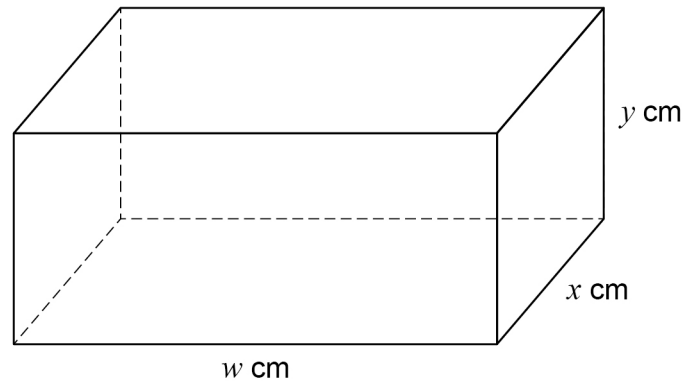
Tick **one** box.

☐ Yes   ☐ No   ☐ Cannot tell

Give a reason for your answer.

[2 marks

_____

_____

_____

_____

_____

_____

7 (a)   Here is a cuboid.

w, x and y are **different** whole numbers.

y cm

x cm

w cm

The total length of **all** the edges of the cuboid is 80 cm

The volume is **greater** than 200 cm^3

Work out one possible set of values for w, x and y.

[2 marks]

_____

_____

_____

_____

_____

_____

$w =$ _____ $x =$ _____ $y =$ _____

7 (b) Here is a solid cube.

$3a$ cm

$3a$ cm

$3a$ cm
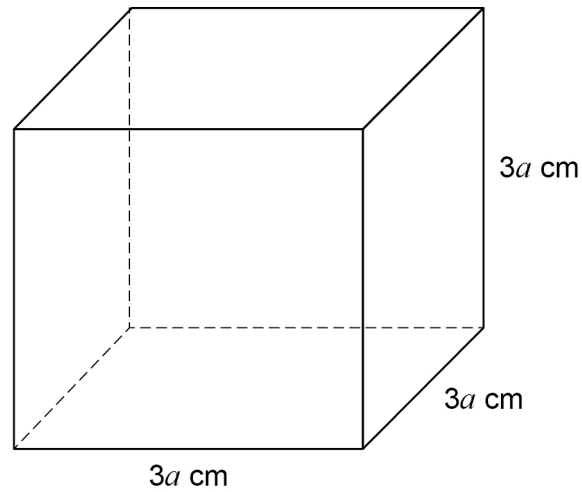
Circle the expression for the **total** surface area in cm^2
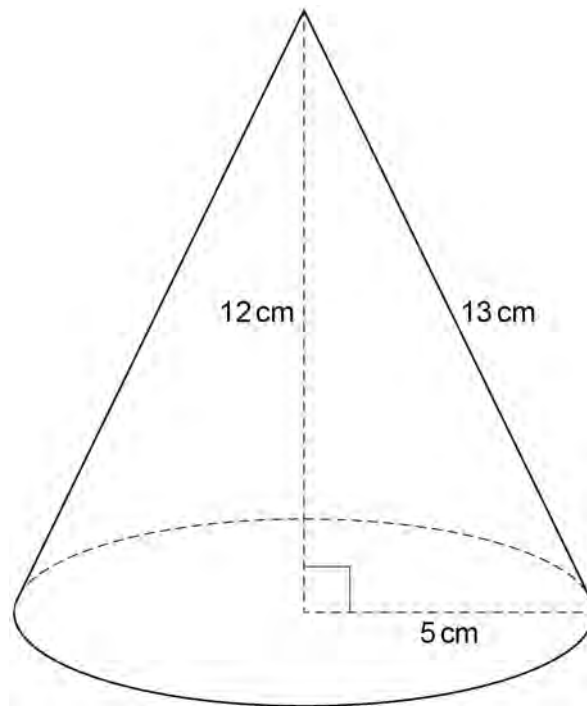
[1 mark]

$36a$ $54a$ $36a^2$ $54a^2$

8   Here is a cone.

8 (a)

> Curved surface area of a cone $= \pi r l$
>
> 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]

_____

_____

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

Work out his estimate.

[2 marks]

Answer _____ cm^2

8 (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]