S3 NAT5 Applications **Numeracy Revision** Week beginning 1 June 2020

ANSWERS

Area Perimeter Volume

Example**:**

Using the formula for the **volume of a cylinder** $\boldsymbol{V = \pi r^2 h}$
find the volume of a cylinder where r = 5cm and h = 10cm.
Take π= 3.14
Answer :

$V = \pi r^2 h$
= 3.14 X 5² X 10
= 785cm³

1. Find the volume of a cylinder where :
   (a) r = 4cm h = 10cm 502.4cm³
   (b) r = 3cm h = 5cm 141.3cm³
   (c) r = 2.5cm h = 4cm 78.5cm³
   (d) r = 3.4cm h = 20cm 726.0cm³

2. A glass is **cylindrical** in shape.
   The circular top has a **radius** of 3.2 centimetres.
   The height of the glass is 15centimetres.
   Find the volume of the glass.
   Give your answer to the nearest cubic centimetre.
   482cm³

Example :

The formula for the **volume of a sphere is** $\boldsymbol{V = \frac{4}{3}\pi r^3}$
Find the volume of a sphere whose radius is 9cm.

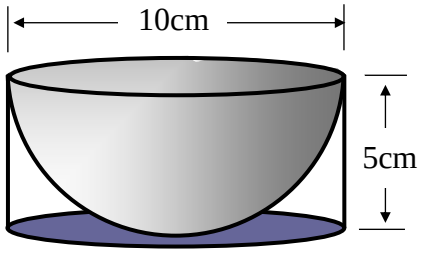
Answer
$V = \frac{4}{3}\pi r^3$
$= \frac{4}{3} X\ 3.14\ X\ 9^3$
= 3052.1cm³ to 1 dec place

3. Find the volume of the spheres where :
   (a) r = 3cm 113.0cm³
   (b) r = 6cm 904.3cm³
   (c) r = 2.5cm 65.4cm³
   (d) r = 5.7cm 775.3cm³
   giving your answers correct to 1 decimal place.

To find the volume of a hemisphere,
find the volume of the sphere then divide by 2.

Example :

Find the volume of the hemisphere shown opposite.



Answer :

Diameter = 10cm
So r = 5

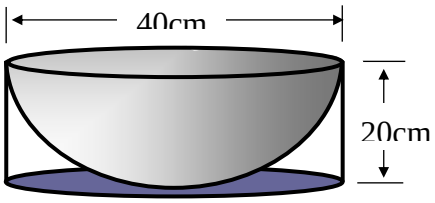
$$V = \frac{4}{3}\pi r^3$$

$$= \frac{4}{3}\pi r^3 = \frac{4}{3}\ X\ 3.14\ X\ 5^3 = 523.3\text{cm}^3$$

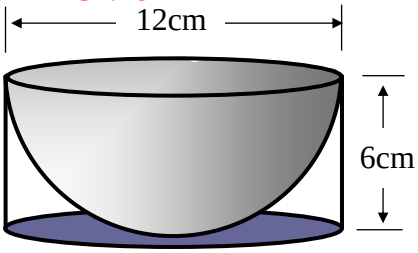
So volume of hemisphere = 523.3 ÷ 2
= 261.7 cm^3 correct to 1 decimal place.

4. Find the volume of these hemispheres in the same way :

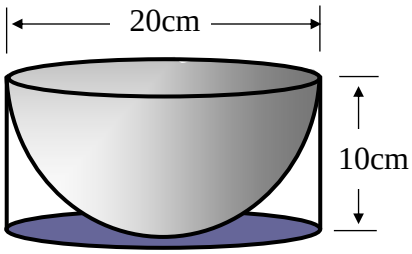
(a) 16746.7cm³



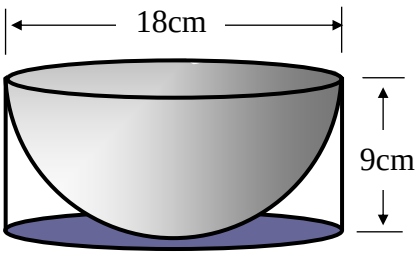
(b) 452.2cm³



(c) 2093.3cm³



(d) 1526.0cm³



Example :

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

Using the formula, find the volume of a cone where the radius is 6cm and the height is 20cm.

Answer : V = ⅓πr²h = ⅓ X 3.14 x 6² X 20 = 753.6cm³

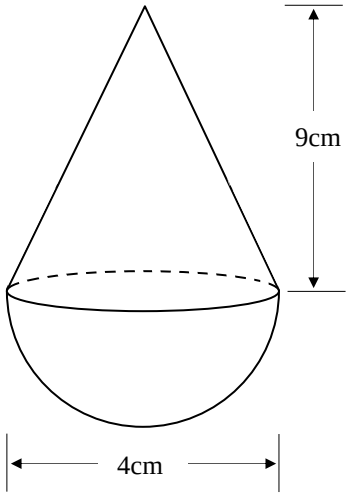
5. In the same way find the volume of a cone where :

(a) r = 4cm	h = 12cm	201.0
(b) r = 5cm	h = 10cm	261.7cm³
(c) r = 3cm	h = 6.5cm	61.2cm³
(d) r = 8.2cm	h = 100cm	7037.8cm³

Example :

The shape opposite consists of a cone sitting on top of a hemisphere.
Find :

(a) the volume od the cone
(b) the volume of the hemisphere
(c) the total volume.



Answer :

(a) diameter of semi-circle = 4cm so r = 2cm

$V = \frac{1}{3}\pi r^2 h = \frac{1}{3} \times 3.14 \times 2^2 \times 9 = 37.7\text{cm}^3$

(b) Volume of sphere

$= \frac{4}{3}\pi r^3 = \frac{4}{3} \times 3.14 \times 2^3 = 33.5\text{cm}^3$

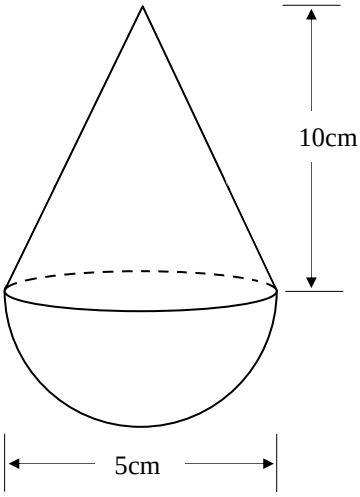
So volume of hemisphere = 33.5 ÷ 2

= 16.8 cm^3 correct to 1 decimal place.

(c) Total volume = 37.7 + 16.8 =54.5cm^3

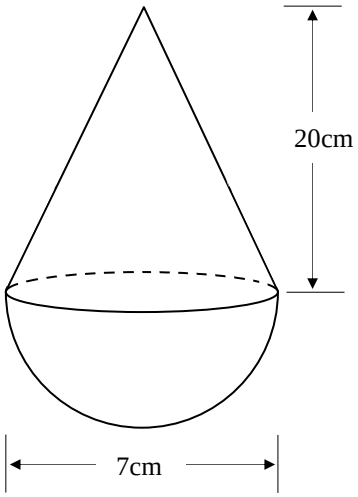
6. Find the volume of each of these shapes :

(a)



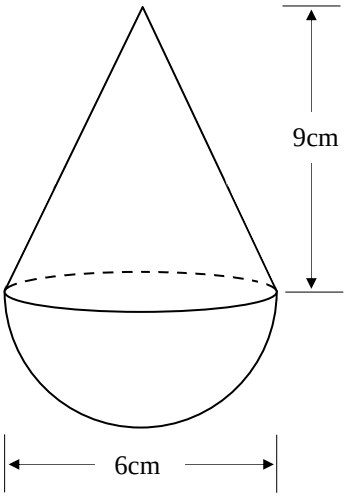
65.4cm³
32.7cm³
98.1cm³

(b)



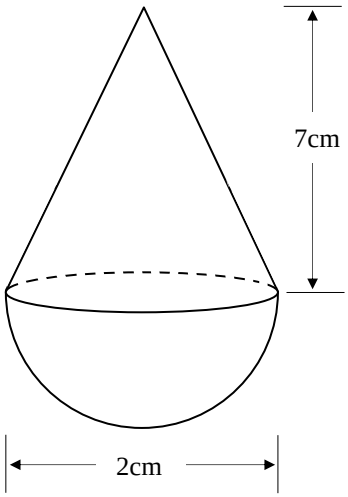
256.4cm³
89.8cm³
346.2cm³

(c)



84.8cm³
56.5cm³
141.3cm³

(d)



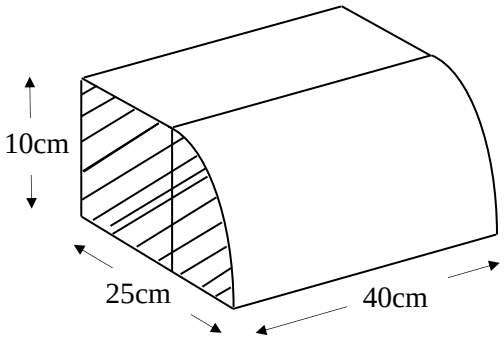
7.3cm³
2.1cm³
9.4cm³

Example :

The diagram shows a bread-bin.
The shaded side is made up from a rectangle and a quarter circle

.

(a) Calculate the shaded area.
(b) Calculate the volume of the bread-bin.
(c) Calculate the length of the black strip around the left side of the bin

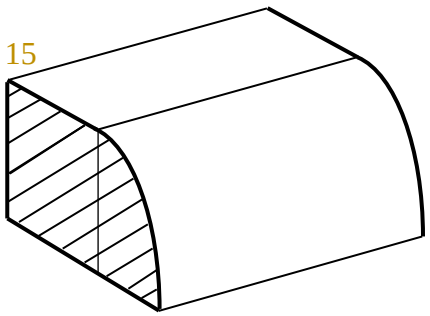


Answer :

(a) Area of rectangle = L X B = 10 X 15 L = 10 B = 25-10 = 15
= 150cm²

Area of circle $A = \pi r^2$ r = 10cm
= 3.14 X 10²
= 314cm²

Area of ¼ circle = 314 ÷ 4
=78.5cm²



Shaded Area of side
= 150 + 78.5
= **228.5cm²**

(b) Volume of tin = **A**rea of side X **L**ength of tin

= 228.5 X 40
= 9140cm³

(c) Circumference of circle

C = πD = 3.14 X 20 = 62.8cm D = 2r =2 X 10 = 20

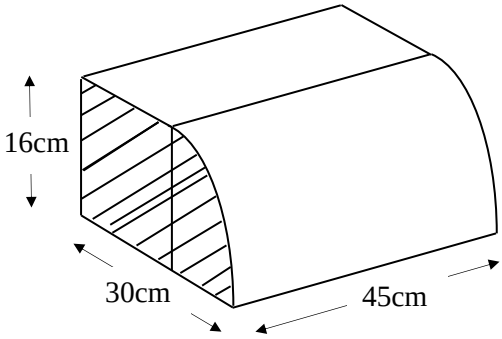
Length of arc = 62.8 ÷4 = 15.7cm

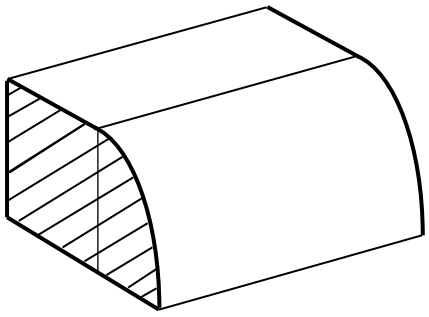
So length of strip = L + B + 25 + arc = 15 +10 +25 + 15.7 = 65.7cm

7. In each of the following , as in the example :

(a) Calculate the shaded area.
(b) Calculate the volume of the bread-bin.
(c) Calculate the length of the black strip around the left side of the bin.

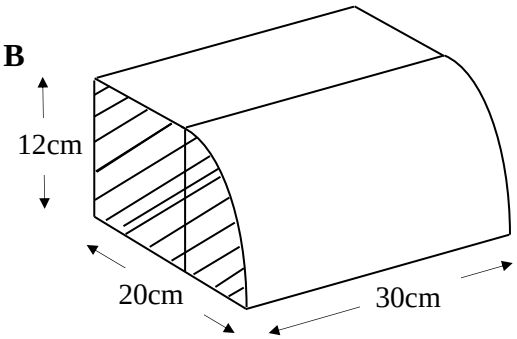
A

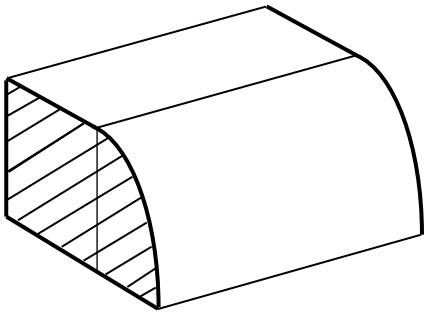




224 + 201 = 425cm²
425 X 45 = 19125cm³
14 +16 +30 + 25.1 = 85.1cm

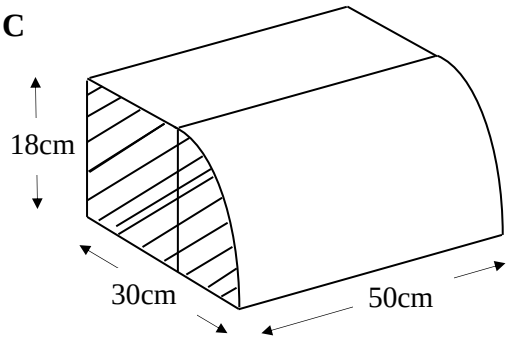
B

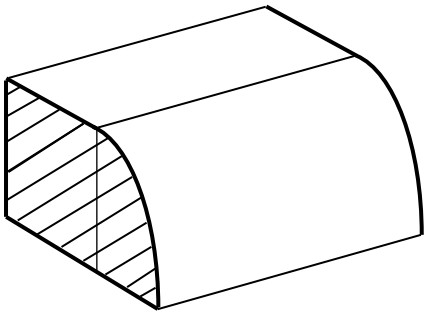




96 +113 = 209cm²
299 X 30 = 6270cm³
8 + 12 + 20 + 18.8 = 58.8cm

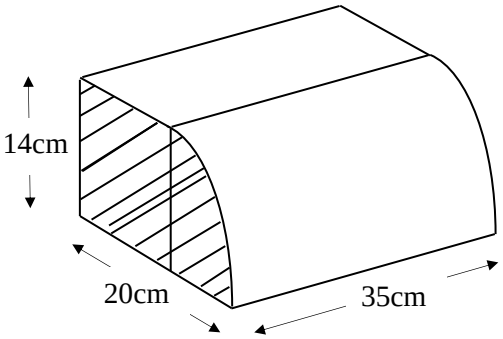
C

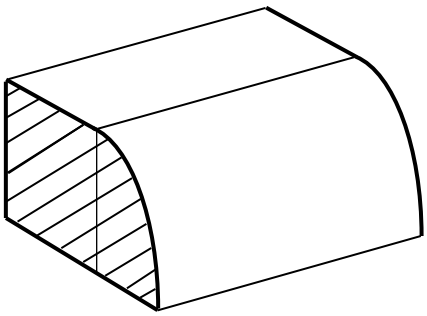




216 + 254.3 = 470.3cm²
470.3 X 50 = 23515cm³
12 + 18 + 30 + 28.3 = 88.3cm

D





84 + 153.9 = 237.9cm²
237.9 X 35 = 8326.5cm³
6 + 14 + 20 + 22.0 = 62.0cm

Mrs McLaughlin
Mr Mailley