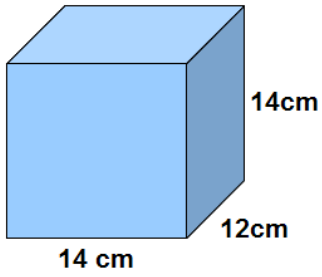
GRADE 10_CAPS Curriculum

10.1 Measurement

All the calculations must be approximated correct to two decimal places.

1.1 Volume and surface area of prisms.

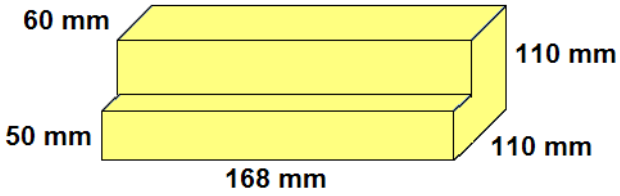
(a) Calculate the volume of the prism.



(b) Calculate the value of the length of a side if the volume of the cube is 67419.14 mm^3.

(c) Calculate the volume and surface area of the prism in mm^3.

(d) Calculate the volume and the surface area of the prism in mm^3.



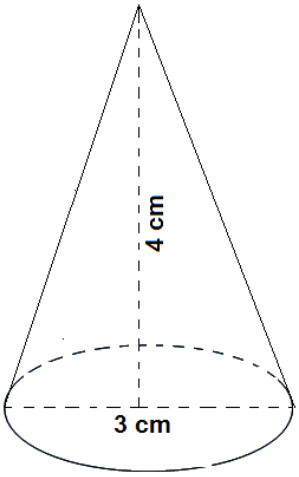
1.2 Volume and surface area of pyramids and cones.

(a) A pyramid has an isosceles, triangular base with sides 25; 25 and 48 units. The height of the pyramid is 30 units. Calculate the volume of the pyramid.

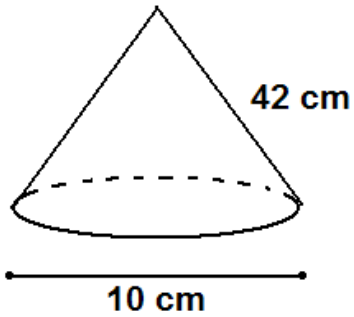
(b) A right pyramid has a square base 6 cm by 6 cm and each face has a slant height of 5 cm. Calculate:

- The height of the pyramid
- The volume of the pyramid
- The total surface area of the pyramid

(c) Calculate the volume of the given cone.

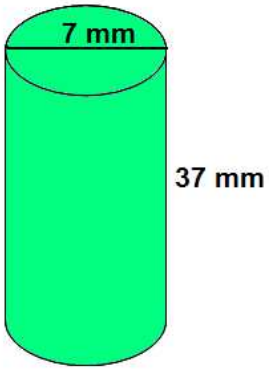


(d) Calculate the surface area of the given cone.

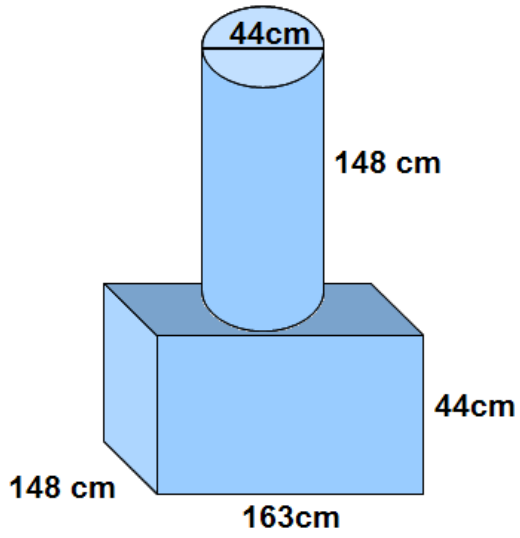


1.3 Volume and surface areas of spheres and cylinders.

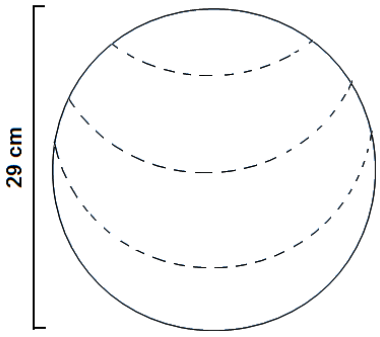
(a) Calculate the surface area of the given cylinder.



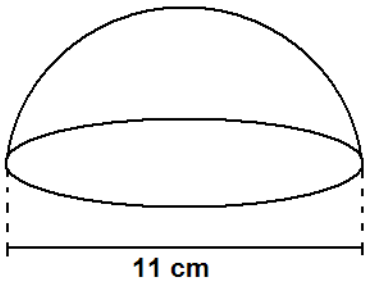
(b) Calculate the volume of the 3D object.



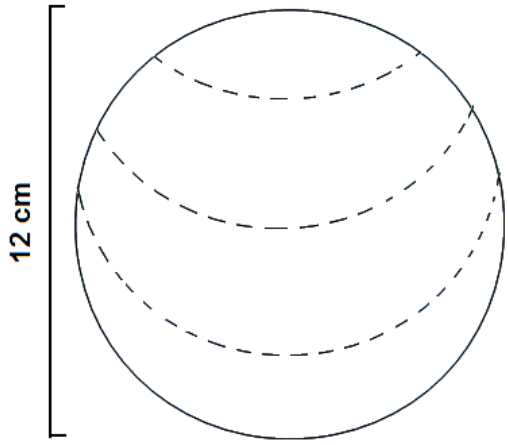
(d) Calculate the volume of the sphere.



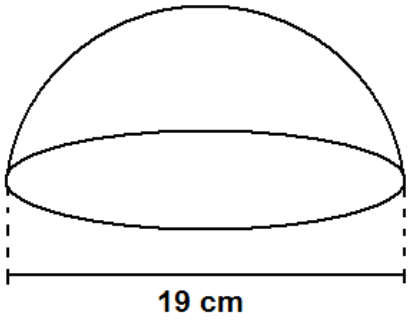
(e) Calculate the volume of a hemisphere.



(f) Calculate the surface area of the given sphere.



(g) Calculate the surface area of the hemisphere.



MEMO

1.1 Volume and surface area of prisms. [9.5.1.1; 9.5.1.2; 9.5.1.3; 9.5.1.4; 9.4.1]

(a) Volume = Length × Width × Height
= 14 cm × 14cm × 12cm
= 2 352 cm^3

(b) Calculate the value of the length of a side if the volume of the cube is 67419.14 mm^3.

Volume = s^3
67 419.14 cm^3 = s^3
$\sqrt[3]{67419.14}$ cm = s
s = 40.70 cm

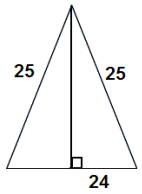
(c) Volume = Length × Width × Height
= 120 mm × 30 mm × 40 mm
= 144 000 mm^3

Surface area = 2(LW) + 2(LH) + 2(HW)
= 2(120)(30) + 2(120)(40) + 2(40)(30)
= 19 200 mm^2

(d) Volume = Area of the base × Height
= [(110 × 110) – (60 × 50)] × 168
= 1 528 800 mm^3

1.2 Volume and surface area of pyramids and cones. [9.5.3; 9.4.4; 9.4.3]

(a) A pyramid has an isosceles, triangular base with sides 25; 25 and 48 units. The height of the pyramid is 30 units. Calculate the volume of the pyramid.



$25^2 - 24^2 = (\perp Height)^2$

$49 = (\perp Height)^2$

$7 = \perp Height$

Area of the Base $= \frac{1}{2} \times$ base $\times$ height

$= \frac{1}{2} \times 48 \times 7$

$= 168$ unit^2

Volume of Pyramid $= \frac{1}{3} \times$ Area of base $\times$ Height

$= \frac{1}{3} \times 168 \times 30$

$= 1680$ units^3

(b)

- The height of the pyramid

$5^2 - 3^2 = height^2$

$4 = height$

- The volume of the pyramid

Volume $= \frac{1}{3} \times$ Area of base $\times$ height

$= \frac{1}{3} \times 36 \times 4$

$= 48$ cm^2

- The total surface area of the pyramid

Total surface area $= 4(\frac{1}{2} \times 6 \times 5) + 6^2$

$= 96$ cm^2

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

$= \frac{1}{3} \times \pi \times (1.5)^2 \times 4$

$= 9.42$ c m^3

(d) Surface area of a cone $= \pi r^2 \times \pi rs$
$= \pi(5)^2 \times \pi(5)(42)$
$= 51\ 815.42\ cm^2$

1.3 Volume and surface areas of spheres and cylinders.
[9.4.1; 9.5.4; 9.5.5; 9.5.2.1; 9.5.2.2; 9.5.2.3; 9.5.2.4]

(a) Surface area of a cylinder $= 2\pi r^2 + 2\pi rh$
$= 2\pi(3.5)^2 + 2\pi(3.5)(37)$
$= 890.64\ mm^2$

(b) Volume of the 3D object = Volume of cylinder + Volume of prism
$= \pi r^2 h + (L \times W \times H)$
$= \pi(22)^2(148) + (163 \times 148 \times 44)$
$= 1\ 286\ 494.57\ cm^3$

(d) Volume of a sphere $= \frac{4}{3}\pi r^3$
$= \frac{4}{3} \times \pi \times (14.5)^3$
$= 12\ 770.05\ cm^3$

(e) Volume of a hemisphere $= \frac{4}{6}\pi r^3$
$= \frac{4}{6} \times \pi \times (5.5)^3$
$= 348.45\ cm^3$

(f) Surface area of a sphere $= 4\pi r^2$
$= 4 \times \pi \times (6)^2$
$= 452.39\ cm^2$

(g) Surface area of a hemisphere $= \frac{1}{2}(4\pi r^2) + \pi r^2$
$= 2 \times \pi \times (9.5)^2 + \pi \times (9.5)^2$
$= 850.59\ cm^2$