Mensuration – 2022 O Level Math D 4024

1. Nov/2022/Paper_4024/11/No.23

[Volume of a cone $= \frac{1}{3}\pi r^2 h$, curved surface area of a cone $= \pi r l$]

[Surface area of a sphere $= 4\pi r^2$]

A solid cone has radius y cm.
The slant height of the cone is 25% larger than the radius of the cone.

A solid sphere has radius R cm.
The surface area of the sphere is equal to the **total** surface area of the cone.

(a) Show that $y = \frac{4R}{3}$.

[3]

(b) Find the volume of the cone in terms of R.
Give your answer as simply as possible.

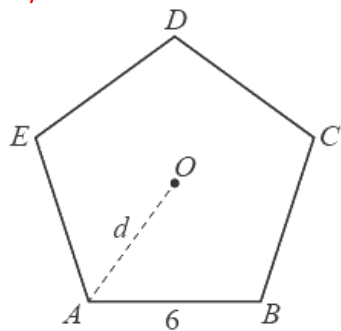.. cm^3 [4]

2. Nov/2022/Paper_4024/12/No.5

The perimeter of a regular hexagon is equal to the perimeter of a regular octagon.
Each edge of the octagon is 9 cm long.

Find the length of one edge of the hexagon.

.... cm [2]

2. Nov/2022/Paper_4024/12/No.5

3. Nov/2022/Paper_4024/21/No.11

NOT TO
SCALE

The diagram shows a regular pentagon $ABCDE$ with centre O.
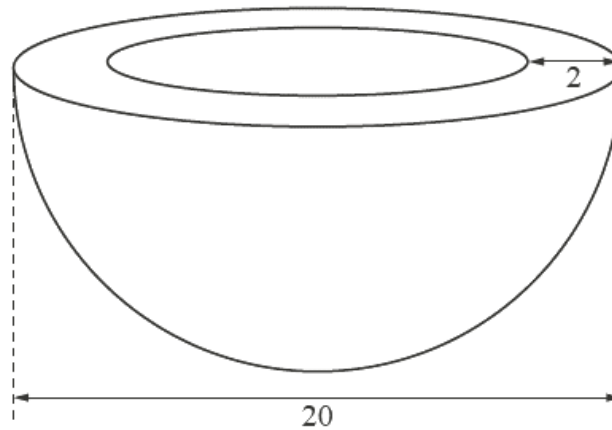$AB = 6\,\text{cm}$ and $OA = d\,\text{cm}$.

(a) Show that $d = 5.10\,\text{cm}$, correct to 2 decimal places.

[3]

4

4. Nov/2022/Paper_4024/22/No.9

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

[Surface area of a sphere $= 4\pi r^2$]

The diagram shows a wooden bowl.
It is made in the shape of a large hemisphere with a small hemisphere removed from the centre.
The diameter of the large hemisphere is 20 cm.
The width of the rim of the bowl is 2 cm.

(a) Show that the total surface area of the bowl is $364\pi\,\text{cm}^2$.

[3]

(b) The bowl is made from wood.
The mass of 1cm^3 of the wood is $0.74\,$g.

Calculate the mass of the bowl.

.... g [3]

(c) Another bowl is mathematically similar to the first bowl and is made from the same type of wood.
The total surface area of the second bowl is $546\pi\,\text{cm}^2$.

Calculate the mass of the second bowl.

.... g [3]

5. June/2022/Paper_4024/11/No.4

Two cubes have a total volume of $152\,\text{cm}^3$.
One cube has an edge of length $5\,\text{cm}$.

(a) Calculate the length of the edge of the other cube.

.... cm [2]

(b) Work out the **total** length of all of the edges of the larger cube.

.... cm [1]
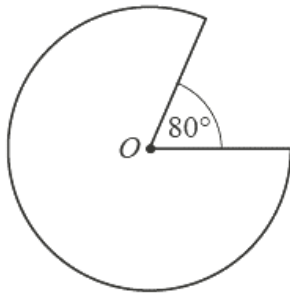
6. June/2022/Paper_4024/12/No.7
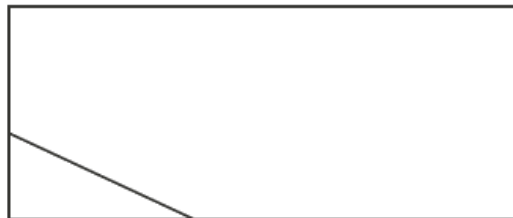
NOT TO SCALE

The area of the rectangle is $9\,\text{cm}^2$.
The area of the triangle is $85\,\text{mm}^2$.

Calculate the shaded area.
Give your answer in cm^2.

.... cm^2 [2]

7. June/2022/Paper_4024/12/No.23

NOT TO SCALE

The diagram shows the major sector of a circle with centre O and radius $3\,\text{cm}$.

Calculate the area of this sector.
Give your answer in the form $k\pi$, where k is an integer.

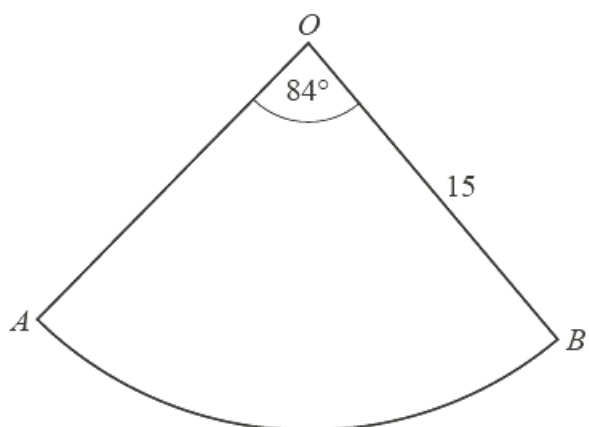.. cm^2 [2]

8. June/2022/Paper_4024/21/No.4

(a) A cuboid has dimensions x cm by x cm by 10 cm.
The volume of the cuboid is 62.5 cm^3.

Find the value of x.

$x = $ .... [2]
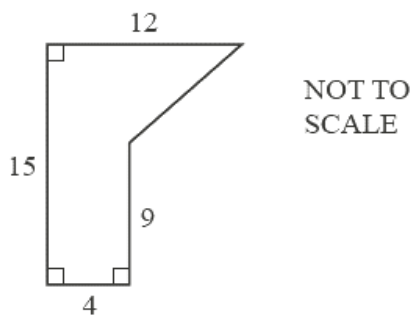
(b)

A piece of card, AOB, is a sector of a circle, centre O, with angle 84° and radius 15 cm.

(i) Show that the arc length of the sector is 7π cm.

[1]

9. June/2022/Paper_4024/22/No.4

(a)

The diagram shows a pentagon.
All the lengths are in centimetres.

(i) Calculate the area of the pentagon.

.... cm^2 [2]

(ii) Find the perimeter of the pentagon.

.... cm [3]

(b) [Volume of a sphere $= \frac{4}{3}\pi r^3$]

A sphere has a volume of $2572\,\text{cm}^3$.

Find the radius of the sphere.

.... cm [3]

11

(c)
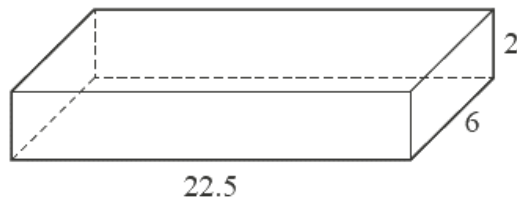
A cuboid has dimensions 2 cm by 6 cm by 22.5 cm.

(i) Calculate the surface area of the cuboid.

.... cm^2 [3]

(ii) A cube of edge x cm has the same surface area as the cuboid.

Form an equation in x and solve it to find the length of the edge of the cube.
Show your working.

.... cm [3]