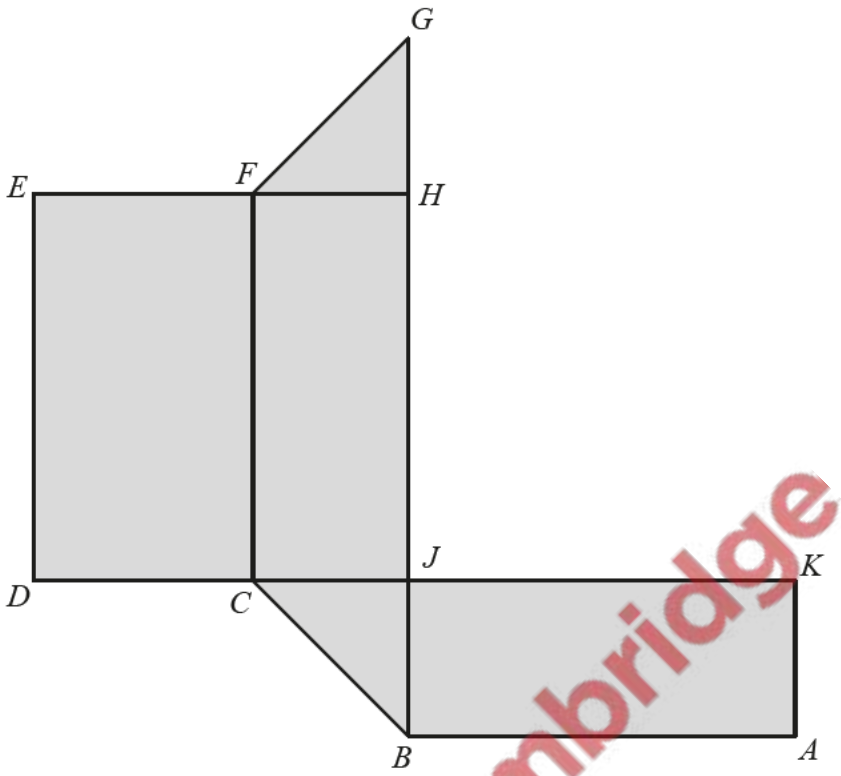
Mensuration – 2020 O Level Math D

1. Nov/2020/Paper_12/No.14



This net is folded to make a triangular prism.

(a) Which vertices join with A?

..... [1]

(b) Which edge joins with DE?

..... [1]

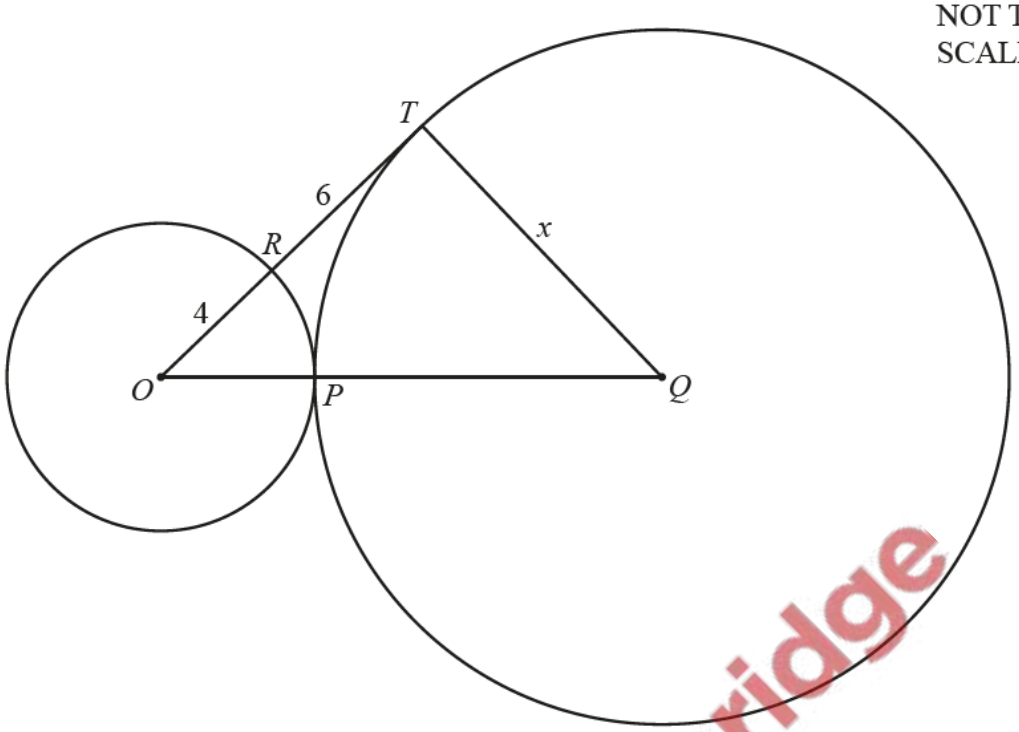
(c) $FH = 2$ cm, $GH = 2$ cm and $JH = 5$ cm.

Find the volume of the triangular prism.

..... cm^3 [2]

2. Nov/2020/Paper_12/No.23

NOT TO SCALE



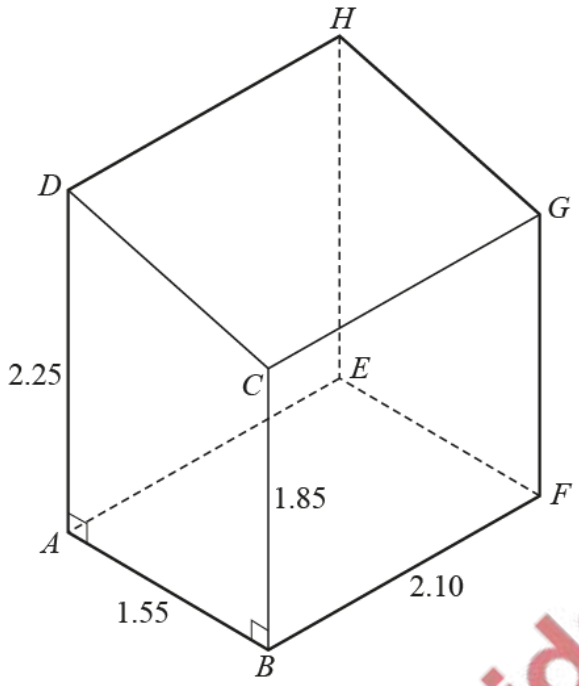
In the diagram, the circles with centres O and Q touch at P where OPQ is a straight line.
The line ORT intersects the smaller circle at R and is a tangent to the larger circle at T.

$OR = 4$ cm and $RT = 6$ cm.
The radius of the larger circle is x cm.

Calculate the value of x.

$x =$ ..... [4]

3. Nov/2020/Paper_21/No.5



The diagram shows a garden shed positioned on horizontal ground.
It is in the shape of a prism with trapezium $ABCD$ as its cross-section.
The base of the shed, $ABFE$, is a rectangle.
$AB = 1.55\,\text{m}$, $AD = 2.25\,\text{m}$, $BC = 1.85\,\text{m}$ and $BF = 2.10\,\text{m}$.

(a) Calculate the volume of the shed.

..... m^3 [3]

(b) The roof of the shed, *CGHD*, is painted.
1 litre of paint covers 2 square metres.

Calculate the amount of paint used.

..... litres [4]

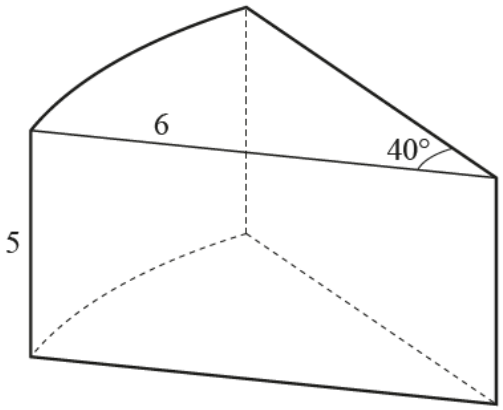
(c) Calculate the angle of elevation of *D* from *F*.

..... [4]

4. Nov/2020/Paper_21/No.7b

(b)

Solid A



The cross-section of solid A is the sector of a circle of radius 6 cm and angle 40°.
The height of solid A is 5 cm.

(i) Calculate the total surface area of solid A.

..... cm^2 [4]

(ii) Solid B is mathematically similar to solid A.
The ratio volume of solid A : volume of solid $B = 27 : 1$.

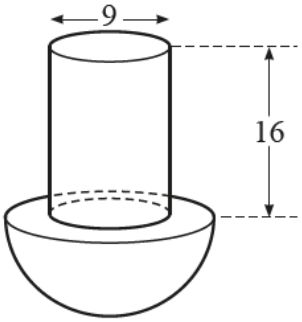
Calculate the surface area of solid B.

..... cm^2 [2]

5. Nov/2020/Paper_22/No.4

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

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



The diagram shows a solid formed by joining a cylinder to a hemisphere.
The diameter of the cylinder is 9 cm and its height is 16 cm.

(i) The volume of the hemisphere is equal to the volume of the cylinder.

Show that the radius of the hemisphere is 7.86 cm, correct to 2 decimal places.

[4]

(ii) Calculate the total surface area of the solid.

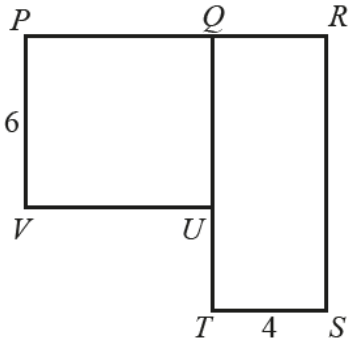
..... cm^2 [3]

(b) A different solid is in the shape of a cuboid.
The cuboid measures 8 cm by 4 cm by 6 cm.
These measurements are given correct to the nearest centimetre.

Calculate the lower bound of the volume of the cuboid.

..... cm^3 [2]

6. June/2020/Paper_11/No.8



NOT TO SCALE

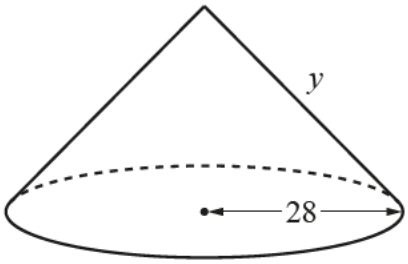
PQUV is a square with side 6 cm.
QRST is a rectangle with width 4 cm.
The area of the square is equal to the area of the rectangle.

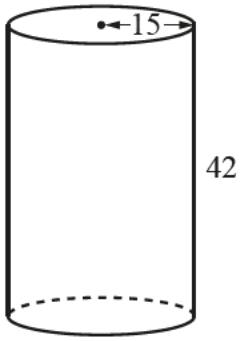
Work out the perimeter of the shape *PRSTUV*.

..... cm [3]

7. June/2020/Paper_11/No.24

[Curved surface area of a cone = πrl]





The diagram shows a cone and a cylinder.
The cone has radius 28 cm and slant height y cm.
The cylinder has radius 15 cm and height 42 cm.
The **curved** surface area of the cone and the cylinder are equal.

Find the value of y.

$y =$ ..... [3]

8. June/2020/Paper_12/No.20

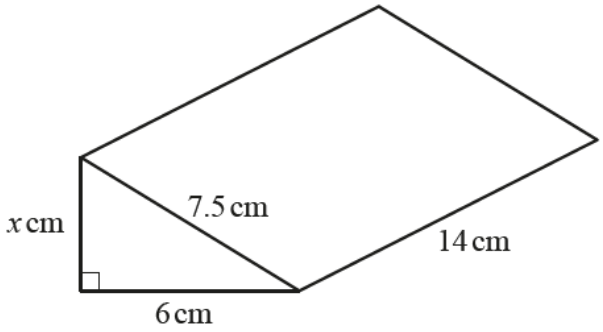
A plan of a house is drawn to a scale of 1 : 50.
On the plan, the floor area of the kitchen is $30\,cm^2$.

Calculate the floor area of the real kitchen.
Give your answer in square metres.

..... m^2 [3]

9. June/2020/Paper_21/No.5

A company makes and packages chocolate bars.



This box contains a chocolate bar.
The box is in the shape of a triangular prism.

(a) Show that $x = 4.5$.

[2]

(b) These boxes are packed into cartons.
Each carton is a cuboid with internal dimensions 30 cm by 28 cm by h cm.
80 boxes fill one carton exactly.

(i) Calculate the value of h.

$h =$ ..... [3]

(ii) One day, the company packs 37 500 of these boxes into cartons.

How many complete cartons are packed that day?

..... [2]

(c) The company sells the chocolate bars to shops for \$0.70 each bar.

(i) The company makes 40% profit on each bar it sells.

Work out the cost to the company of producing each bar.

\$ ..... [2]

(ii) A shop buys one carton of chocolate bars.

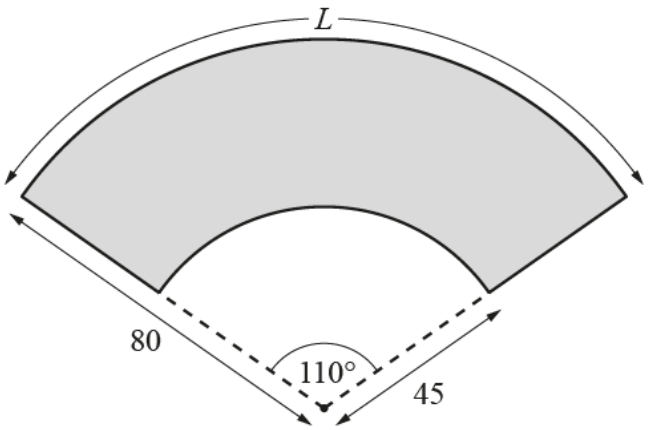
- They sell $\frac{3}{5}$ of the bars at a profit of 30% .
- They sell each of the remaining bars at \$0.84 .

Calculate the overall percentage profit made by the shop from selling all 80 bars.

..... % [5]

10. June/2020/Paper_21/No.8

(a)



NOT TO SCALE

A display notice is made by removing a sector of a circle from a larger sector.
Both sectors have an angle of 110°.
The radii of the sectors are 80 cm and 45 cm.

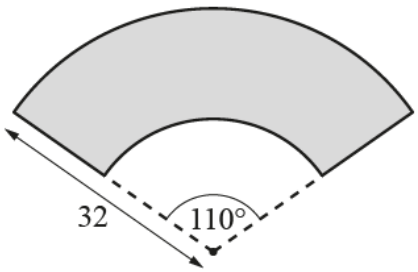
(i) Calculate arc length L.

$L =$ ..... cm [2]

(ii) Calculate the area of this display notice.

..... cm^2 [3]

(b)



NOT TO SCALE

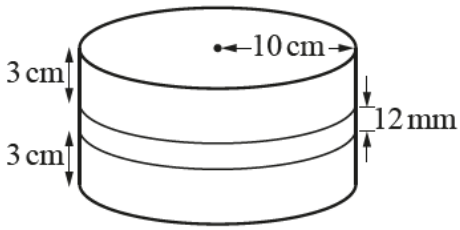
This diagram shows a display notice mathematically similar to the one in **part (a)**.
The radius of the larger sector is 32 cm.

Calculate the area of this display notice.

..... cm^2 [2]

11. June/2020/Paper_22/No.8

A birthday cake is in the shape of a cylinder.
There are two layers of cake and one layer of icing.



Each layer of cake has radius 10 cm and height 3 cm.
The icing, between the two layers of cake, has radius 10 cm and height 12 mm.

(a) Calculate the volume of **icing** in the birthday cake.
Give your answer in cm^3.

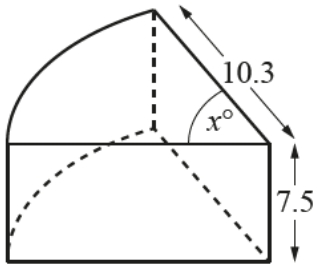
..... cm^3 [2]

(b) The top and curved surface of the birthday cake are now covered with chocolate.

Calculate the area of the birthday cake that is covered with chocolate.

..... cm^2 [3]

(c) Anil has a slice of this chocolate-covered birthday cake.



His slice is a prism of height 7.5 cm.
The top of the cake is a sector, radius 10.3 cm and angle $x°$.
The volume of his slice is 200 cm^3.

Calculate the value of x.

$x =$ ..... [3]