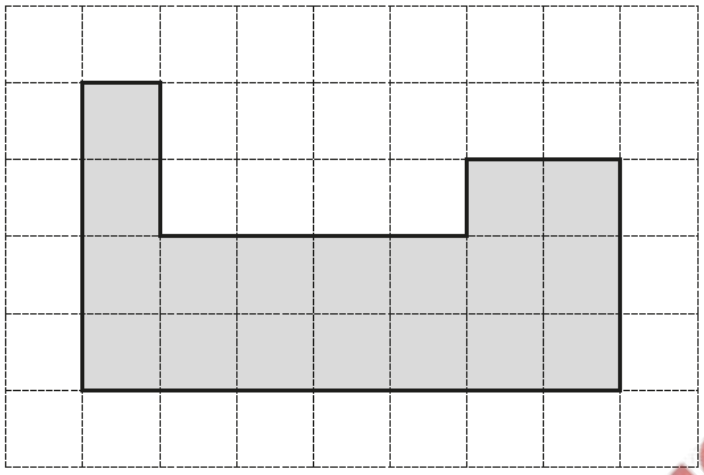
Mensuration – 2021 IGCSE 0580

1. Nov/2021/Paper_11/No.2



This shape is drawn on a 1 cm^2 grid.

Find the perimeter of the shape.

..... cm [1]

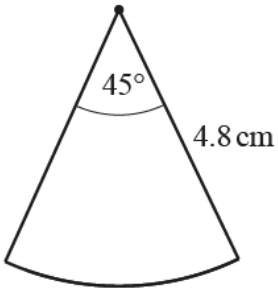
2. Nov/2021/Paper_11/No.13

A circular disc has circumference 250 cm.

Calculate the radius of the disc.

..... cm [2]

3. Nov/2021/Paper_11/No.21



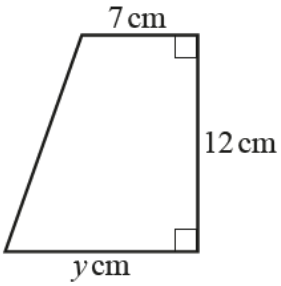
NOT TO SCALE

The diagram shows a sector of a circle with radius 4.8 cm and sector angle 45°.

Calculate the area of the sector.

..... cm^2 [2]

4. Nov/2021/Paper_13/No.17



NOT TO SCALE

The area of this trapezium is 96 cm^2.

Find the value of y.

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

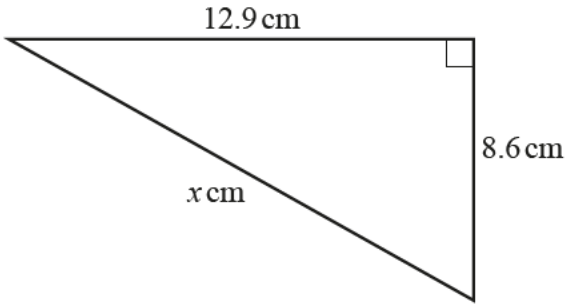
5. Nov/2021/Paper_13/No.19

Calculate the radius of a circle with circumference 26 cm.

..... cm [2]

6. Nov/2021/Paper_13/No.24

(a)

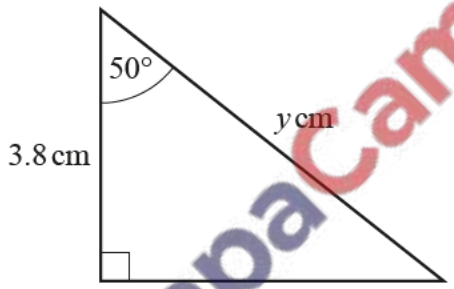


NOT TO SCALE

Calculate the value of x.

$x =$ ..... [2]

(b)

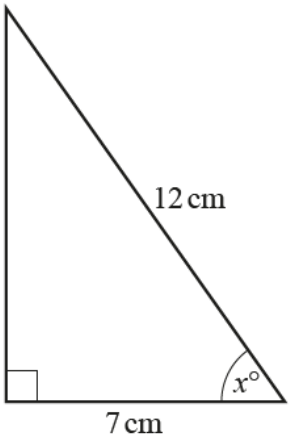


NOT TO SCALE

Show that the value of y is 5.9, correct to 2 significant figures.

[3]

7. Nov/2021/Paper_21/No.9

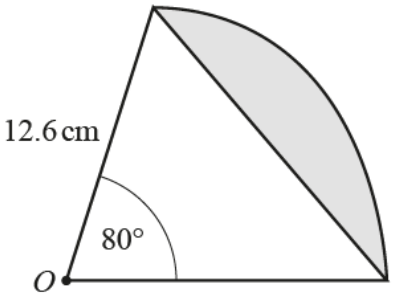


NOT TO SCALE

Calculate the value of x.

$x =$ ..... [2]

8. Nov/2021/Paper_23/No.19



NOT TO SCALE

The diagram shows a sector of a circle, centre O, radius 12.6 cm.

Calculate the perimeter of the shaded segment.

..... cm [4]

9. Nov/2021/Paper_23/No.20

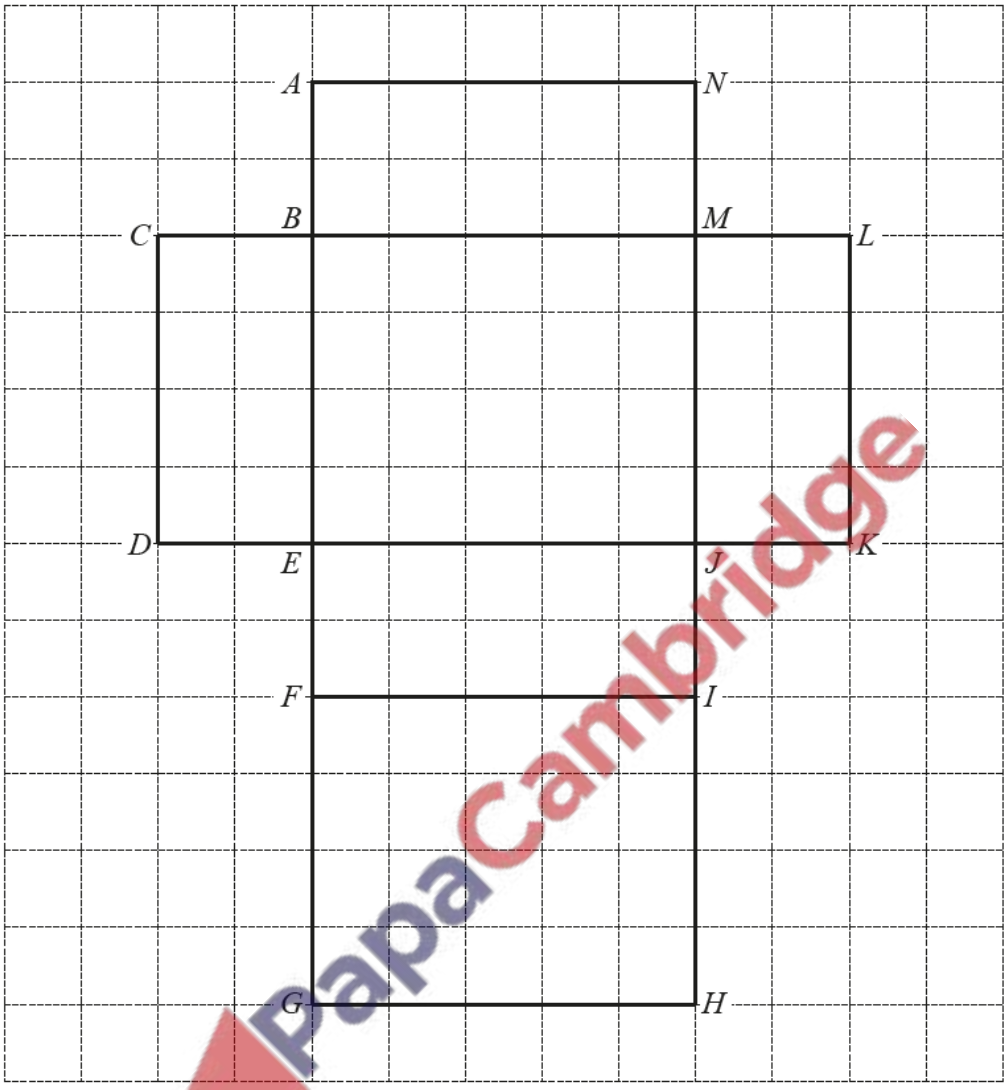
A lake has an area of $3\,\text{km}^2$.
On a map the area of the lake is $18.75\,\text{cm}^2$.

Find the scale of the map in the form $1 : n$.

1 : ..... [3]

10. Nov/2021/Paper_31/No.7

(a) The diagram shows the net of a cuboid on a 1 cm^2 grid.



(i) The net is folded to form the cuboid.

(a) Write down which two corners join to corner A.

..... [1]

(b) Write down the edge which joins with KL.

..... [1]

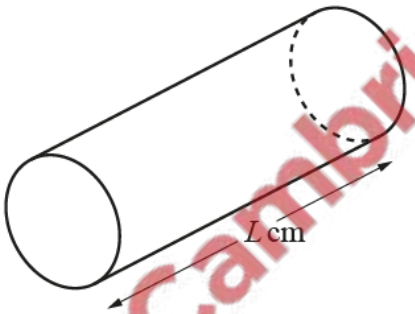
(ii) Find the total surface area of the cuboid.

..... cm^2 [2]

(iii) Find the volume of the cuboid.

..... cm^3 [2]

(b) The diagram shows a cylinder with length L cm.
The radius of the cylinder is 3.2 cm and the volume is 775 cm^3.



NOT TO SCALE

(i) Calculate the value of L.

$L =$ ..... [3]

(ii) Calculate the volume of a solid sphere with radius 3 cm.
[The volume, V, of a sphere with radius r is $V = \frac{4}{3}\pi r^3$.]

..... cm^3 [2]

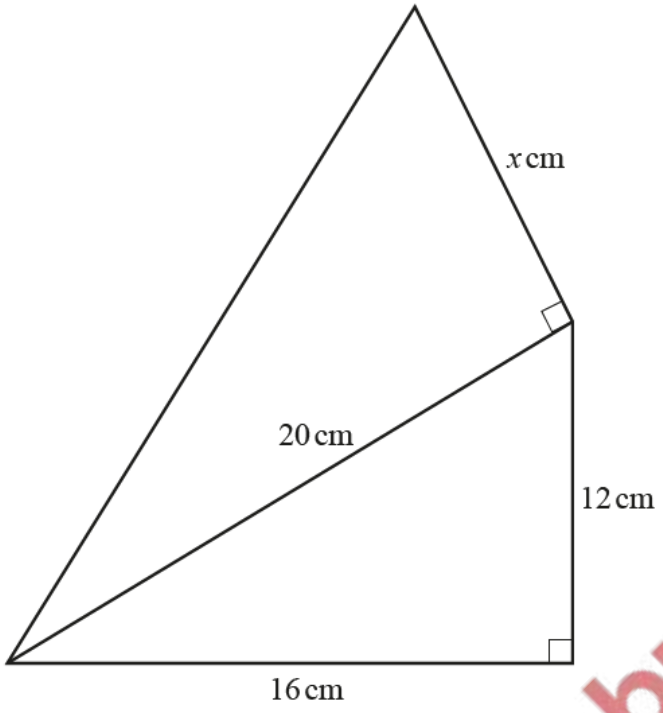
(iii) Four of these spheres are placed inside the cylinder.

Calculate the percentage of the cylinder that is empty.

..... % [3]

11. Nov/2021/Paper_31/No.8b

(b)



NOT TO SCALE

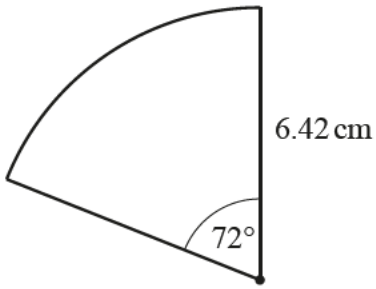
The diagram shows a shape made from two right-angled triangles.
The total area of this shape is 246 cm^2.

Work out the value of x.

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

12. Nov/2021/Paper_32/No.4c

(c)



NOT TO SCALE

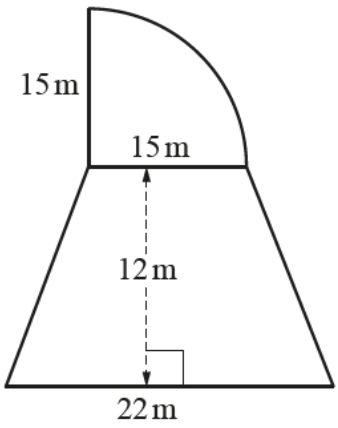
The diagram shows a sector of a circle with radius 6.42 cm and sector angle 72°.

Calculate the perimeter of this sector.

..... cm [3]

13. Nov/2021/Paper_32/No.7

(a)



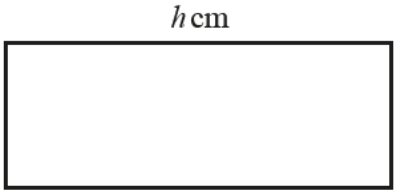
NOT TO SCALE

The diagram shows a shape made from a quarter circle and a trapezium.

Find the total area of this shape.

..... m^2 [4]

(b)



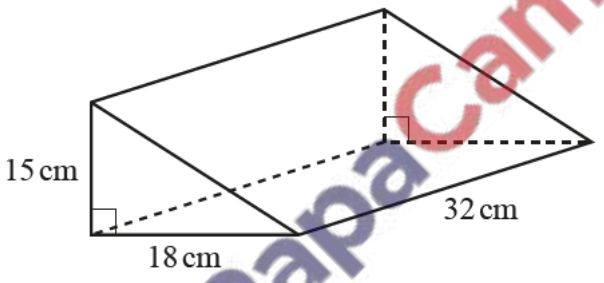
NOT TO SCALE

The diagram shows a rectangle.
The area of the rectangle is 387.1 cm^2.

Find the value of h.

$h =$ ..... [2]

(c)



NOT TO SCALE

The diagram shows a right-angled triangular prism.

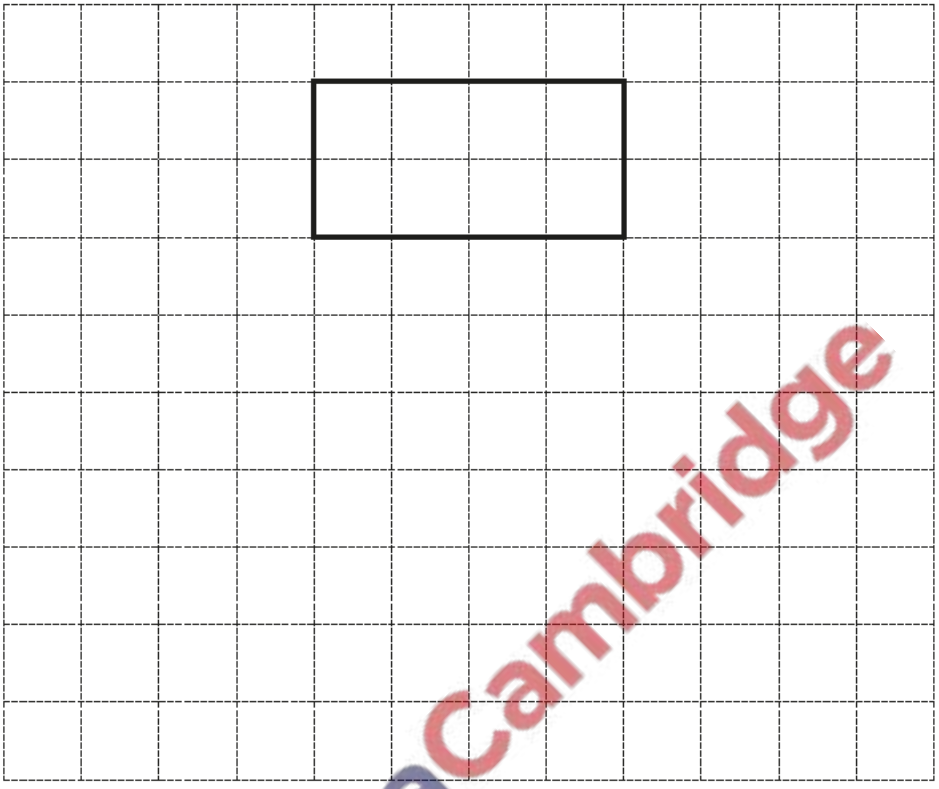
Find the volume of the prism.

..... cm^3 [3]

14. Nov/2021/Paper_33/No.5

(a) A cuboid measures 4 cm by 2 cm by 2 cm.

(i) On the 1 cm^2 grid, draw an accurate net of this cuboid.
One face has been drawn for you.



[3]

(ii) Calculate the surface area of the cuboid.

..... cm^2 [2]

(iii) A factory makes 5000 of these cuboids.
25 of the cuboids are checked and 3 of these cuboids are faulty.

How many of the 5000 cuboids are expected to be faulty?

..... [2]

15. Nov/2021/Paper_41/No.1d

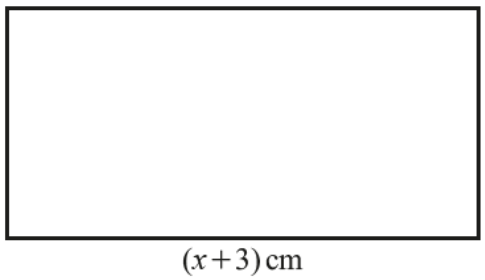
(d) Rafa has a cylindrical tank.
The cylinder has a height of 105 cm and a diameter of 45 cm.

Calculate the capacity of the tank in litres.

..... litres [3]

16. Nov/2021/Paper_41/No.9

(a)



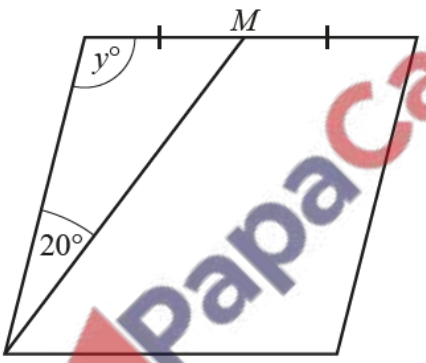
NOT TO SCALE

This rectangle has perimeter 20 cm.

Find the value of x.

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

(b)



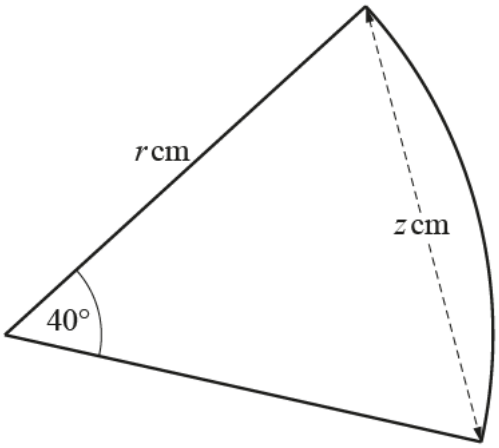
NOT TO SCALE

This rhombus has perimeter 20 cm and angle y is obtuse.
M is the midpoint of one of the sides.

Find the value of y.

$y =$ ..... [5]

(c)



NOT TO SCALE

This sector of a circle has radius r and perimeter 20 cm.

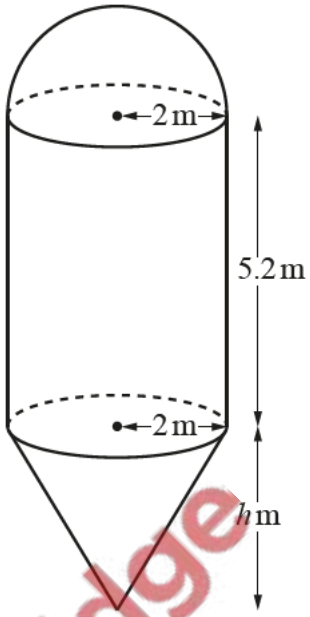
Find the value of z.

$z =$ ..... [6]

17. Nov/2021/Paper_42/No.7

(a) The diagram shows a container for storing grain.

The container is made from a hemisphere, a cylinder and a cone, each with radius 2 m. The height of the cylinder is 5.2 m and the height of the cone is h m.



NOT TO SCALE

(i) Calculate the volume of the hemisphere.
Give your answer as a multiple of π.

[The volume, V, of a sphere with radius r is $V = \frac{4}{3}\pi r^3$.]

..... m^3 [2]

(ii) The total volume of the container is $\frac{88\pi}{3}$ m^3.

Calculate the value of h.

[The volume, V, of a cone with radius r and height h is $V = \frac{1}{3}\pi r^2 h$.]

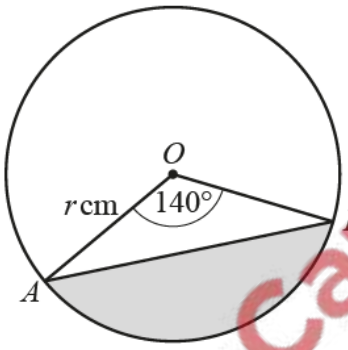
$h =$ ..... [4]

(iii) The container is full of grain.
Grain is removed from the container at a rate of 35 000 kg per hour.
$1\,m^3$ of grain has a mass of 620 kg.

Calculate the time taken to empty the container.
Give your answer in hours and minutes.

..... h ..... min [3]

(b)



NOT TO SCALE

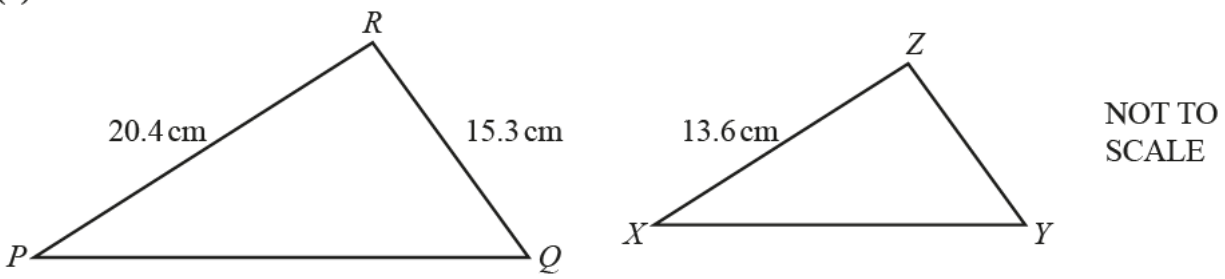
A and B are points on a circle, centre O, radius r cm.
The area of the shaded segment is $65\,cm^2$.

Calculate the value of r.

$r =$ ..... [4]

18. Nov/2021/Paper_42/No.11

(a)



Triangle PQR is mathematically similar to triangle XYZ.

(i) Find YZ.

$YZ =$ ..... cm [2]

(ii) The area of triangle XYZ is $63.6\,cm^2$.

Calculate the area of triangle PQR.

..... cm^2 [3]

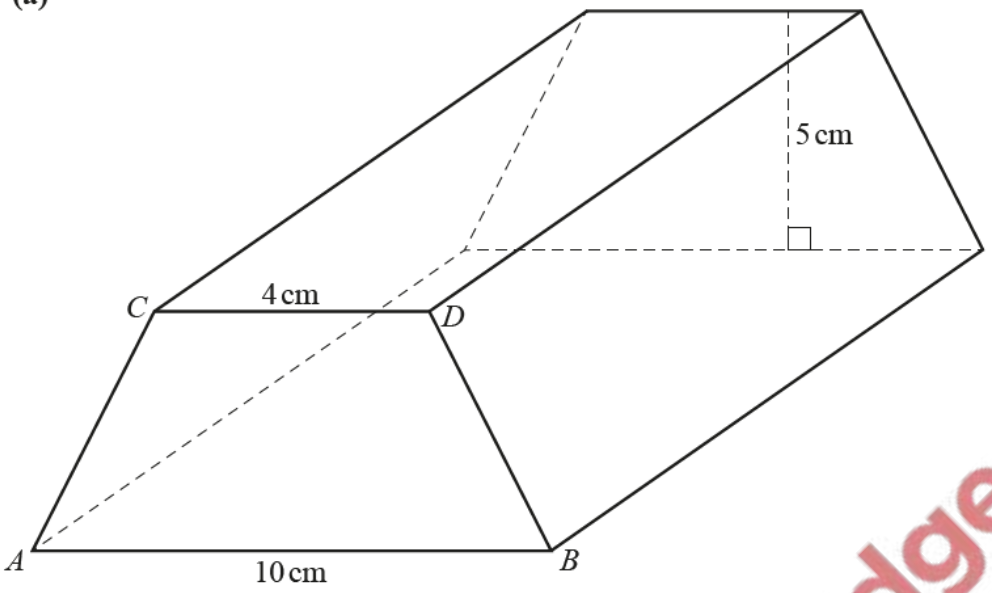
(b) Two containers are mathematically similar.
The larger container has a capacity of 64.8 litres and a surface area of $0.792\,m^2$.
The smaller container has a capacity of 37.5 litres.

Calculate the surface area of the smaller container.

..... m^2 [3]

19. Nov/2021/Paper_43/No.3

(a)



NOT TO SCALE

The diagram shows a prism.
The cross-section of the prism is a trapezium with CD parallel to AB and $AC = BD$.

$AB = 10$ cm, $CD = 4$ cm and the height of the trapezium is 5 cm.
The volume of the prism is 525 cm^3.

(i) The prism is made of iron.
1 cm^3 of iron has a mass of 7.8 g.

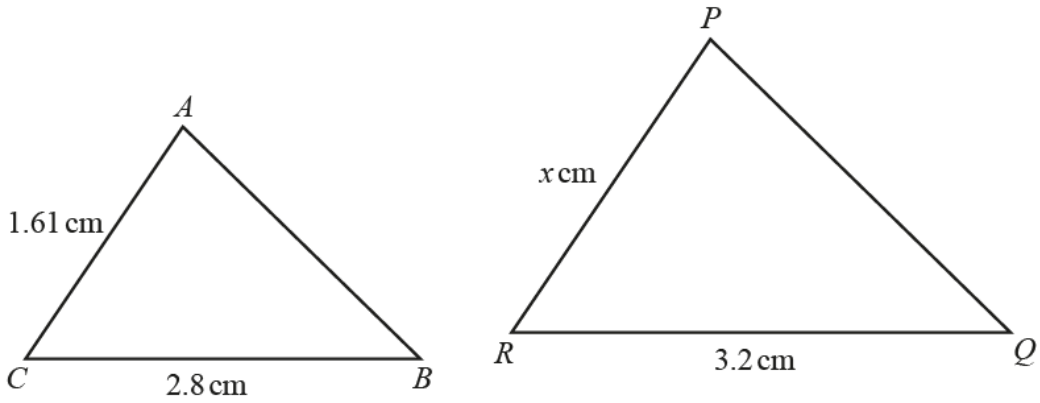
Calculate the mass of the prism.
Give your answer in kilograms.

..... kg [2]

(ii) Calculate the length of the prism.

..... cm [3]

20. March/2021/Paper_12/No.17

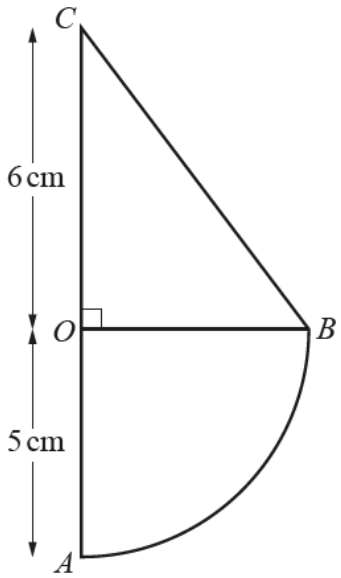


Triangle ABC is mathematically similar to triangle PQR.

Find the value of x.

$x =$ ..... [2]

21. March/2021/Paper_12/No.21



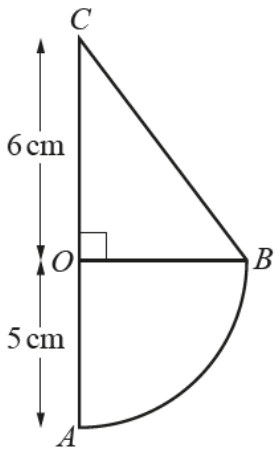
NOT TO SCALE

The diagram shows a shape made from a quarter-circle, OAB, and a right-angled triangle OBC. The radius of the circle is 5 cm and $OC = 6$ cm.

Calculate the area of the shape.

..... cm^2 [3]

22. March/2021/Paper_22/No.12



NOT TO SCALE

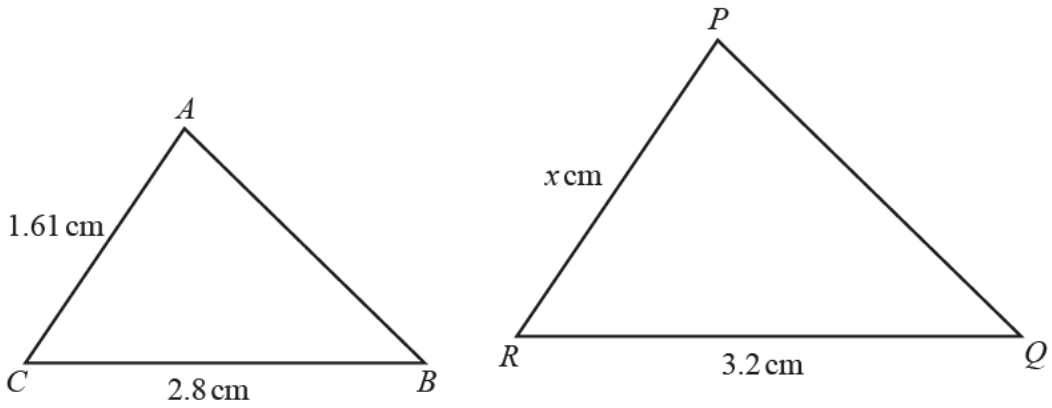
The diagram shows a shape made from a quarter-circle, OAB, and a right-angled triangle OBC. The radius of the circle is 5 cm and $OC = 6$ cm.

Calculate the area of the shape.

..... cm^2 [3]

23. March/2021/Paper_22/No.20

(a)



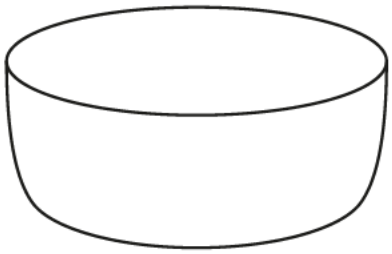
NOT TO SCALE

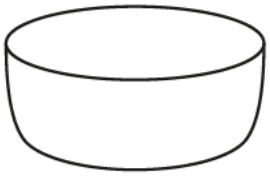
Triangle ABC is mathematically similar to triangle PQR.

Find the value of x.

$x =$ ..... [2]

(b)





NOT TO SCALE

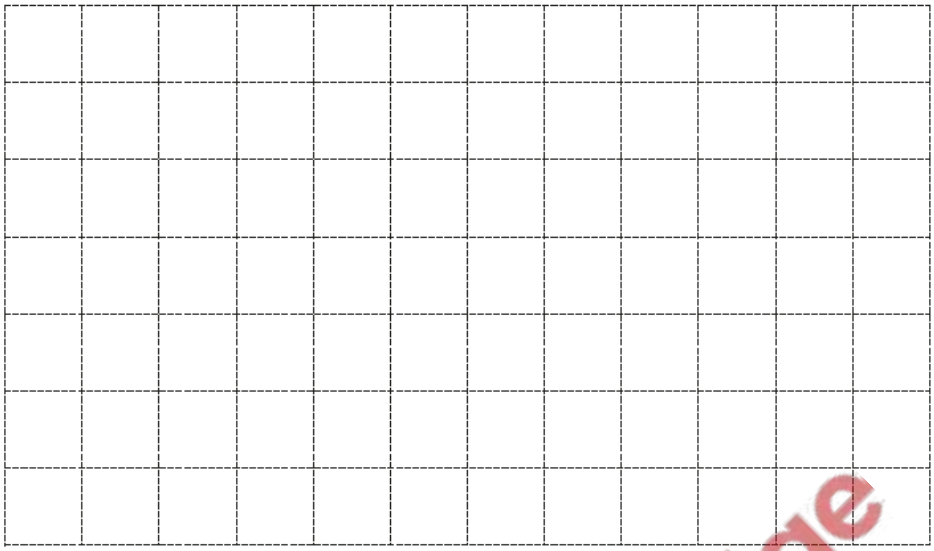
The diagram shows two mathematically similar bowls.
The larger bowl has capacity 7.8 litres and height 11.5 cm.
The smaller bowl has capacity 4 litres.

Calculate the height of the smaller bowl.

..... cm [3]

24. March/2021/Paper_32/No.9a

(a)



On the $1\,cm^2$ grid, draw **one** rectangle that has

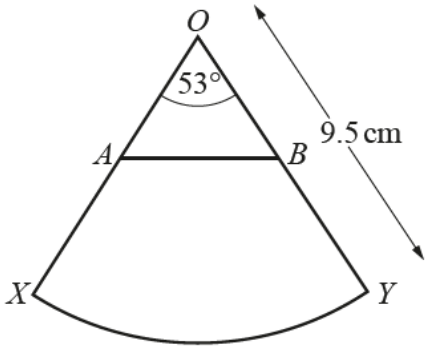
- a perimeter of 22 cm

and

- an area of $24\,cm^2$. [2]

25. March/2021/Paper_42/No.8

(a)



NOT TO SCALE

The diagram shows a sector OXY of a circle with centre O and radius 9.5 cm.
The sector angle is 53°.
A lies on OX, B lies on OY and $OA = OB$.

(i) Show that the area of the sector is 41.7 cm^2, correct to 1 decimal place.

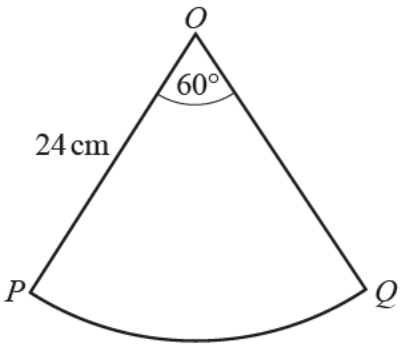
[2]

(ii) The area of triangle OAB is $\frac{1}{3}$ of the area of sector OXY.

Calculate OA.

$OA =$ ..... cm [4]

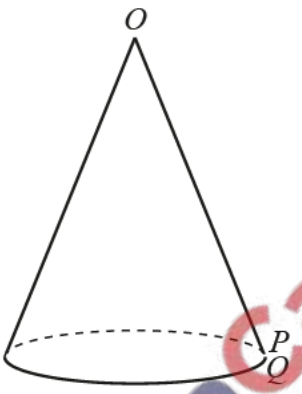
(b)



NOT TO SCALE

The diagram shows a sector OPQ of a circle with centre O and radius 24 cm. The sector angle is 60°.

A cone is made from this sector by joining OP to OQ.



NOT TO SCALE

Calculate the volume of the cone.

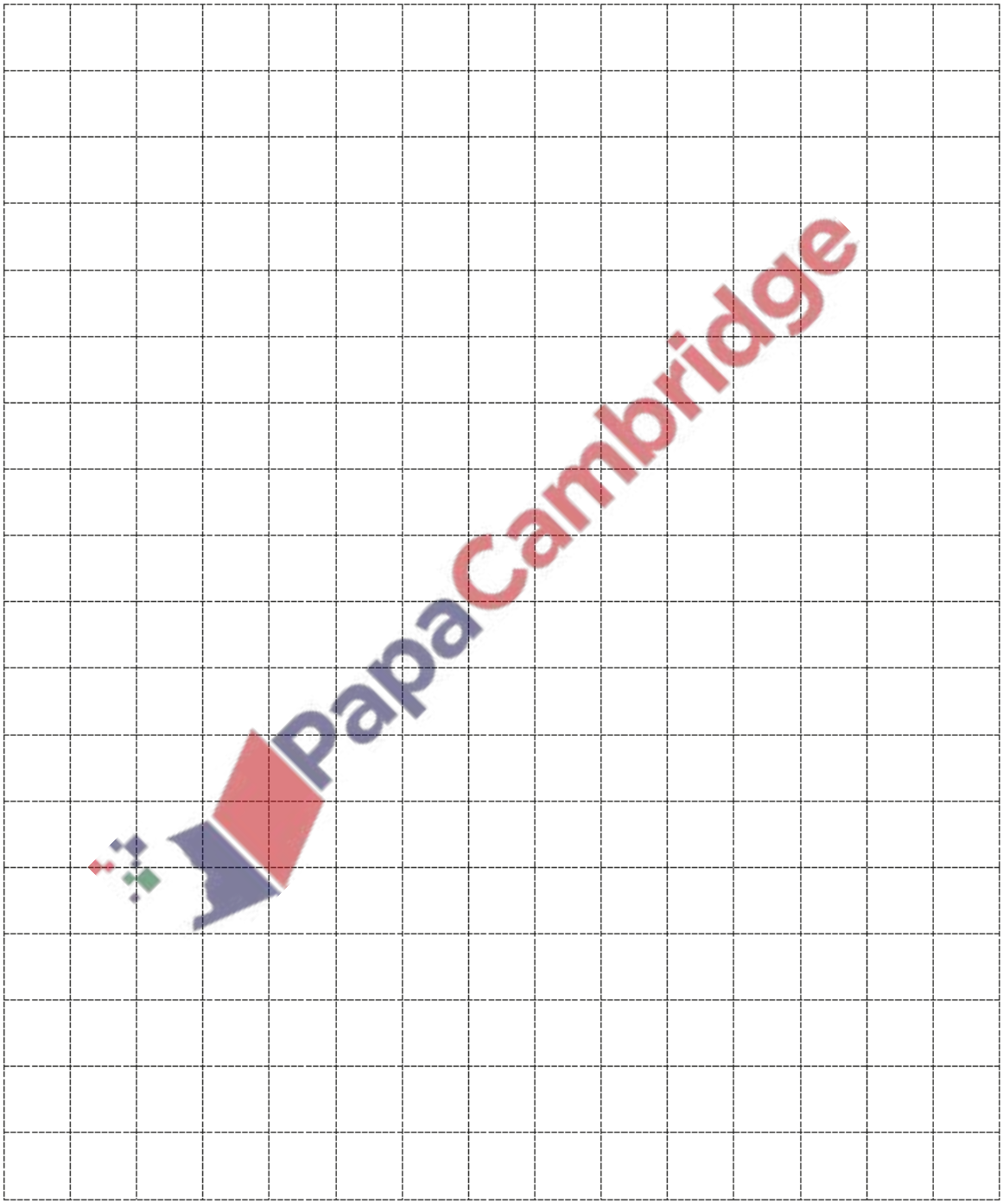
[The volume, V, of a cone with radius r and height h is $V = \frac{1}{3}\pi r^2 h$.]

..... cm^3 [6]

26. June/2021/Paper_11/No.5

The volume of a cuboid is $24\,cm^3$.
The base of the cuboid is 3 cm by 2 cm.

Draw a net of the cuboid on the $1\,cm^2$ grid.



[4]

27. June/2021/Paper_11/No.13

The radius of a circle is 42 cm.

Work out the circumference of the circle.
Give your answer in terms of π.

..... cm [2]

28. June/2021/Paper_11/No.14

Change 680 000 cm^3 into m^3.

..... m^3 [1]

29. June/2021/Paper_12/No.16

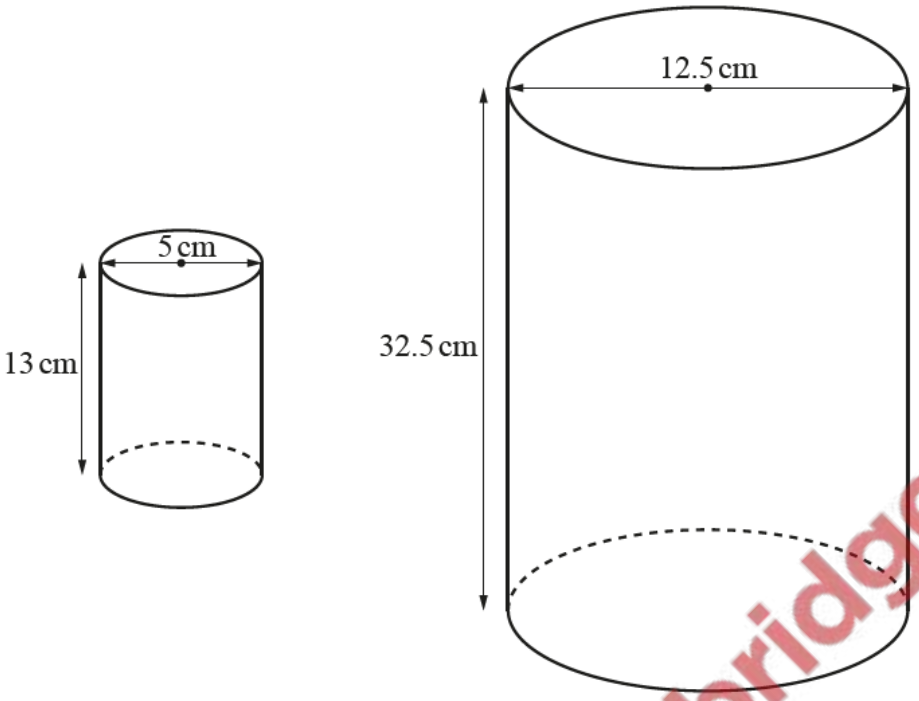
A cuboid has a square base.
The volume of this cuboid is 867 cm^3 and its height is 12 cm.

Calculate the length of one side of the square base.

..... cm [3]

30. June/2021/Paper_12/No.20

NOT TO SCALE

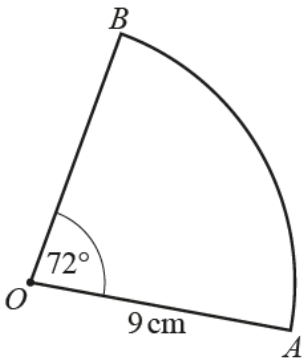


The diagram shows two cylinders.

Show that the two cylinders are mathematically similar.

[2]

31. June/2021/Paper_12/No.25



NOT TO SCALE

The diagram shows a sector of a circle, centre O, radius 9 cm.
The sector angle is 72°.

(a) Calculate the length of the arc AB.

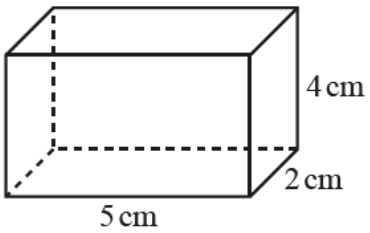
..... cm [2]

(b) Calculate the area of the sector AOB.

..... cm^2 [2]

32. June/2021/Paper_13/No.7

The diagram shows a box in the shape of a cuboid.
The box has an **open top**.



NOT TO SCALE

(a) On the 1 cm^2 grid, draw a net of this box.

[3]

(b) The outside of the box is painted.

Work out the total area that is painted.

..... cm^2 [2]

33. June/2021/Paper_13/No.18

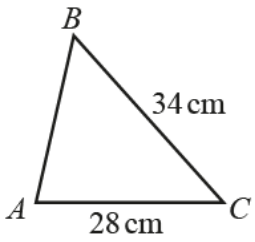
(a) Calculate the volume of a cylindrical vase with radius 14.2 cm and height 18 cm.

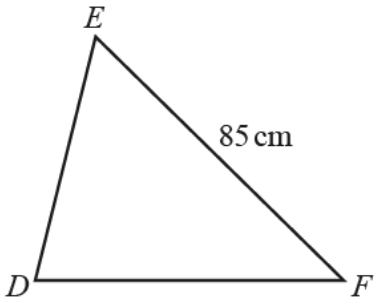
..... cm^3 [2]

(b) Change your answer to **part (a)** into litres.

..... litres [1]

34. June/2021/Paper_13/No.22





NOT TO SCALE

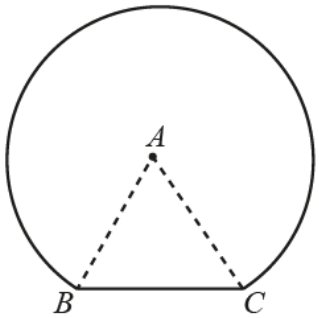
Triangle ABC is similar to triangle DEF.

Calculate DF.

$DF =$ ..... cm [2]

35. June/2021/Paper_22/No.19

(a)



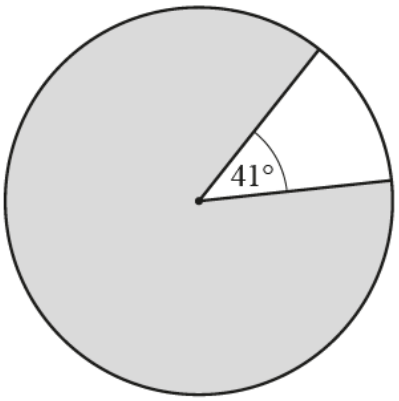
NOT TO SCALE

The diagram shows a shape made from an equilateral triangle ABC and a sector of a circle.
Points B and C lie on the circle, centre A.
The side length of the equilateral triangle is 12.4 cm.

Work out the perimeter of the shape.

..... cm [3]

(b)



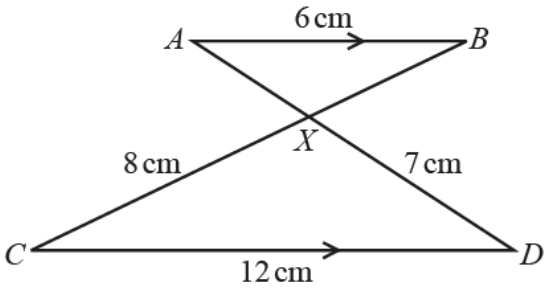
NOT TO SCALE

The diagram shows two sectors of a circle.
The major sector is shaded.
The area of the major sector is $74.5\,cm^2$.

Calculate the radius of the circle.

..... cm [3]

36. June/2021/Paper_23/No.15



NOT TO SCALE

In the diagram, AB is parallel to CD.
AD and BC intersect at X.
$AB = 6\,\text{cm}$, $CD = 12\,\text{cm}$, $CX = 8\,\text{cm}$ and $DX = 7\,\text{cm}$.

(a) Complete the statement.

Triangle ABX is ..... to triangle DCX. [1]

(b) Work out the length of BX.

$BX =$ ..... cm [2]

(c) The area of triangle DCX is $26.906\,\text{cm}^2$.

Use this value to find the area of

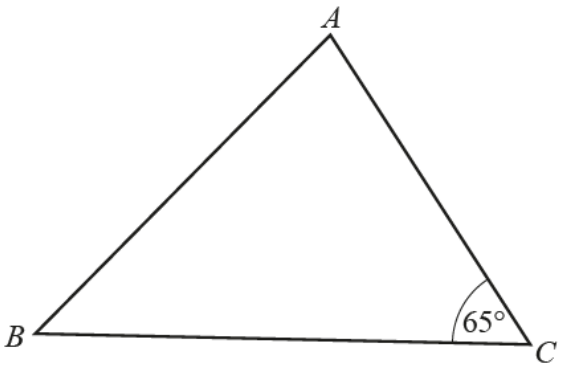
(i) triangle ABX,

..... cm^2 [2]

(ii) triangle ACX.

..... cm^2 [1]

37. June/2021/Paper_23/No.21



NOT TO SCALE

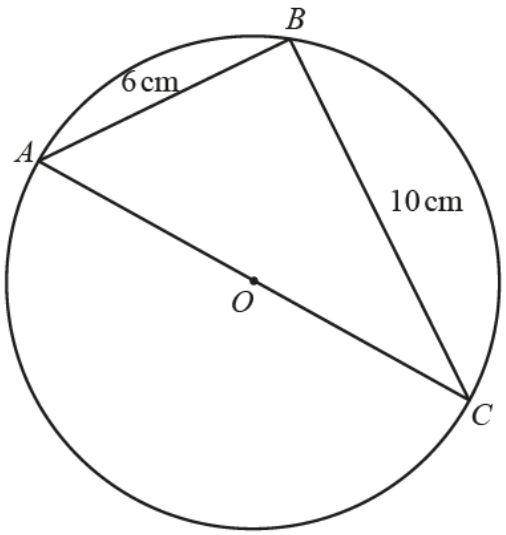
The shortest distance from B to AC is 12.8 cm.

Calculate BC.

$BC =$ ..... cm [3]

38. June/2021/Paper_31/No.8

(a)



NOT TO SCALE

A, B and C lie on a circle, centre O, diameter AC.

(i) Complete this statement.

Angle ABC is 90° because ..... [1]

(ii) Work out the area of triangle ABC.

..... cm^2 [2]

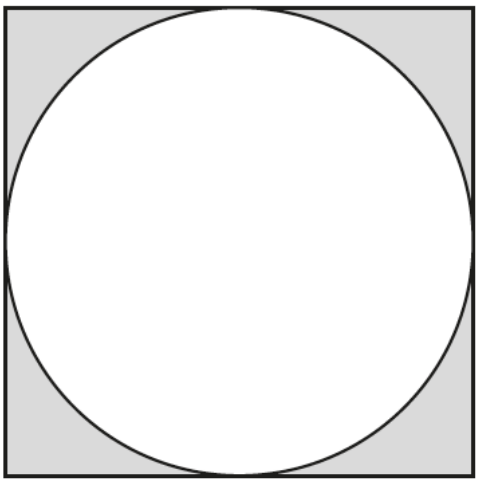
(iii) Work out AC.

$AC =$ ..... cm [2]

(b) Make r the subject of the formula $A = \pi r^2$.

$r =$ ..... [2]

(c)



NOT TO SCALE

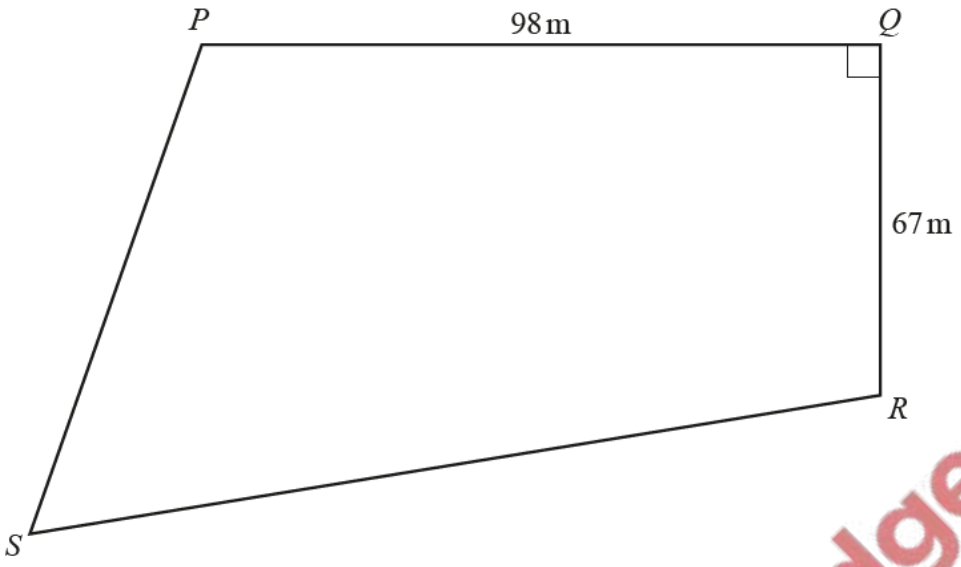
The diagram shows a circle inside a square.
The circle touches the four sides of the square.
The area of the square is 81 cm^2.

Calculate the shaded area.

..... cm^2 [4]

39. June/2021/Paper_32/No.6b

(b)



NOT TO SCALE

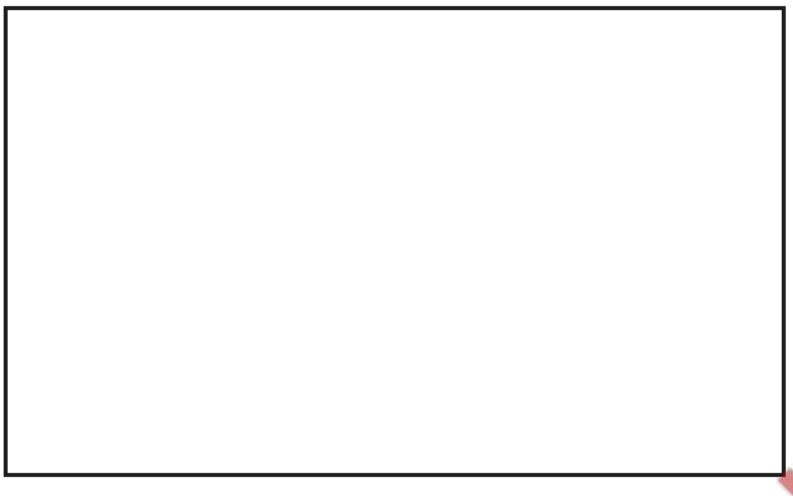
The diagram shows a field $PQRS$.
$PQ = 98$ m, $QR = 67$ m and angle $PQR = 90°$.
There is a straight path from P to R.

Calculate the length of this path.

..... m [2]

40. June/2021/Paper_33/No.3

(a) The diagram shows a scale drawing of Joel's rectangular garden.
The scale is 1 centimetre represents 8 metres.

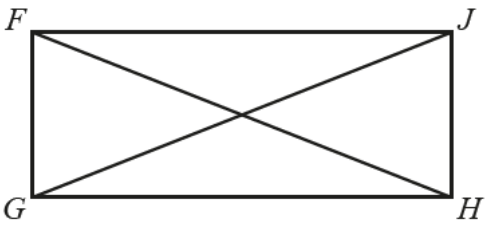


Scale: 1 cm to 8 m

Find the actual area of his garden.

..... m^2 [3]

(b) The diagram shows a rectangular gate, $FGHJ$, in Joel's garden.



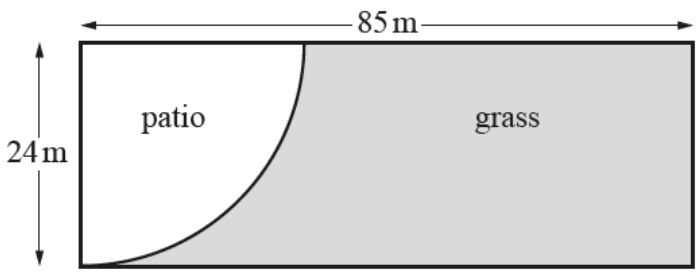
NOT TO SCALE

$GJ = 2.1$ m and $FG = 0.85$ m.

Find FJ.

$FJ =$ ..... m [3]

(c)



NOT TO SCALE

The diagram shows Brenda's rectangular garden.
There is a patio in the shape of a quarter-circle.

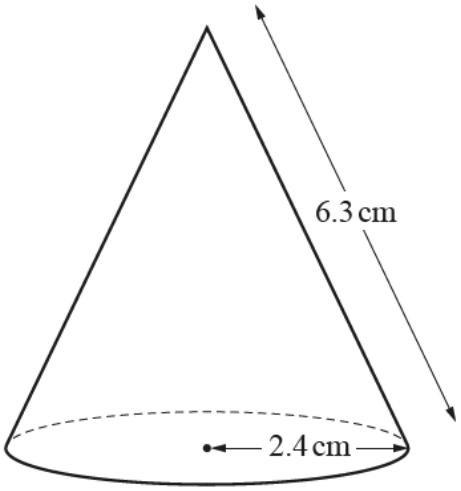
She wants to grow grass in the shaded part of the garden.
She needs 40 g of grass seed per square metre.
Grass seed is sold in 1 kg bags which cost $6.80 per bag.

Calculate the cost of the grass seed she needs to buy.

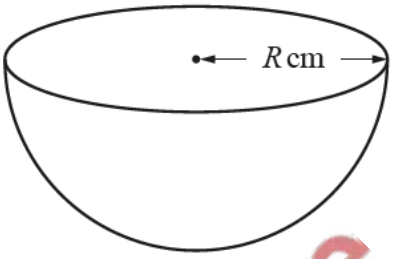
$ ..... [6]

41. June/2021/Paper_41/No.3

(a)



NOT TO SCALE



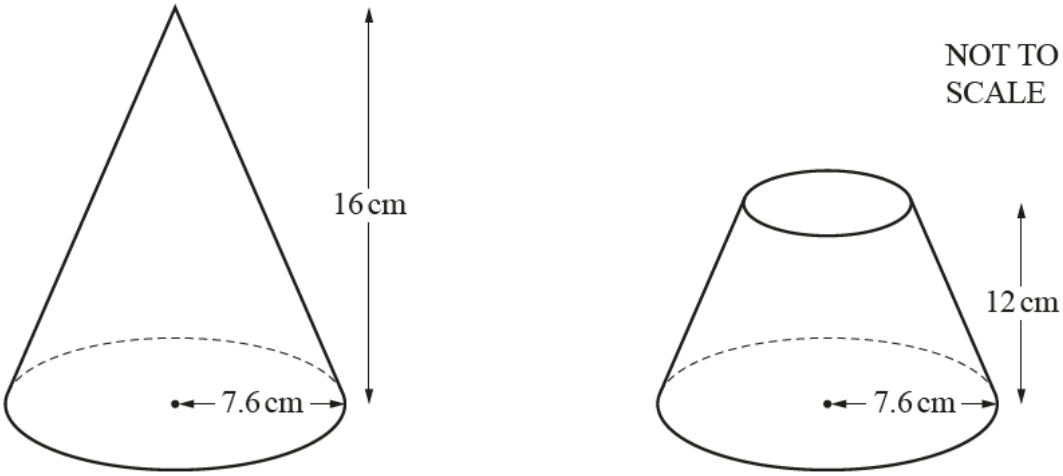
The diagram shows a solid cone and a solid hemisphere.
The cone has radius 2.4 cm and slant height 6.3 cm.
The hemisphere has radius R cm.
The **total** surface area of the cone is equal to the **total** surface area of the hemisphere.

Calculate the value of R.

[The curved surface area, A, of a cone with radius r and slant height l is $A = \pi rl$.]
[The curved surface area, A, of a sphere with radius r is $A = 4\pi r^2$.]

$R =$ ..... [4]

(b)



The diagram shows a solid cone with radius 7.6 cm and height 16 cm.
A cut is made parallel to the base of the cone and the top section is removed.
The remaining solid has height 12 cm, as shown in the diagram.

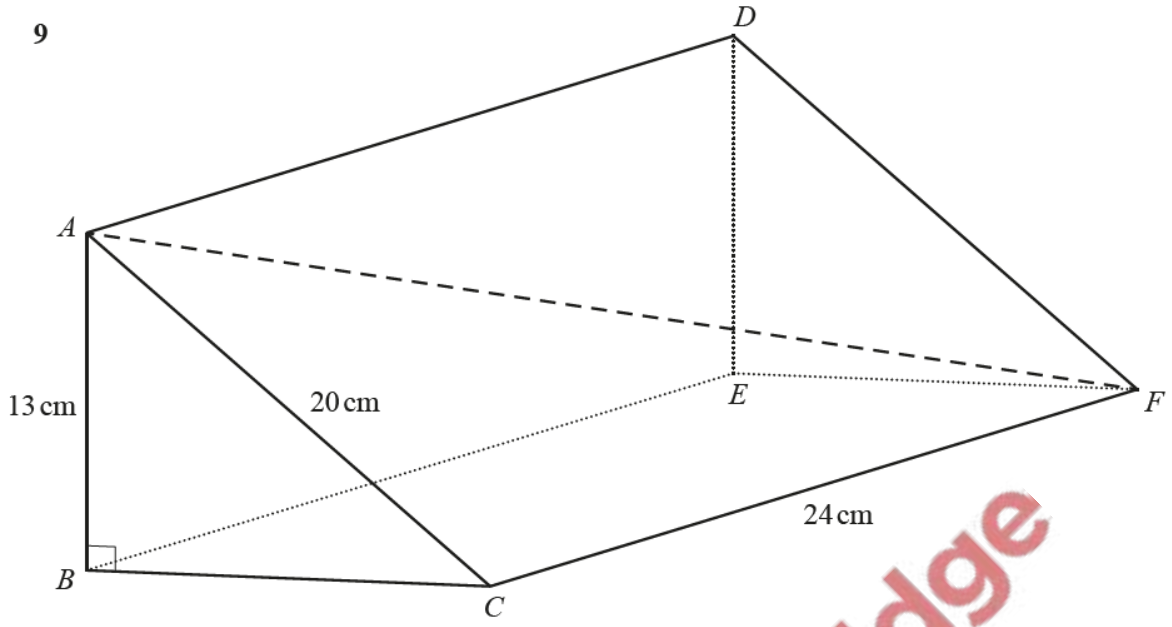
Calculate the volume of the remaining solid.

[The volume, V, of a cone with radius r and height h is $V = \frac{1}{3}\pi r^2 h$.]

..... cm^3 [4]

42. June/2021/Paper_41/No.9

9



NOT TO SCALE

The diagram shows a prism, $ABCDEF$.
$AB = 13$ cm, $AC = 20$ cm, $CF = 24$ cm and angle $ABC = 90°$.

(a) Calculate the total surface area of the prism.

..... cm^2 [6]

(b) Calculate the volume of the prism.

..... cm^3 [1]

(c) Calculate the angle that AF makes with the base $BCFE$.

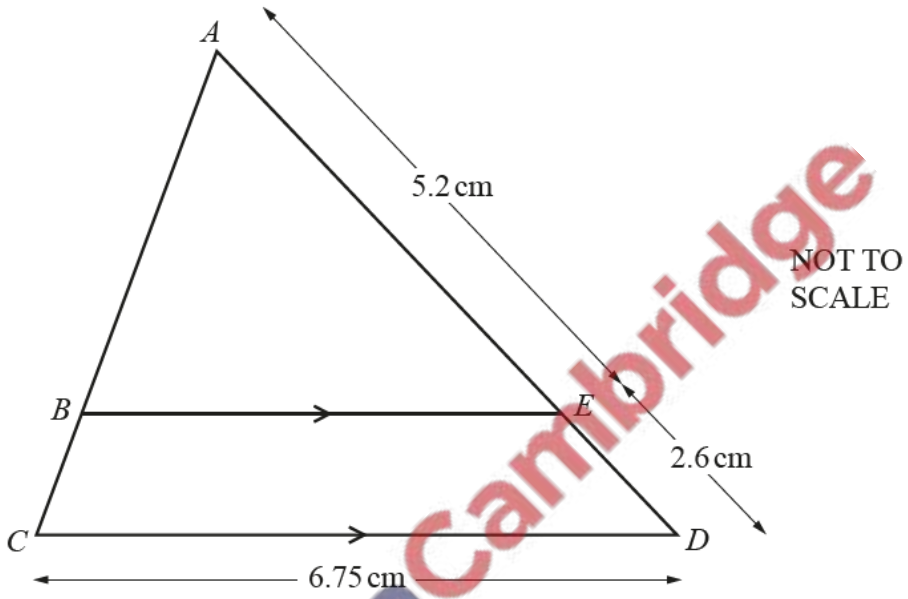
..... [4]

43. June/2021/Paper_41/No.11

(a) Find the size of an exterior angle of a regular polygon with 18 sides.

..... [2]

(b)



In triangle ACD, B lies on AC and E lies on AD such that BE is parallel to CD.
$AE = 5.2$ cm and $ED = 2.6$ cm.

Calculate BE.

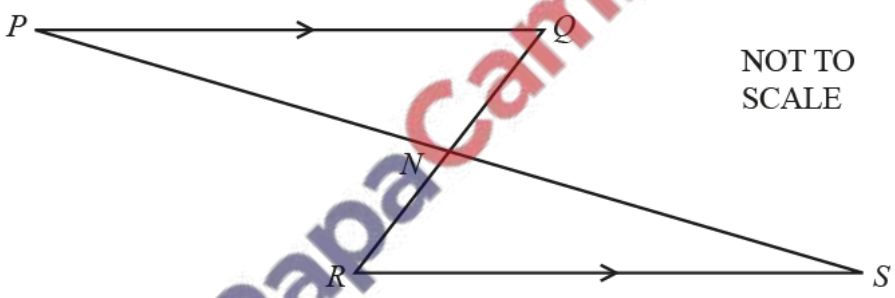
$BE =$ ..... cm [2]

(c) Two solids are mathematically similar.
The smaller solid has height 2 cm and volume 32 cm^3.
The larger solid has volume 780 cm^3.

Calculate the height of the larger solid.

..... cm [3]

(d)



PQ is parallel to *RS*, *PNS* is a straight line and *N* is the midpoint of *RQ*.

Explain, giving reasons, why triangle *PQN* is congruent to triangle *SRN*.

.....

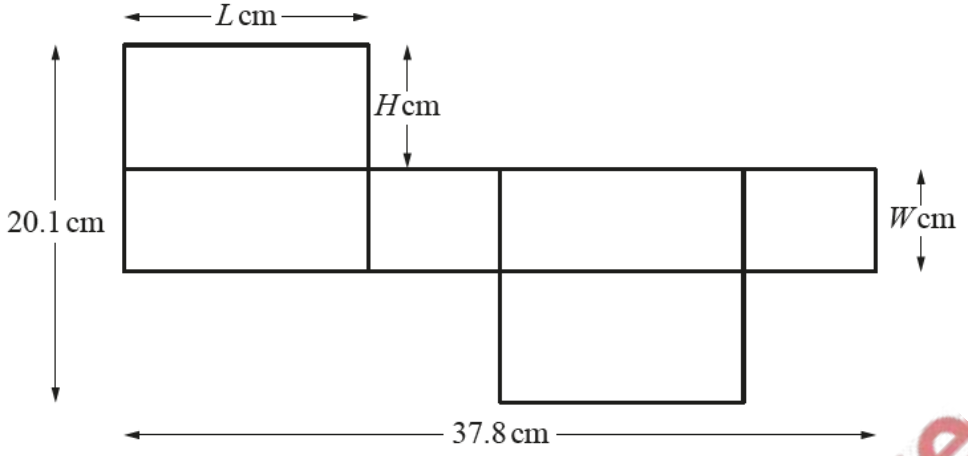
.....

.....

..... [4]

44. June/2021/Paper_42/No.8

(a) A cuboid has length L cm, width W cm and height H cm.



NOT TO SCALE

The diagram shows the net of this cuboid.
The ratio $W : L = 1 : 2$.

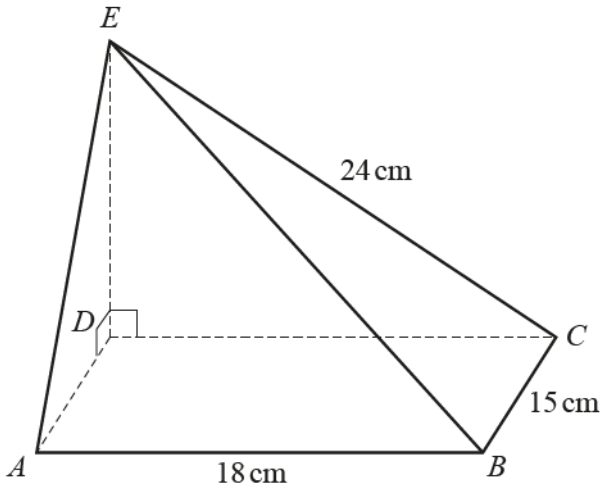
Find the value of L, the value of W and the value of H.

$L =$ .....

$W =$ .....

$H =$ ..... [5]

(b)



NOT TO SCALE

The diagram shows a solid pyramid with a rectangular base $ABCD$.
E is vertically above D.
Angle EDC = angle EDA = 90°.
AB = 18 cm, BC = 15 cm and EC = 24 cm.

(i) The pyramid is made of wood and has a mass of 800 g.

Calculate the density of the wood.
Give the units of your answer.

[The volume, V, of a pyramid is $V = \frac{1}{3} \times$ area of base $\times$ height.]
[Density = mass ÷ volume]

.... [5]

(ii) Calculate the angle between BE and the base of the pyramid.

..... [4]

45. June/2021/Paper_43/No.8

(a) A solid cuboid measures 20 cm by 12 cm by 5 cm.

(i) Calculate the volume of the cuboid.

..... cm^3 [1]

(ii) **(a)** Calculate the total surface area of the cuboid.

..... cm^2 [3]

(b) The surface of the cuboid is painted.
The cost of the paint used is \$1.52 .

Find the cost to paint $1 cm^2$ of the cuboid.
Give your answer in cents.

..... cents [1]

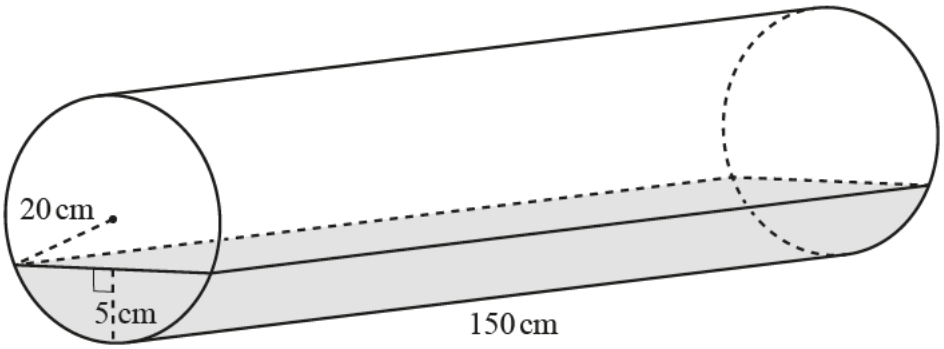
(b) A solid metal cylinder with radius x and height $\frac{9x}{2}$ is melted.
All the metal is used to make a sphere with radius r.

Find r in terms of x.

[The volume, V, of a sphere with radius r is $V = \frac{4}{3}\pi r^3$.]

$r =$ ..... [3]

(c)



NOT TO SCALE

The diagram shows a cylinder of length 150 cm on horizontal ground.
The cylinder has radius 20 cm.
The cylinder contains water to a depth of 5 cm, as shown in the diagram.

Calculate the volume of water in the cylinder.
Give your answer in litres.

..... litres [7]