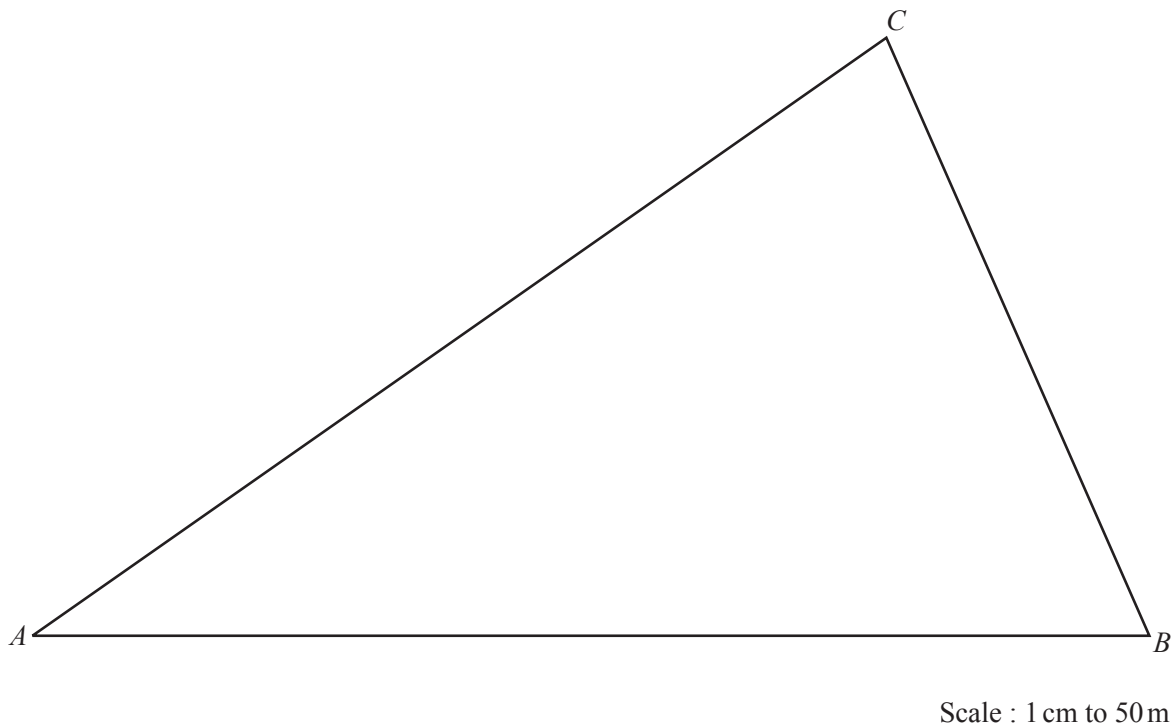


1. Question | 0580 Feb-March 2016 P4 V2 Q2

- 2 In this question use a ruler and compasses only.**
Show all your construction arcs.

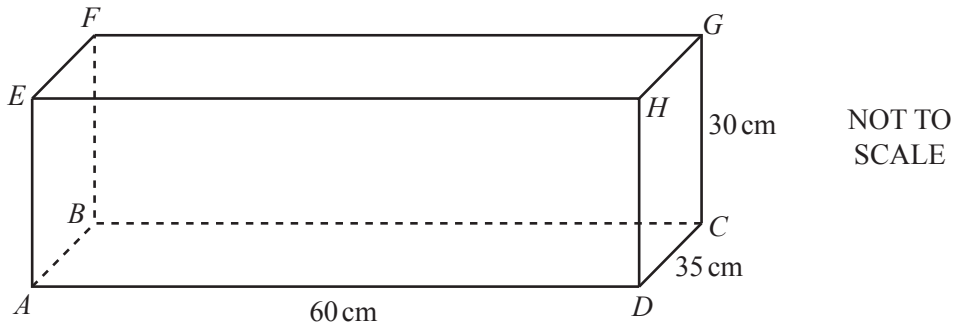
The diagram shows a triangular field ABC .
The scale is 1 centimetre represents 50 metres.



- (a) Construct the locus of points that are equidistant from A and B . [2]
- (b) Construct the locus of points that are equidistant from the lines AB and AC . [2]
- (c) The two loci intersect at the point E .
Construct the locus of points that are 250 m from E . [2]
- (d) Shade any region inside the field ABC that is
- more than 250 m from E
 - and
 - closer to AC than to AB . [2]

2. Question part 1/2 | 0580 May-June 2016 P4 V2 Q6

6 The diagram shows a cuboid.



$AD = 60\text{ cm}$, $CD = 35\text{ cm}$ and $CG = 30\text{ cm}$.

(a) Write down the number of planes of symmetry of this cuboid.

..... [1]

(b) (i) Work out the surface area of the cuboid.

..... cm^2 [3]

(ii) Write your answer to **part (b)(i)** in square metres.

..... m^2 [1]

(c) Calculate

(i) the length AG ,

$AG =$ cm [4]

(ii) the angle between AG and the base $ABCD$.

..... [3]

(d) (i) Show that the volume of the cuboid is $63\,000\text{ cm}^3$.

[1]

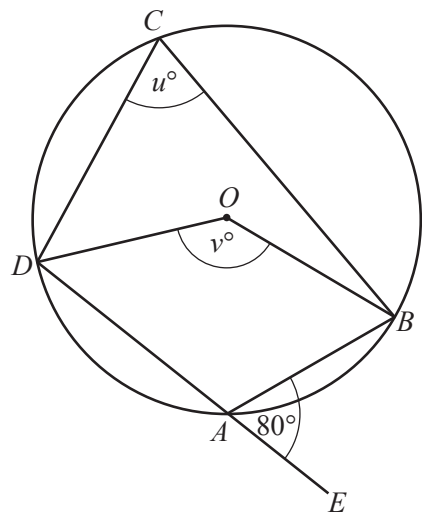
(ii) A cylinder of height 40 cm has the same volume as the cuboid.

Calculate the radius of the cylinder.

..... cm [3]

3. Question part 1/2 | 0580 Oct-Nov 2016 P4 V2 Q8

8 (a)



NOT TO
SCALE

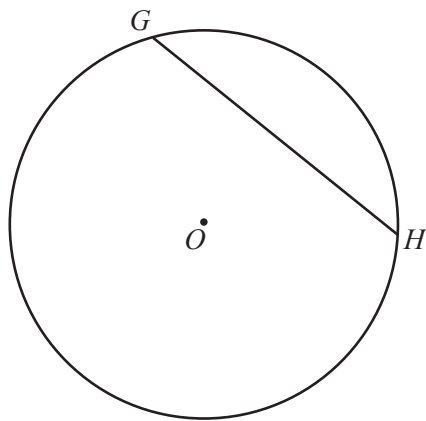
A, B, C and D lie on the circle, centre O .
 DAE is a straight line.

Find the value of u and the value of v .

$u =$

$v =$ [2]

(b)



NOT TO
SCALE

The diagram shows a circle, centre O , radius 8 cm.
 GH is a chord of length 10 cm.

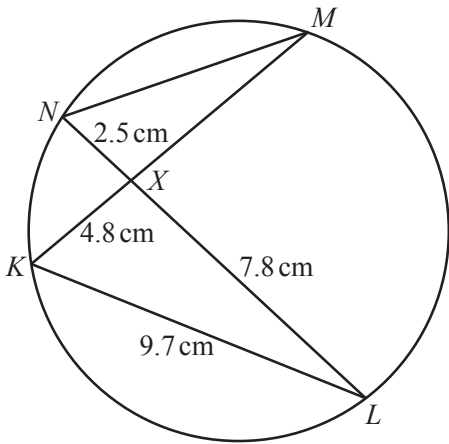
Calculate the length of the perpendicular from O to GH .

..... cm [3]

3. Question part 2/2 | 0580 Oct-Nov 2016 P4 V2 Q8

- (c) K, L, M and N lie on the circle.
 KM and LN intersect at X .
 $KL = 9.7\text{ cm}$, $KX = 4.8\text{ cm}$,
 $LX = 7.8\text{ cm}$ and $NX = 2.5\text{ cm}$.

Calculate MN .



NOT TO
SCALE

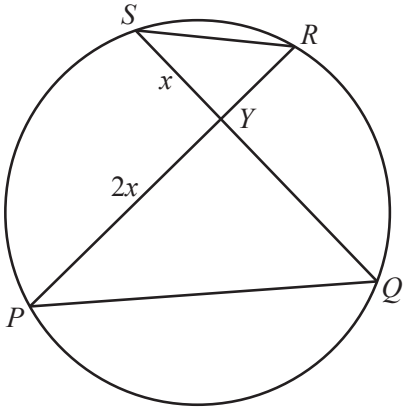
$MN = \dots\dots\dots\text{ cm [2]}$

- (d) All lengths are in centimetres.
 P, Q, R and S lie on the circle.
 PR and QS intersect at Y .
 $PY = 2x$ and $YS = x$.

The area of triangle $YRS = \frac{5}{12}x(x - 1)$.

The area of triangle $YQP = x(x + 1)$.

Find the value of x .

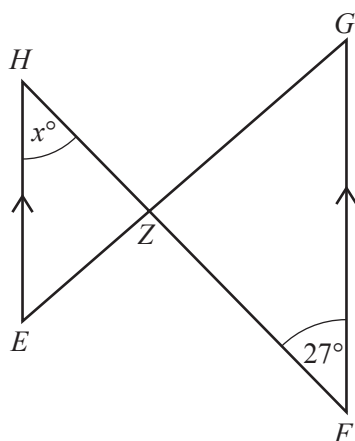


NOT TO
SCALE

$x = \dots\dots\dots [4]$

4. Question part 1/2 | 0580 Feb-March 2017 P4 V2 Q6

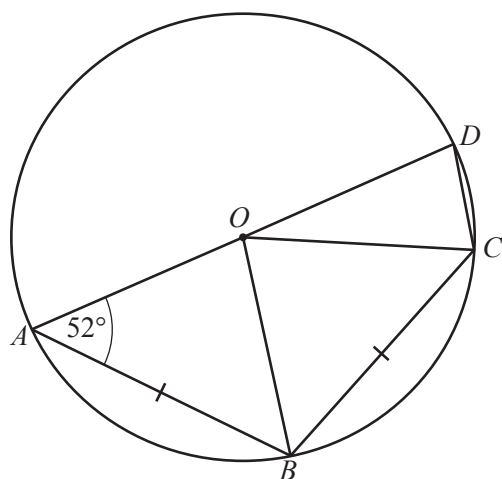
6 (a)

NOT TO
SCALE

In the diagram, EH is parallel to FG .
The straight lines EG and FH intersect at Z .
Angle $ZFG = 27^\circ$.

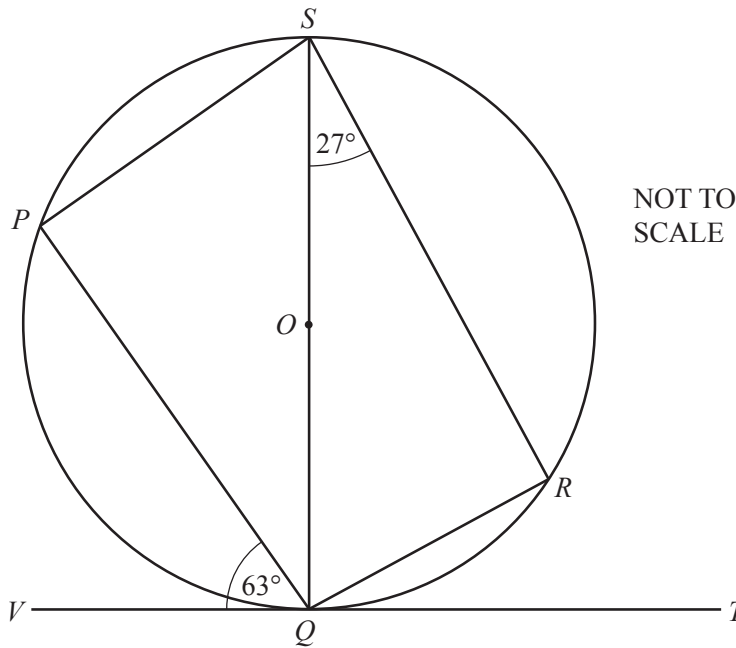
(i) Find the value of x . $x = \dots\dots\dots [1]$ (ii) $EH = 5$ cm, $FG = 9$ cm and $ZG = 7$ cm.Calculate EZ . $EZ = \dots\dots\dots$ cm [2]

(b) The diagram shows points A , B , C and D on the circumference of a circle, centre O .
 AD is a straight line, $AB = BC$ and angle $OAB = 52^\circ$.

NOT TO
SCALEFind angle ADC .Angle $ADC = \dots\dots\dots [3]$

4. Question part 2/2 | 0580 Feb-March 2017 P4 V2 Q6

- (c) The diagram shows points P , Q , R and S on the circumference of a circle, centre O . VT is the tangent to the circle at Q .

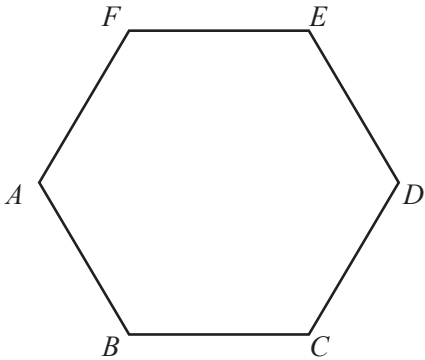


Complete the statements.

- (i) Angle QPS = angle QRS = ... $^\circ$ because
..... [2]
- (ii) Angle SQP = ... $^\circ$ because
..... [2]
- (iii) **Part (c)(i)** and **part (c)(ii)** show that
the cyclic quadrilateral $PQRS$ is a [1]

5. Question part 1/2 | 0580 Feb-March 2017 P4 V2 Q10

- 10 (a) The diagram shows a regular hexagon $ABCDEF$ of side 10 cm.



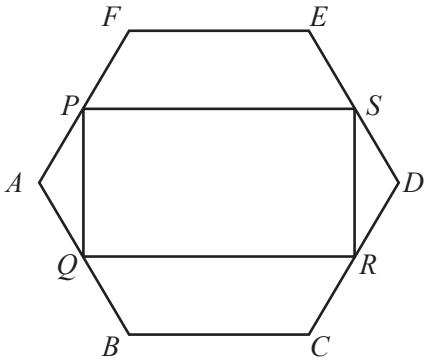
NOT TO
SCALE

- (i) Show that angle $BAF = 120^\circ$.

[2]

- (ii) The vertices of a rectangle $PQRS$ touch the sides FA , AB , CD and DE .

PS is parallel to FE and $AP = x$ cm.



NOT TO
SCALE

Use trigonometry to find the length of PQ in terms of x .

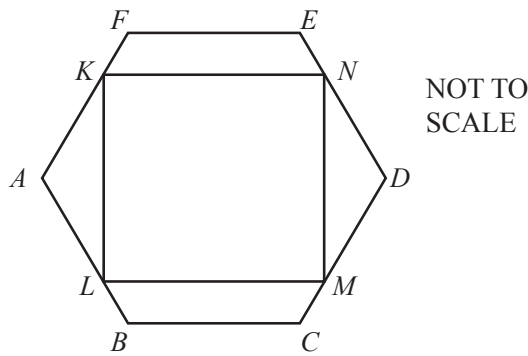
$PQ = \dots\dots\dots$ cm [3]

- (iii) $PF = (10 - x)$ cm.

Show that $PS = (20 - x)$ cm.

[3]

(b)



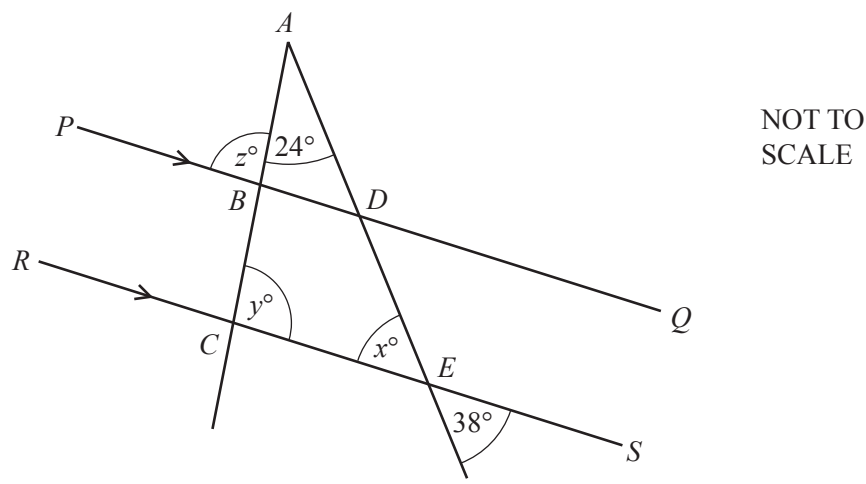
The diagram shows the vertices of a square $KLMN$ touching the sides of the same hexagon $ABCDEF$, with KN parallel to FE .

Use your results from **part (a)(ii)** and **part (a)(iii)** to find the length of a side of the square.

..... cm [4]

6. Question part 1/2 | 0580 May-June 2017 P4 V3 Q2

2 (a)

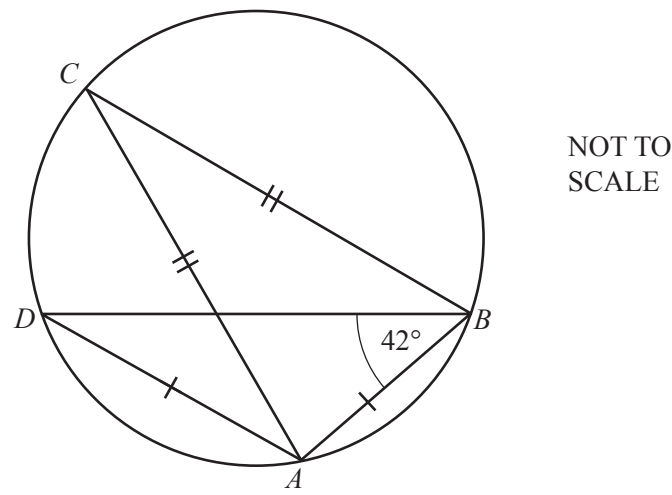


PQ is parallel to RS .
 ABC and ADE are straight lines.

Find the values of x , y and z .

$x =$
 $y =$
 $z =$ [3]

(b)

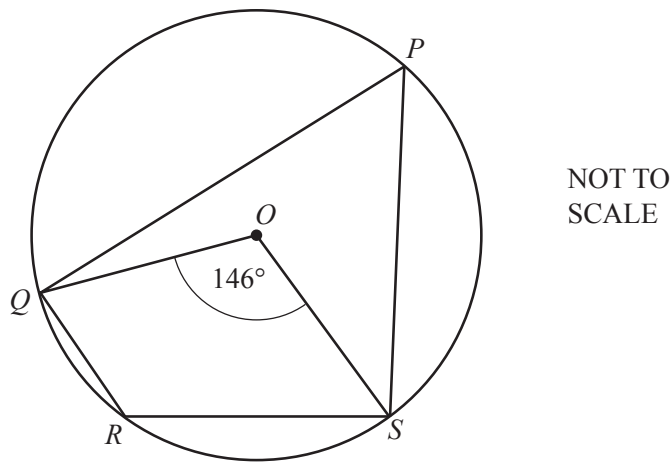


The points A , B , C and D lie on the circumference of the circle.
 $AB = AD$, $AC = BC$ and angle $ABD = 42^\circ$.

Find angle CAB .

Angle $CAB =$ [3]

(c)

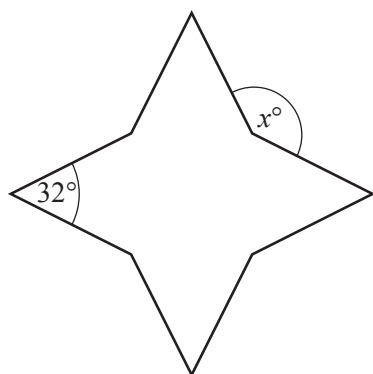


The points P, Q, R and S lie on the circumference of the circle, centre O .
Angle $QOS = 146^\circ$.

Find angle QRS .

Angle $QRS = \dots\dots\dots [2]$

2 (a)

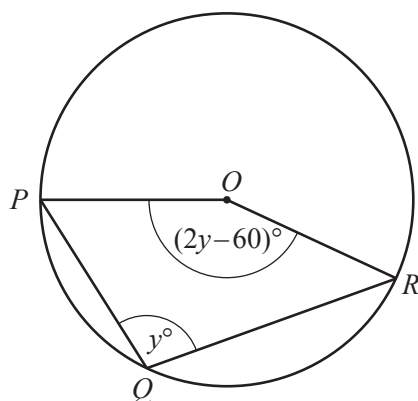
NOT TO
SCALE

The diagram shows an octagon.
 All of the sides are the same length.
 Four of the interior angles are each 32° .
 The other four interior angles are equal.

Find the value of x .

$x = \dots\dots\dots$ [4]

(b)

NOT TO
SCALE

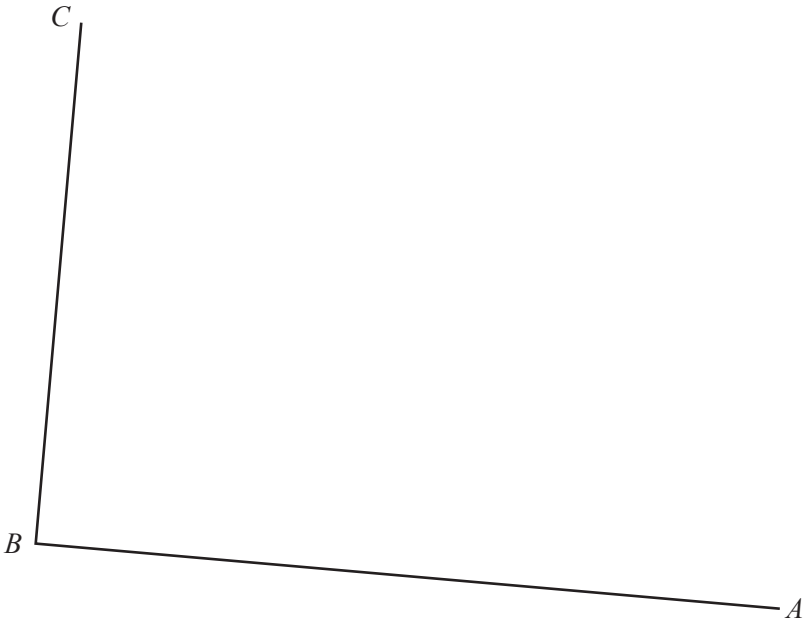
P , Q and R lie on a circle, centre O .
 Angle $PQR = y^\circ$ and angle $POR = (2y - 60)^\circ$.

Find the value of y .

$y = \dots\dots\dots$ [3]

8. Question | 0580 May-June 2018 P4 V1 Q2

- 2
- The scale drawing shows two boundaries, AB and BC , of a field $ABCD$.
The scale of the drawing is 1 cm represents 8 m.



Scale: 1 cm to 8 m

- (a)
- The boundaries CD and AD of the field are each 72 m long.
- (i)
- Work out the length of CD and AD on the scale drawing.
- cm [1]
- (ii)
- Using a ruler and compasses only, complete accurately the scale drawing of the field. [2]
- (b)
- A tree in the field is
- equidistant from A and Band
 - equidistant from AB and BC .

On the scale drawing, construct two lines to find the position of the tree.
Use a **straight edge and compasses only** and leave in your construction arcs. [4]

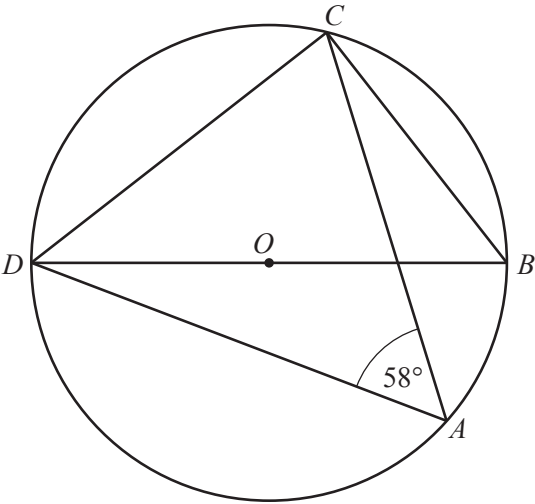
9. Question part 1/2 | 0580 May-June 2018 P4 V1 Q8

- 8 (a) The exterior angle of a regular polygon is x° and the interior angle is $8x^\circ$.

Calculate the number of sides of the polygon.

..... [3]

(b)



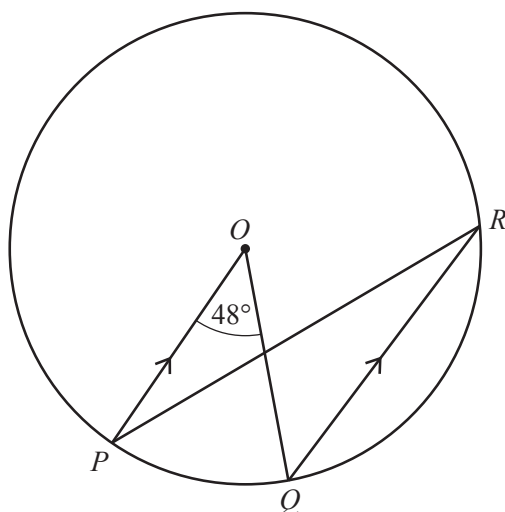
NOT TO
SCALE

A, B, C and D are points on the circumference of the circle, centre O .
 DOB is a straight line and angle $DAC = 58^\circ$.

Find angle CDB .

Angle $CDB =$ [3]

(c)

NOT TO
SCALE

P , Q and R are points on the circumference of the circle, centre O .
 PO is parallel to QR and angle $POQ = 48^\circ$.

(i) Find angle OPR .

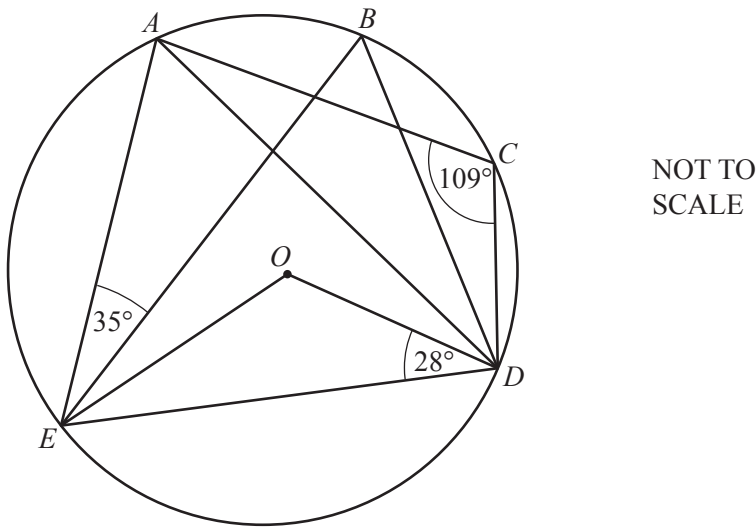
Angle $OPR = \dots\dots\dots$ [2]

(ii) The radius of the circle is 5.4 cm.

Calculate the length of the **major** arc PQ .

$\dots\dots\dots$ cm [3]

9 (a)



A, B, C, D and E lie on the circle, centre O .
Angle $AEB = 35^\circ$, angle $ODE = 28^\circ$ and angle $ACD = 109^\circ$.

(i) Work out the following angles, giving reasons for your answers.

- (a) Angle $EBD = \dots\dots\dots$ because $\dots\dots\dots$
 $\dots\dots\dots$
 $\dots\dots\dots$ [3]
- (b) Angle $EAD = \dots\dots\dots$ because $\dots\dots\dots$
 $\dots\dots\dots$ [2]

(ii) Work out angle BEO .

Angle $BEO = \dots\dots\dots$ [3]

10. Question part 2/2 | 0580 May-June 2018 P4 V2 Q9

(b) In a regular polygon, the interior angle is 11 times the exterior angle.

(i) Work out the number of sides of this polygon.

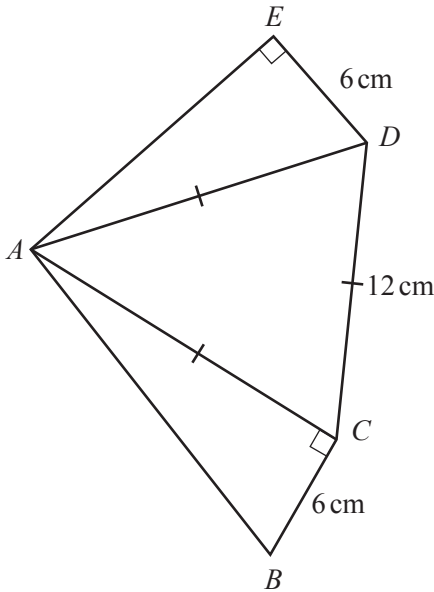
..... [3]

(ii) Find the sum of the interior angles of this polygon.

..... [2]

11. Question part 1/2 | 0580 May-June 2018 P4 V3 Q6

6 (a)



In the pentagon $ABCDE$, angle $ACB = \text{angle } AED = 90^\circ$.
Triangle ACD is equilateral with side length 12 cm.
 $DE = BC = 6\text{ cm}$.

(i) Calculate angle BAE .

Angle $BAE = \dots\dots\dots$ [4]

(ii) Calculate AB .

$AB = \dots\dots\dots\text{ cm}$ [2]

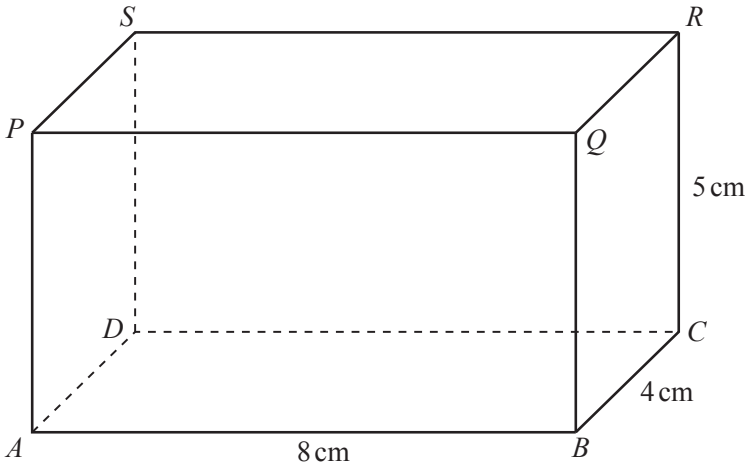
(iii) Calculate AE .

$AE = \dots\dots\dots\text{ cm}$ [3]

(iv) Calculate the area of the pentagon.

..... cm^2 [4]

(b)



NOT TO
SCALE

The diagram shows a cuboid.
 $AB = 8\text{ cm}$, $BC = 4\text{ cm}$ and $CR = 5\text{ cm}$.

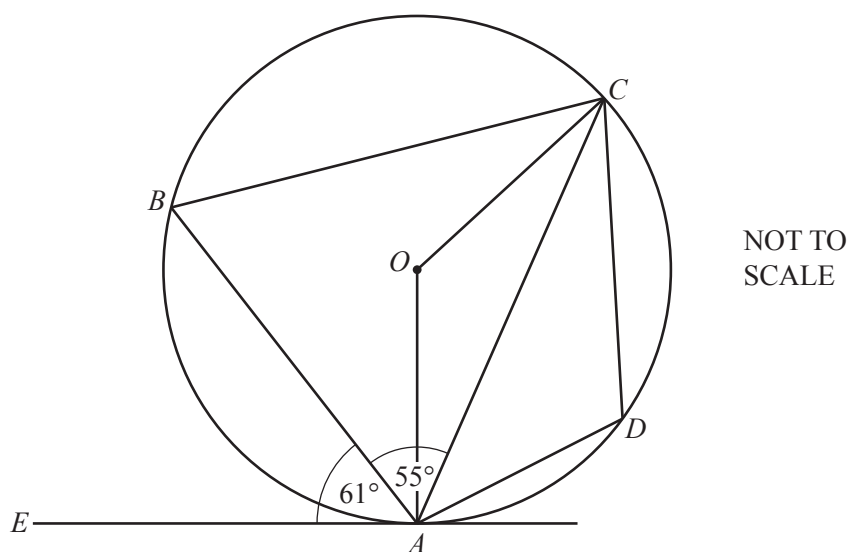
(i) Write down the number of planes of symmetry of this cuboid.

..... [1]

(ii) Calculate the angle between the diagonal AR and the plane $BCRQ$.

..... [4]

7



In the diagram, A , B , C and D lie on the circle, centre O .
 EA is a tangent to the circle at A .
 Angle $EAB = 61^\circ$ and angle $BAC = 55^\circ$.

(a) Find angle BAO .

Angle $BAO = \dots\dots\dots$ [1]

(b) Find angle AOC .

Angle $AOC = \dots\dots\dots$ [2]

(c) Find angle ABC .

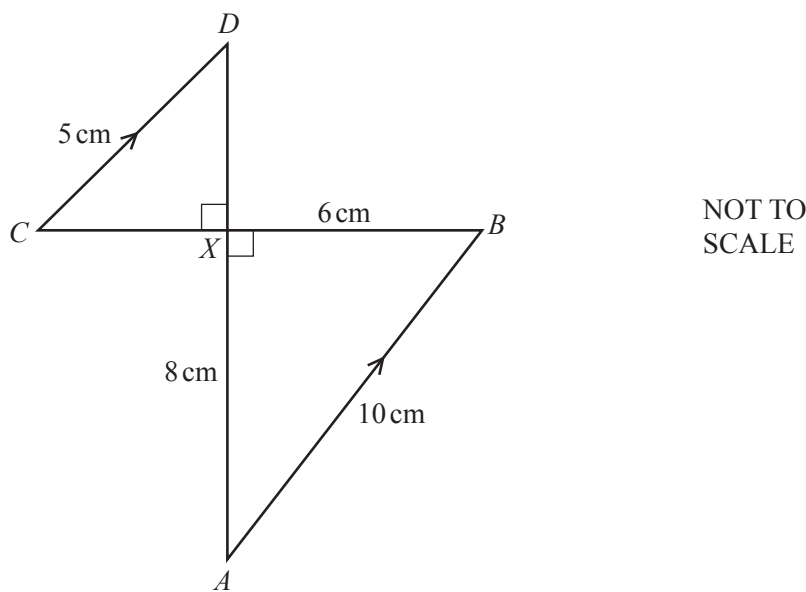
Angle $ABC = \dots\dots\dots$ [1]

(d) Find angle CDA .

Angle $CDA = \dots\dots\dots$ [1]

13. Question part 1/2 | 0580 Oct-Nov 2018 P4 V3 Q8

8 (a)



In the diagram, AB and CD are parallel.
 AD and BC intersect at right angles at the point X .
 $AB = 10\text{ cm}$, $CD = 5\text{ cm}$, $AX = 8\text{ cm}$ and $BX = 6\text{ cm}$.

(i) Use similar triangles to calculate DX .

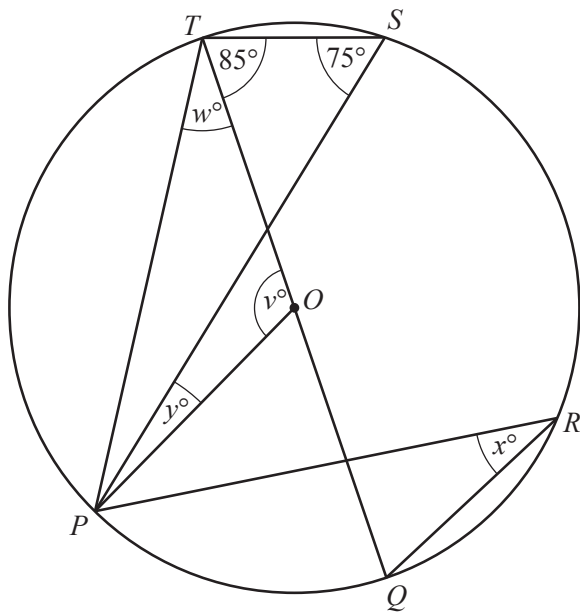
$DX = \dots\dots\dots\text{ cm}$ [2]

(ii) Calculate angle XAB .

Angle $XAB = \dots\dots\dots$ [2]

13. Question part 2/2 | 0580 Oct-Nov 2018 P4 V3 Q8

(b)



NOT TO
SCALE

P, Q, R, S and T lie on the circle, centre O .
Angle $PST = 75^\circ$ and angle $QTS = 85^\circ$.

Find the values of v, w, x and y .

$v =$
 $w =$
 $x =$
 $y =$ [6]

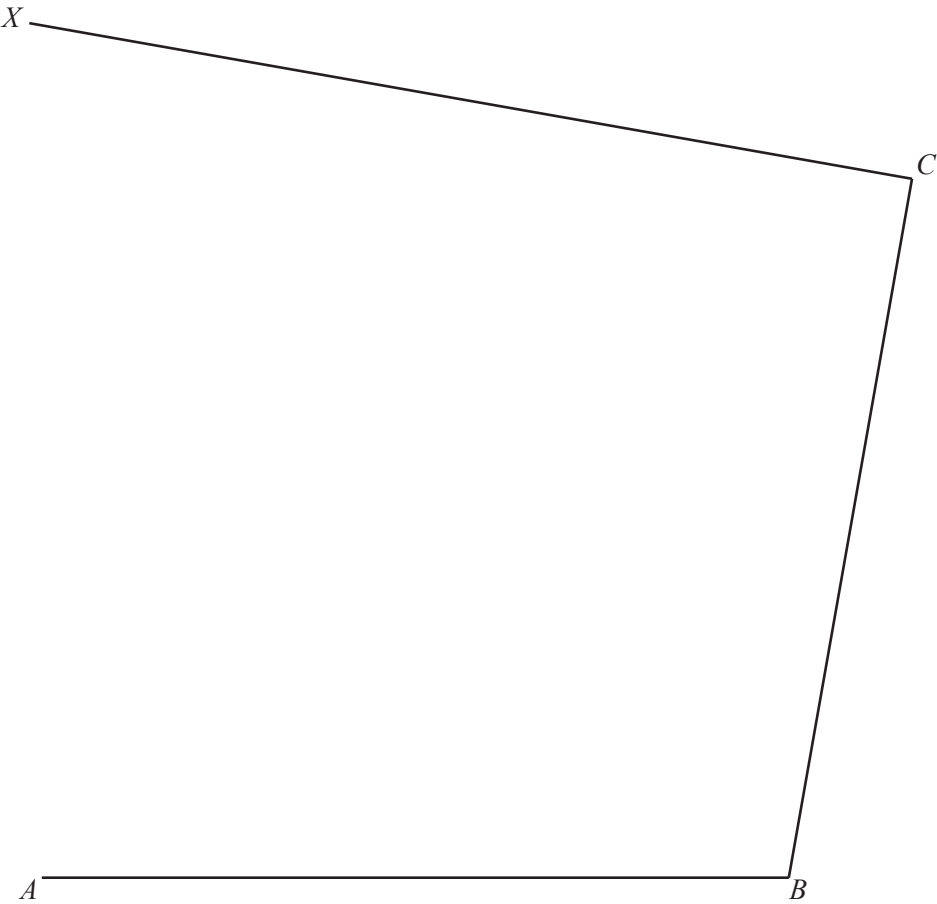
- (c) Two containers are mathematically similar.
The surface area of the larger container is 226 cm^2 and the surface area of the smaller container is 94 cm^2 .
The volume of the larger container is 680 cm^3 .

Find the volume of the smaller container.

..... cm^3 [3]

14. Question part 1/2 | 0580 Feb-March 2019 P4 V2 Q4

- 4 The diagram shows an incomplete scale drawing of a market place, $ABCD$, where D is on CX .
The scale is 1 centimetre represents 5 metres.



D lies on CX such that angle $DAB = 75^\circ$.

- (a) On the diagram, draw the line AD and mark the position of D . [2]
- (b) Find the actual length of the side BC of the market place.

..... m [2]

(c) In this part, use a ruler and compasses only.

Street sellers are allowed in the part of the market place that is

- more than 35 metres from A
- and
- nearer to C than to B
- and
- nearer to CD than to BC .

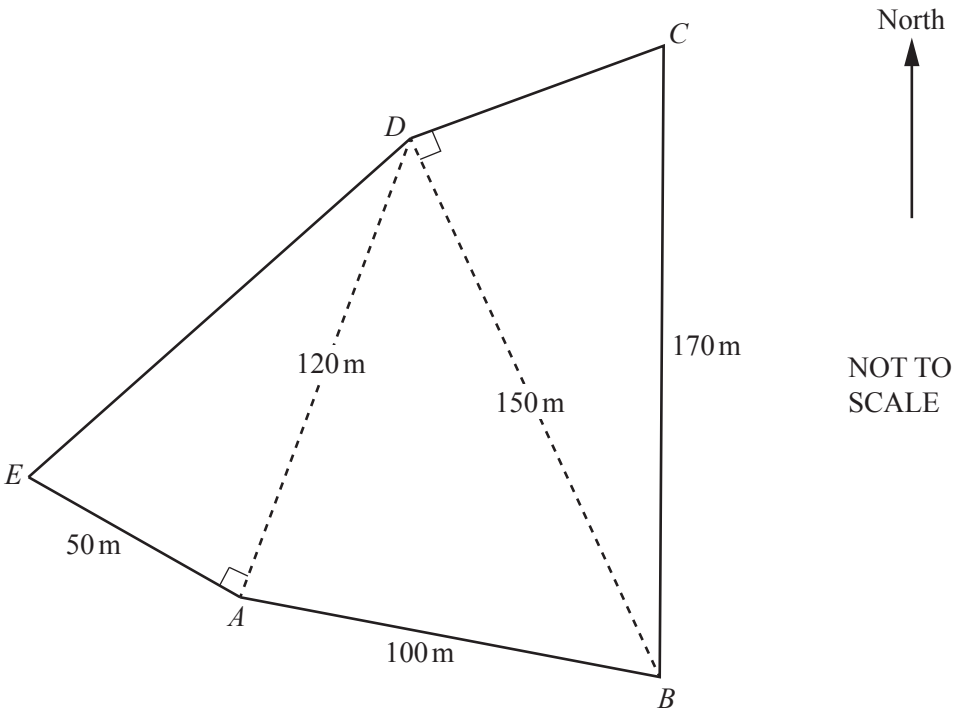
On the diagram, construct and shade the region where street sellers are allowed. [7]

(d) Write the scale of the drawing in the form $1 : n$.

1 : [1]

15. Question part 1/2 | 0580 May-June 2019 P4 V1 Q3

3



The diagram shows a field $ABCDE$.

(a) Calculate the perimeter of the field $ABCDE$.

..... m [4]

(b) Calculate angle ABD .

Angle ABD = ... [4]

15. Question part 2/2 | 0580 May-June 2019 P4 V1 Q3

(c) (i) Calculate angle CBD .

Angle $CBD = \dots\dots\dots$ [2]

(ii) The point C is due north of the point B .

Find the bearing of D from B .

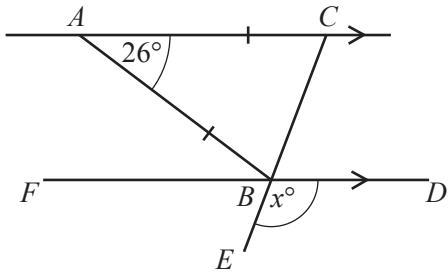
$\dots\dots\dots$ [2]

(d) Calculate the area of the field $ABCDE$.
Give your answer in hectares.
[1 hectare = 10 000 m²]

$\dots\dots\dots$ hectares [4]

16. Question | 0580 May-June 2019 P4 V2 Q2

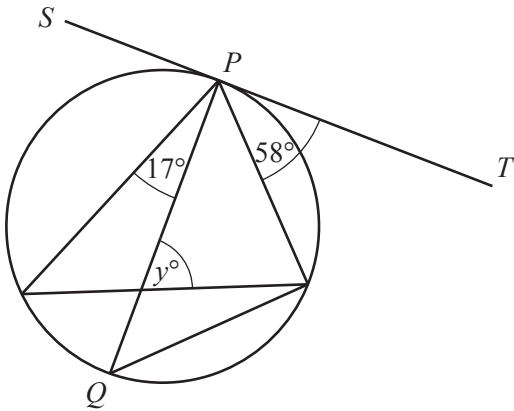
2 (a)



AC is parallel to FBD , ABC is an isosceles triangle and CBE is a straight line.
Find the value of x .

$x = \dots\dots\dots$ [3]

(b)



The diagram shows a circle with diameter PQ .
 SPT is a tangent to the circle at P .
Find the value of y .

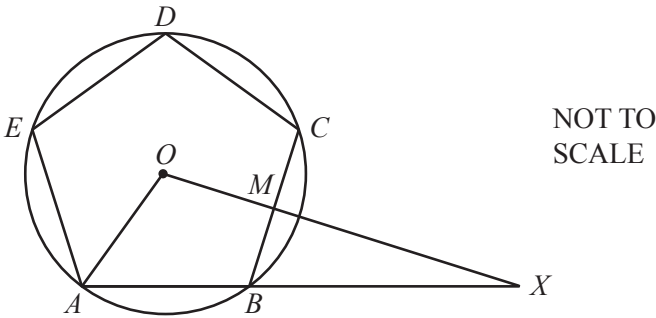
$y = \dots\dots\dots$ [5]

17. Question | 0580 May-June 2019 P4 V2 Q7

- 7 (a) Show that each interior angle of a regular pentagon is 108° .

[2]

(b)



The diagram shows a regular pentagon $ABCDE$.
The vertices of the pentagon lie on a circle, centre O , radius 12 cm.
 M is the midpoint of BC .

- (i) Find BM .

$BM = \dots\dots\dots$ cm [3]

- (ii) OMX and ABX are straight lines.

- (a) Find BX .

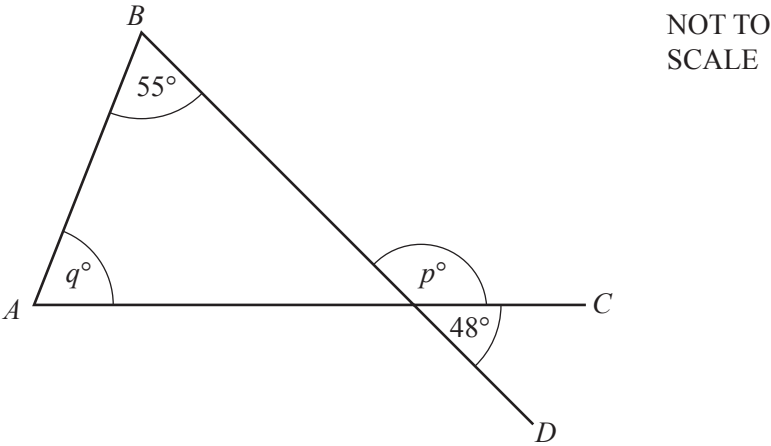
$BX = \dots\dots\dots$ cm [3]

- (b) Calculate the area of triangle AOX .

$\dots\dots\dots$ cm^2 [3]

18. Question part 1/2 | 0580 Oct-Nov 2019 P4 V1 Q1

1 (a)



In the diagram, AC and BD are straight lines.

Find the value of p and the value of q .

$p =$

$q =$ [3]

(b) The angles of a quadrilateral are x° , $(x + 5)^\circ$, $(2x - 25)^\circ$ and $(x + 10)^\circ$.

Find the value of x .

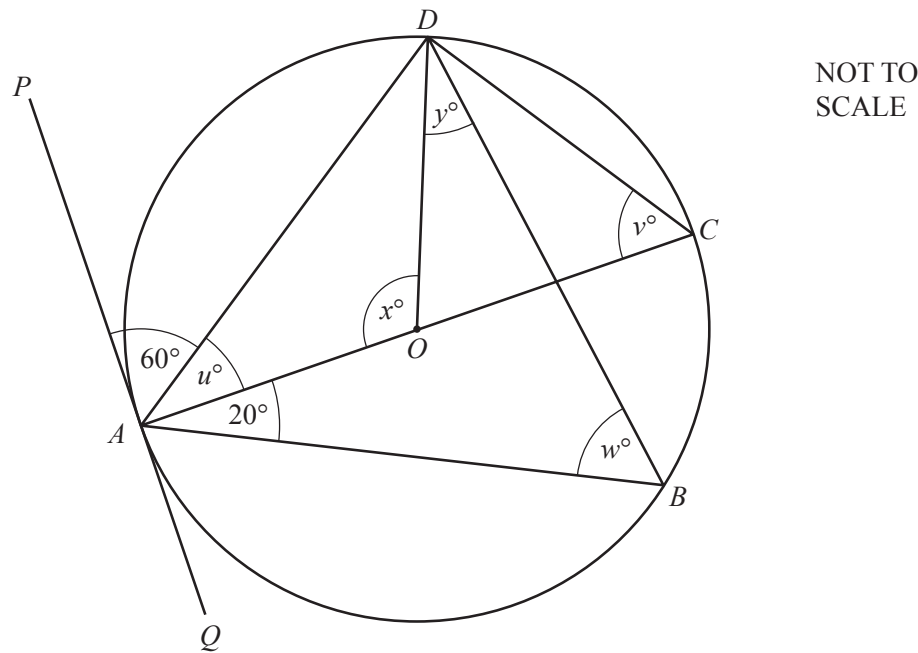
$x =$ [3]

(c) A regular polygon has 72 sides.

Find the size of an interior angle.

..... [3]

(d)



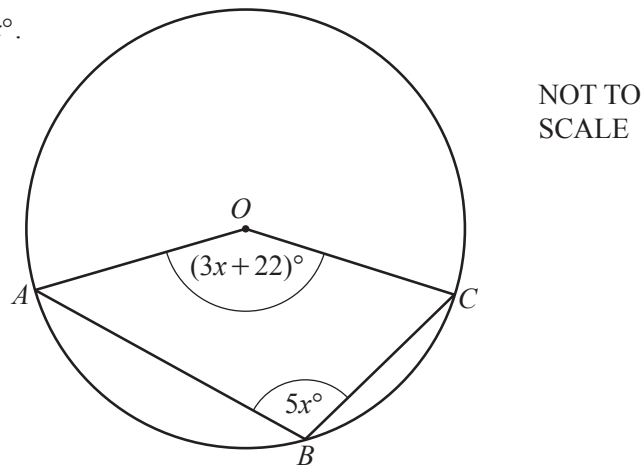
A, B, C and D lie on the circle, centre O , with diameter AC .
 PQ is a tangent to the circle at A .
Angle $PAD = 60^\circ$ and angle $BAC = 20^\circ$.

Find the values of u, v, w, x and y .

$u = \dots\dots\dots, v = \dots\dots\dots, w = \dots\dots\dots, x = \dots\dots\dots, y = \dots\dots\dots$ [6]

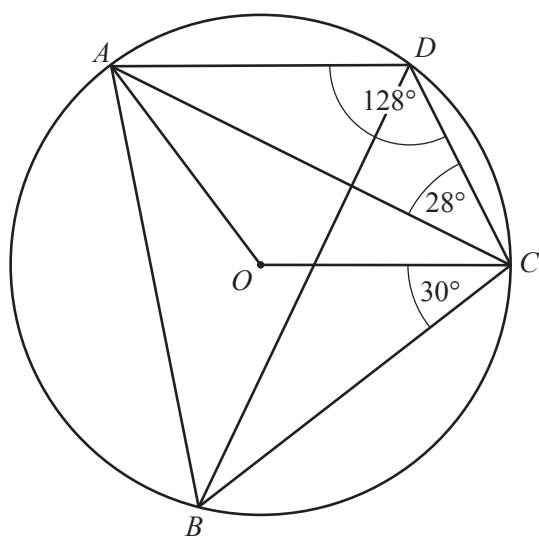
(e) A, B and C lie on the circle, centre O .
Angle $AOC = (3x + 22)^\circ$ and angle $ABC = 5x^\circ$.

Find the value of x .



$x = \dots\dots\dots$ [4]

6 (a)

NOT TO
SCALE

In the diagram, A , B , C and D lie on the circle, centre O .
Angle $ADC = 128^\circ$, angle $ACD = 28^\circ$ and angle $BCO = 30^\circ$.

- (i) Show that obtuse angle $AOC = 104^\circ$.
Give a reason for each step of your working.

[3]

- (ii) Find angle BAO .

Angle $BAO = \dots\dots\dots$ [2]

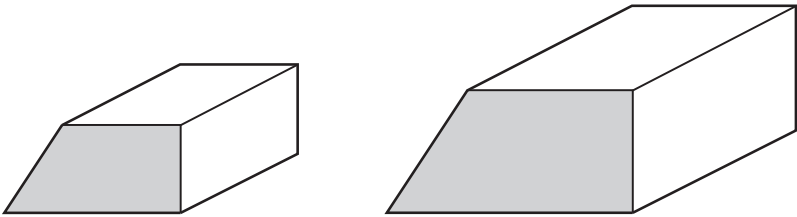
- (iii) Find angle ABD .

Angle $ABD = \dots\dots\dots$ [1]

(iv) The radius, OC , of the circle is 9.6 cm.

Calculate the total perimeter of the sector $OADC$.

(b)



NOT TO
SCALE

The diagram shows two mathematically similar solid metal prisms.
The volume of the smaller prism is 648 cm^3 and the volume of the larger prism is 2187 cm^3 .
The area of the cross-section of the smaller prism is 36 cm^2 .

(i) Calculate the area of the cross-section of the larger prism.

..... cm^2 [3]

(ii) The larger prism is melted down into a sphere.

Calculate the radius of the sphere.

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

..... cm [3]

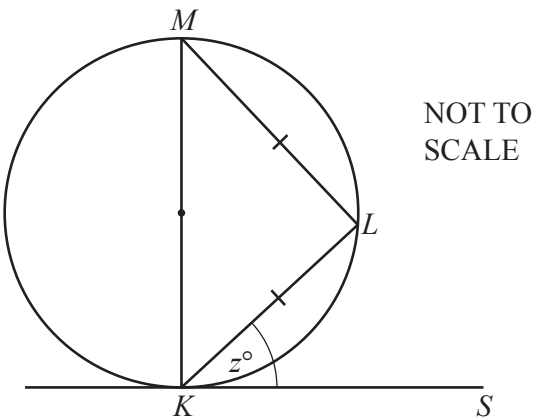
8 (a) The interior angle of a regular polygon with n sides is 150° .

Calculate the value of n .

$n = \dots\dots\dots$ [2]

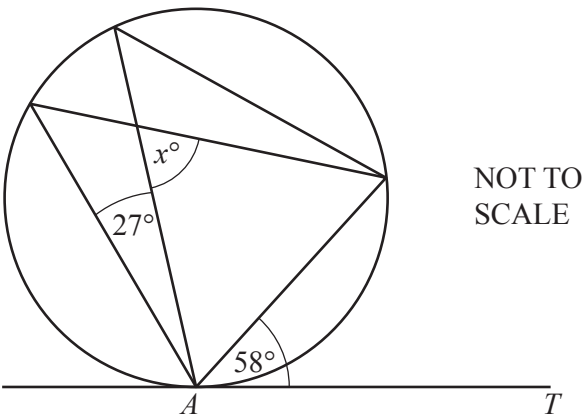
- (b) (i) K, L and M are points on the circle.
 KS is a tangent to the circle at K .
 KM is a diameter and triangle KLM is isosceles.

Find the value of z .



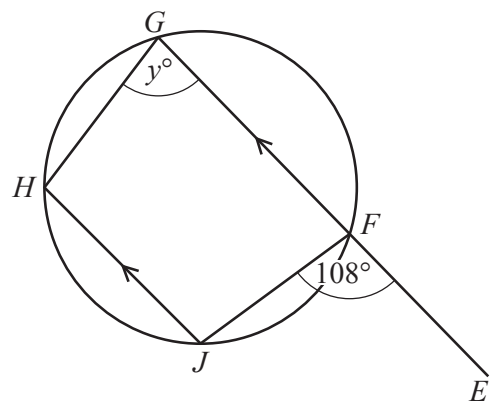
$z = \dots\dots\dots$ [2]

- (ii) AT is a tangent to the circle at A .
Find the value of x .



$x = \dots\dots\dots$ [2]

(iii)



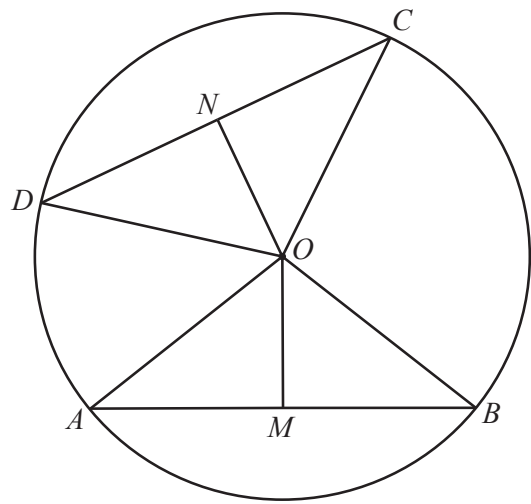
NOT TO
SCALE

F, G, H and J are points on the circle.
 EFG is a straight line parallel to JH .

Find the value of y .

$y = \dots\dots\dots$ [2]

(c)



NOT TO
SCALE

A, B, C and D are points on the circle, centre O .
 M is the midpoint of AB and N is the midpoint of CD .
 $OM = ON$

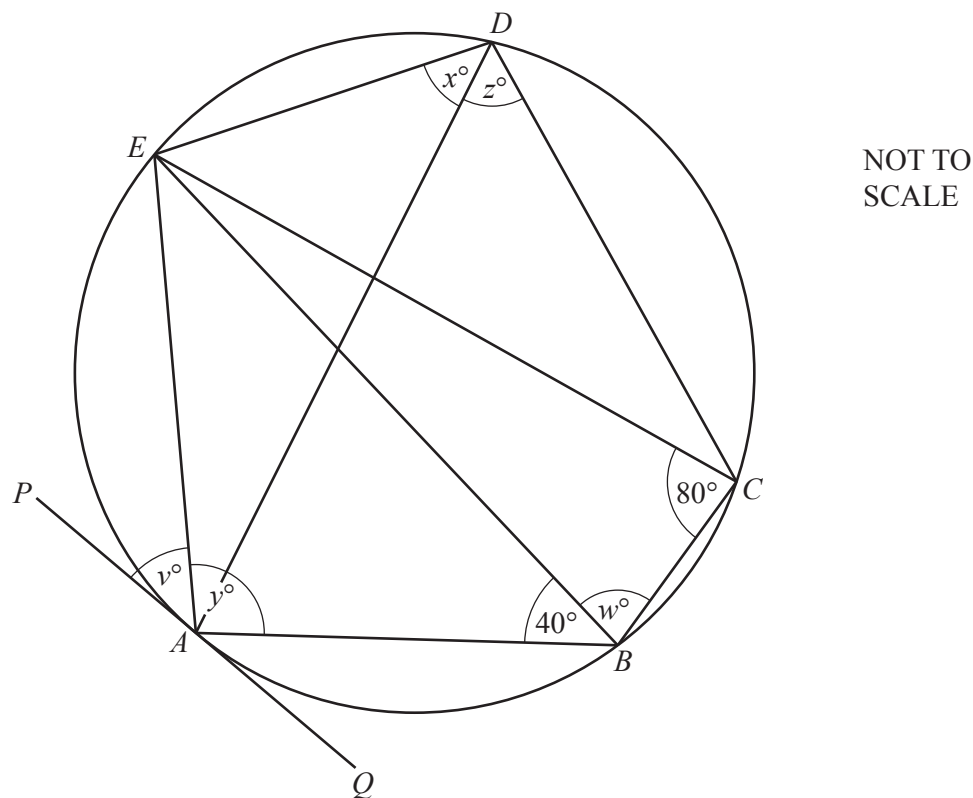
Explain, giving reasons, why triangle OAB is congruent to triangle OCD .

.....
.....
.....
.....

[3]

21. Question part 1/2 | 0580 Oct-Nov 2020 P4 V2 Q8

8 (a)

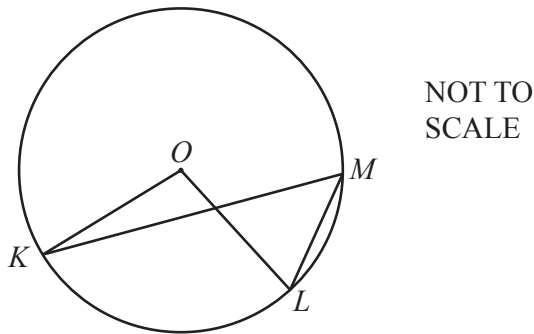


The points A, B, C, D and E lie on the circle.
 PAQ is a tangent to the circle at A and $EC = EB$.
Angle $ECB = 80^\circ$ and angle $ABE = 40^\circ$.

Find the values of v, w, x, y and z .

$v = \dots\dots\dots$ $w = \dots\dots\dots$ $x = \dots\dots\dots$ $y = \dots\dots\dots$ $z = \dots\dots\dots$ [5]

(b)

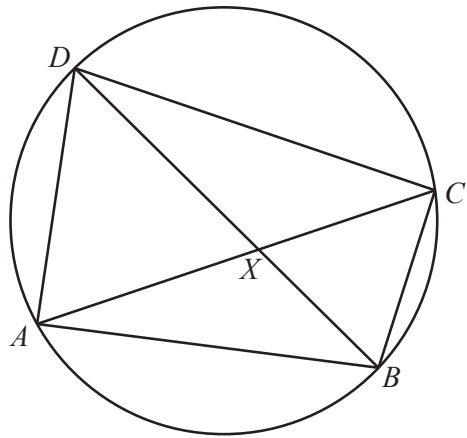


In the diagram, K, L and M lie on the circle, centre O .
Angle $KML = 2x^\circ$ and reflex angle $KOL = 11x^\circ$.

Find the value of x .

$x = \dots\dots\dots$ [3]

(c)



NOT TO
SCALE

The diagonals of the cyclic quadrilateral $ABCD$ intersect at X .

- (i) Explain why triangle ADX is similar to triangle BCX .
Give a reason for each statement you make.

.....

.....

.....

..... [3]

- (ii) $AD = 10\text{ cm}$, $BC = 8\text{ cm}$, $BX = 5\text{ cm}$ and $CX = 7\text{ cm}$.

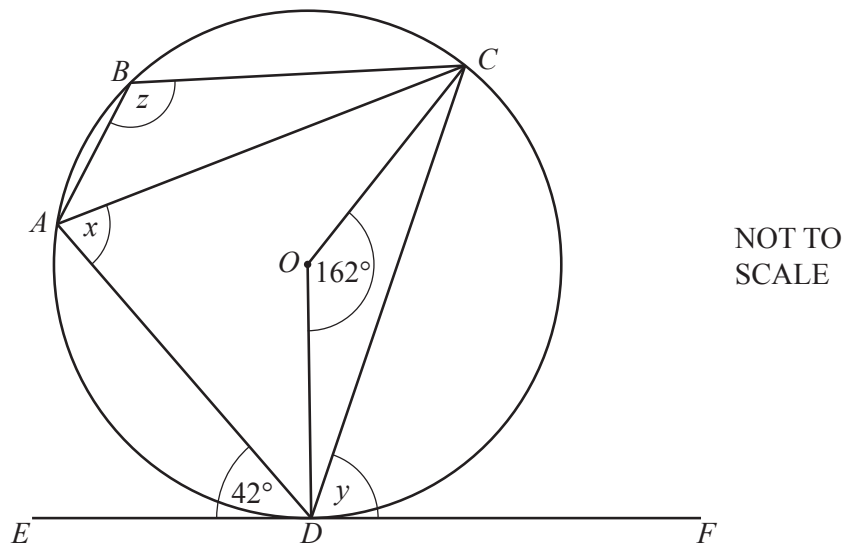
- (a) Calculate DX .

$DX = \text{..... cm}$ [2]

- (b) Calculate angle BXC .

Angle $BXC = \text{.....}$ [4]

5 (a)



A, B, C and D are points on the circle, centre O .
 EF is a tangent to the circle at D .
Angle $ADE = 42^\circ$ and angle $COD = 162^\circ$.

Find the following angles, giving reasons for each of your answers.

(i) Angle x

$x = \dots\dots\dots$ because $\dots\dots\dots$
 $\dots\dots\dots$ [2]

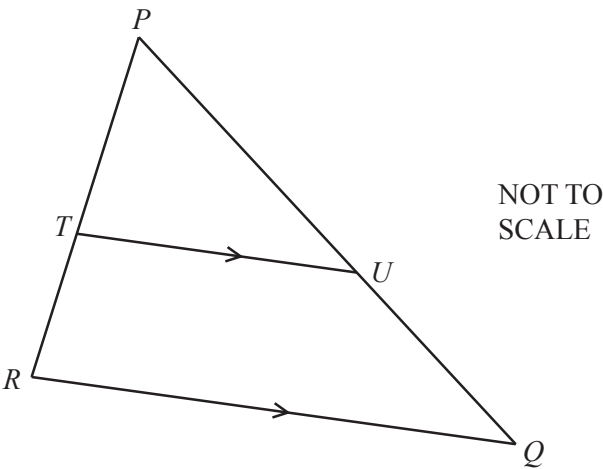
(ii) Angle y

$y = \dots\dots\dots$ because $\dots\dots\dots$
 $\dots\dots\dots$ [2]

(iii) Angle z

$z = \dots\dots\dots$ because $\dots\dots\dots$
 $\dots\dots\dots$
 $\dots\dots\dots$ [3]

(b)



PQR is a triangle.
 T is a point on PR and U is a point on PQ .
 RQ is parallel to TU .

- (i) Explain why triangle PQR is similar to triangle PUT .
Give a reason for each statement you make.

.....
.....
.....
..... [3]

- (ii) $PT : TR = 4 : 3$

- (a) Find the ratio $PU : PQ$.

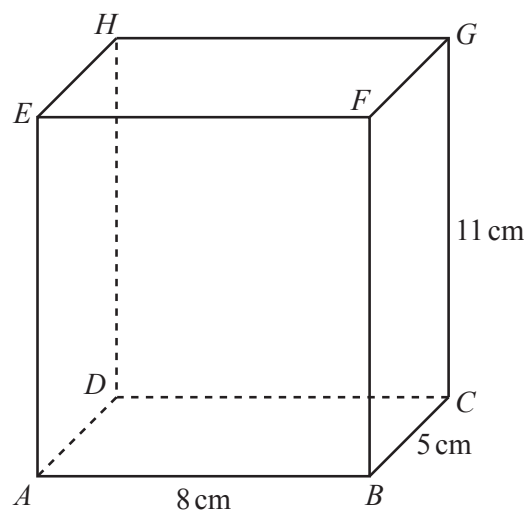
..... : [1]

- (b) The area of triangle PUT is 20 cm^2 .

Find the area of the quadrilateral $QRTU$.

..... cm^2 [3]

6



NOT TO
SCALE

ABCDEFGH is a cuboid.
 $AB = 8\text{ cm}$, $BC = 5\text{ cm}$ and $CG = 11\text{ cm}$.

(a) Work out the volume of the cuboid.

..... cm^3 [2]

(b) Ivana has a pencil of length 13 cm.

Does this pencil fit completely inside the cuboid?
Show how you decide.

[4]

11

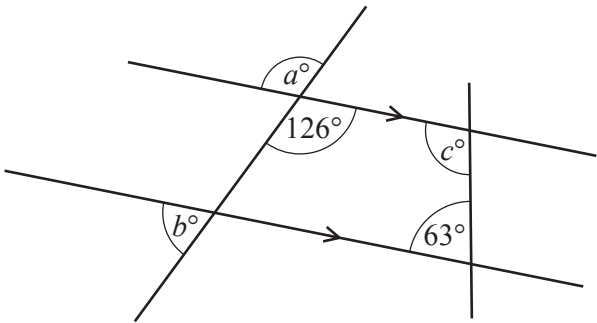
(c) (i) Calculate angle CAB .

Angle $CAB = \dots\dots\dots$ [2]

(ii) Calculate angle GAC .

Angle $GAC = \dots\dots\dots$ [2]

3 (a)



NOT TO
SCALE

The diagram shows two straight lines intersecting two parallel lines.

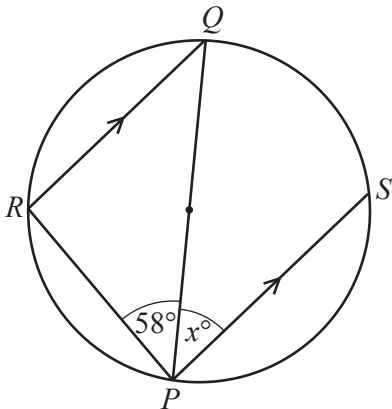
Find the values of a , b and c .

$a =$

$b =$

$c =$ [3]

(b)



NOT TO
SCALE

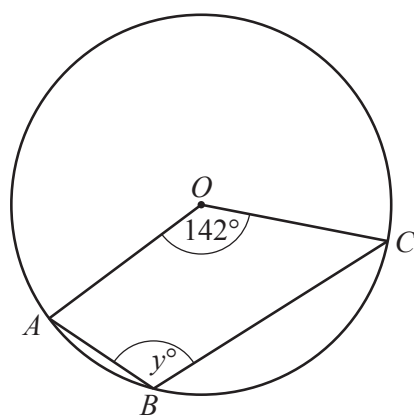
Points R and S lie on a circle with diameter PQ .
 RQ is parallel to PS .
Angle $RPQ = 58^\circ$.

Find the value of x , giving a geometrical reason for each stage of your working.

.....
.....
.....

$x =$ [3]

(c)

NOT TO
SCALE

Points A , B and C lie on a circle, centre O .
Angle $AOC = 142^\circ$.

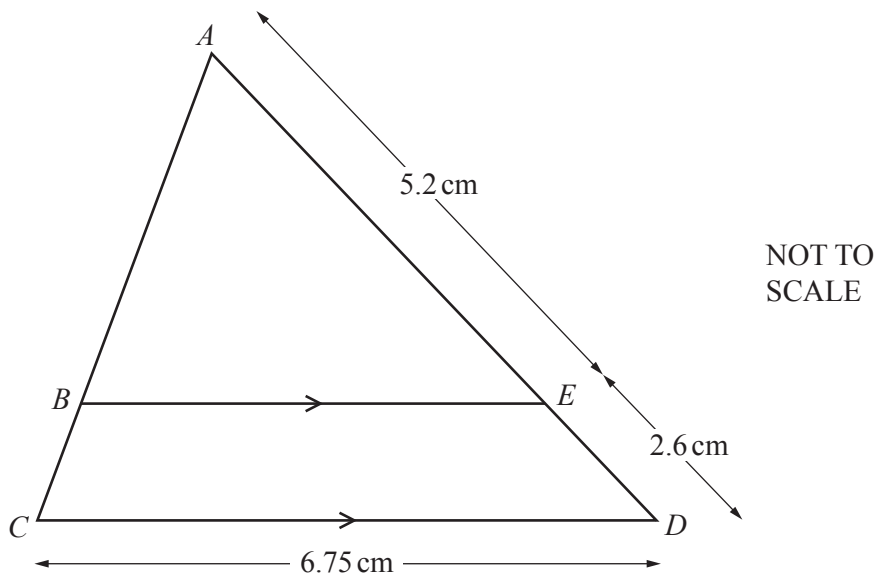
Find the value of y .

$y = \dots\dots\dots$ [2]

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 .
 $AE = 5.2\text{ cm}$ and $ED = 2.6\text{ cm}$.

Calculate BE .

$BE =$ cm [2]

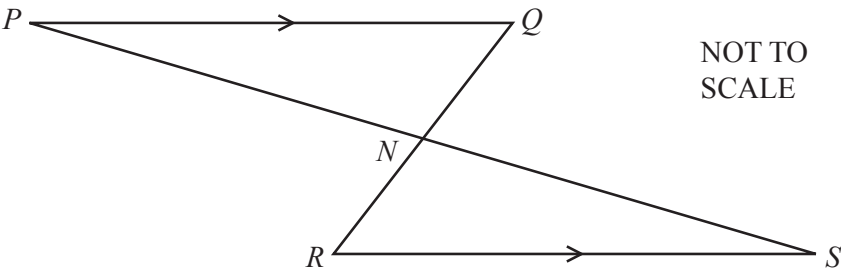
25. Question part 2/2 | 0580 May-June 2021 P4 V1 Q11

- (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)



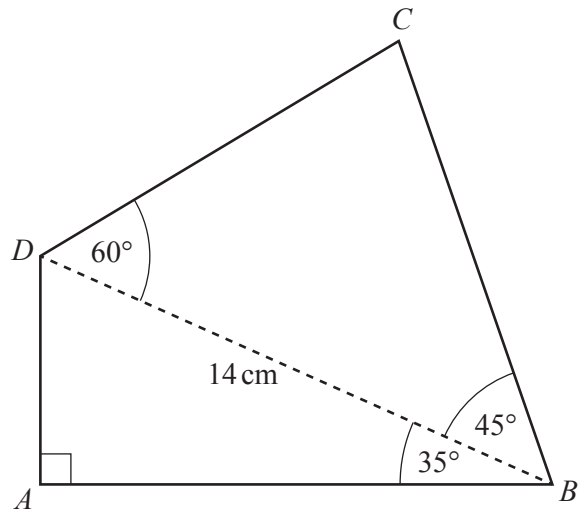
PQ is parallel to RS , PNS is a straight line and N is the midpoint of RQ .

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

.....
.....
.....
..... [4]

26. Question part 1/2 | 0580 May-June 2021 P4 V3 Q9

9 (a)

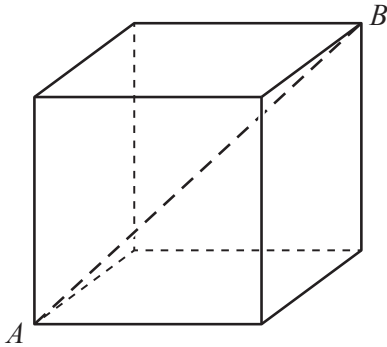


NOT TO
SCALE

Calculate the perimeter of the quadrilateral $ABCD$.

..... cm [7]

(b)



NOT TO
SCALE

The diagram shows a cube.
The length of the diagonal AB is 8.5 cm.

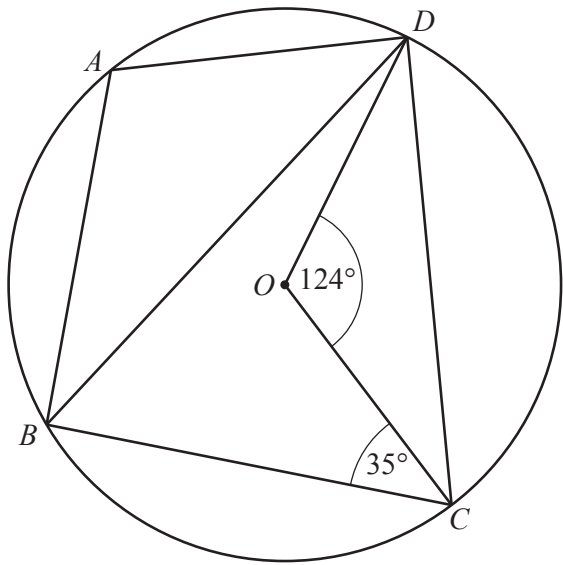
(i) Calculate the length of an edge of the cube.

..... cm [3]

(ii) Calculate the angle between AB and the base of the cube.

..... [3]

5 (a)



NOT TO
SCALE

A, B, C and D are points on a circle, centre O .
Angle $COD = 124^\circ$ and angle $BCO = 35^\circ$.

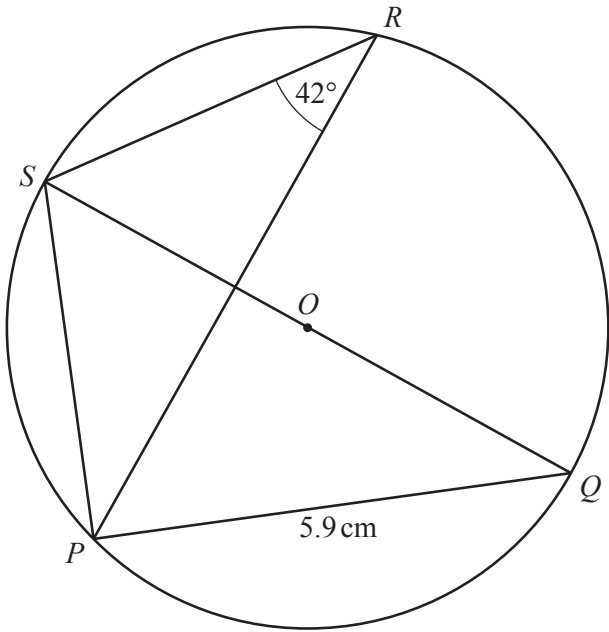
- (i) Work out angle CBD .
Give a geometrical reason for your answer.

Angle $CBD = \dots\dots\dots$ because $\dots\dots\dots$
 $\dots\dots\dots$ [2]

- (ii) Work out angle BAD .
Give a geometrical reason for each step of your working.

Angle $BAD = \dots\dots\dots$ because $\dots\dots\dots$
 $\dots\dots\dots$
 $\dots\dots\dots$ [4]

(b)



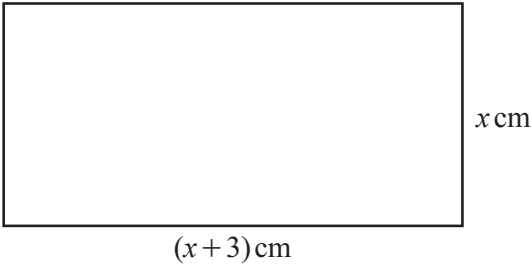
NOT TO
SCALE

P , Q , R and S are points on a circle, centre O .
 QS is a diameter.
Angle $PRS = 42^\circ$ and $PQ = 5.9\text{ cm}$.

Calculate the circumference of the circle.

..... cm [5]

9 (a)



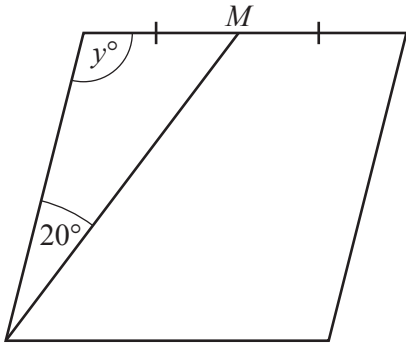
NOT TO
SCALE

This rectangle has perimeter 20 cm.

Find the value of x .

$x = \dots\dots\dots$ [3]

(b)



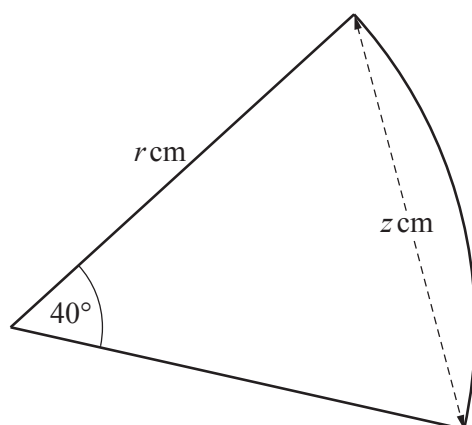
NOT TO
SCALE

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 .

$y = \dots\dots\dots$ [5]

(c)

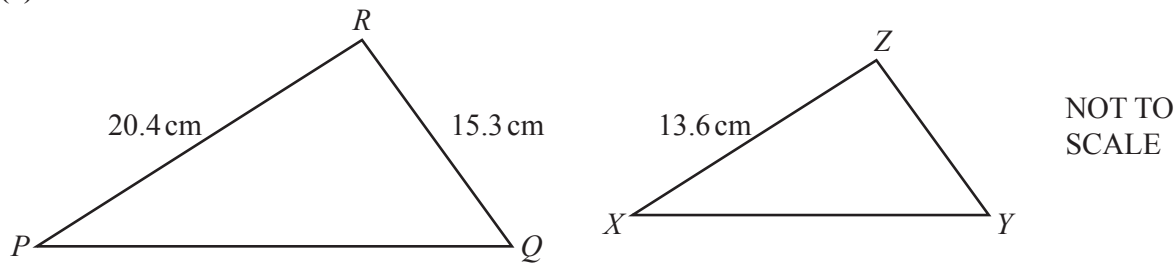


This sector of a circle has radius r and perimeter 20 cm.

Find the value of z .

$z = \dots\dots\dots$ [6]

11 (a)



Triangle PQR is mathematically similar to triangle XYZ .

(i) Find YZ .

$YZ = \dots\dots\dots\text{ cm}$ [2]

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

Calculate the area of triangle PQR .

$\dots\dots\dots\text{ cm}^2$ [3]

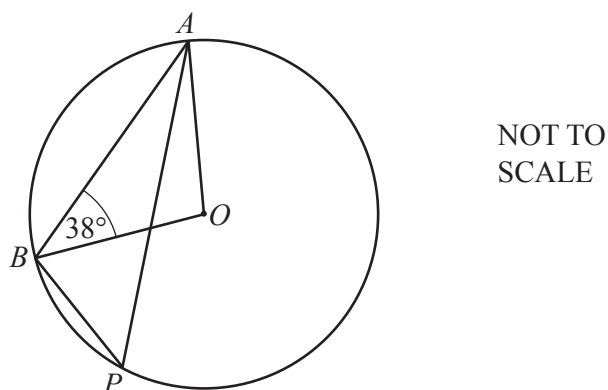
(b) Two containers are mathematically similar.
The larger container has a capacity of 64.8 litres and a surface area of 0.792 m^2 .
The smaller container has a capacity of 37.5 litres.

Calculate the surface area of the smaller container.

$\dots\dots\dots\text{ m}^2$ [3]

30. Question | 0580 Oct-Nov 2021 P4 V3 Q2

2 (a)

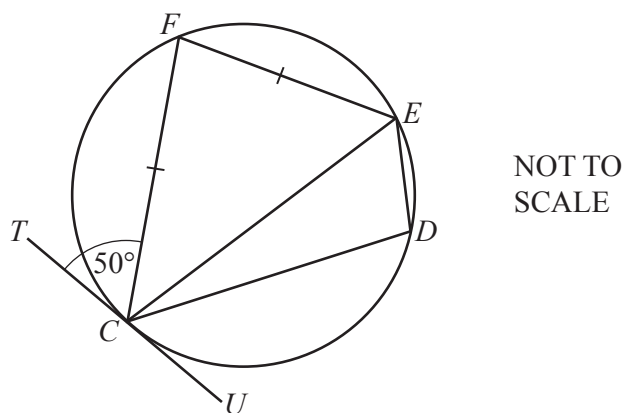


A , B and P are points on a circle, centre O and angle $OBA = 38^\circ$.

Find angle APB .

Angle $APB = \dots\dots\dots$ [3]

(b)



$CDEF$ is a cyclic quadrilateral and $FC = FE$.
 TU is a tangent to the circle at C and angle $TCF = 50^\circ$.

Find

(i) angle EFC ,

Angle $EFC = \dots\dots\dots$ [2]

(ii) angle CDE .

Angle $CDE = \dots\dots\dots$ [1]

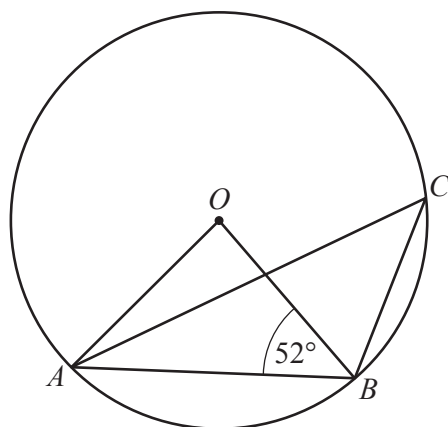
31. Question part 1/2 | 0580 Feb-March 2022 P4 V2 Q6

- 6 (a) The interior angle of a regular polygon is 156° .

Calculate the number of sides of this polygon.

..... [2]

(b)



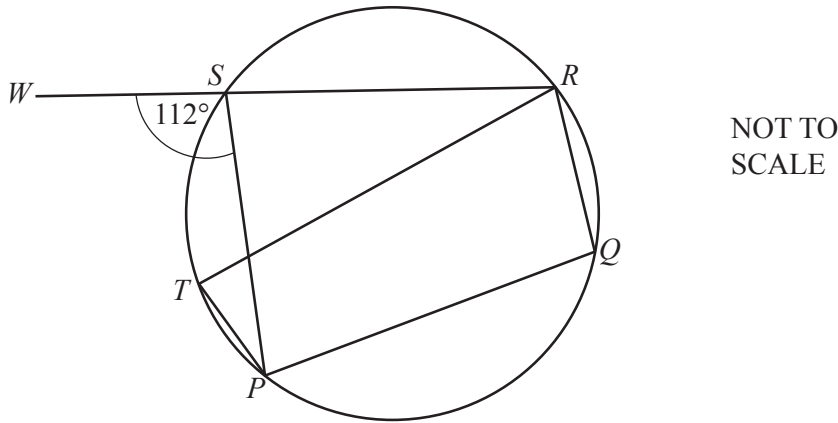
NOT TO
SCALE

A , B and C lie on a circle, centre O .
Angle $OBA = 52^\circ$.

Calculate angle ACB .

Angle $ACB =$ [2]

(c)



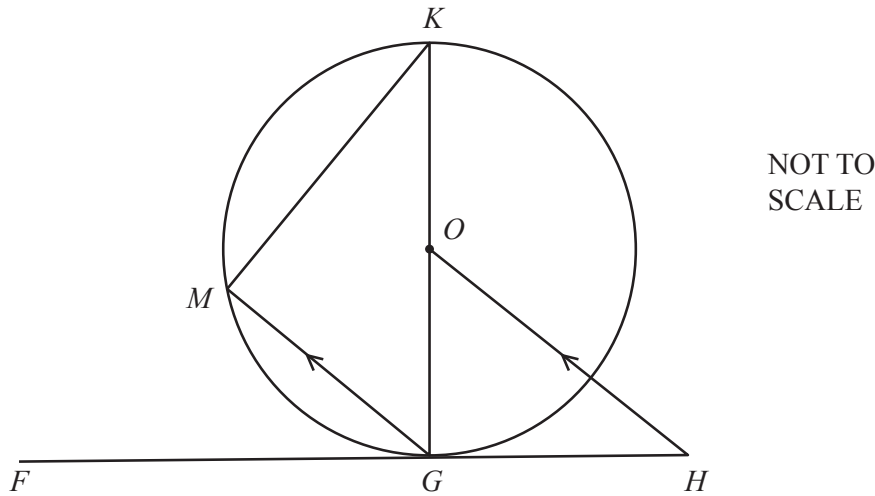
NOT TO
SCALE

P, Q, R, S and T lie on a circle.
 WSR is a straight line and angle $WSP = 112^\circ$.

Calculate angle PTR .

Angle $PTR = \dots\dots\dots$ [2]

(d)



NOT TO
SCALE

G, K and M lie on a circle, centre O .
 FGH is a tangent to the circle at G and MG is parallel to OH .

Show that triangle GKM is mathematically similar to triangle OHG .
Give a geometrical reason for each statement you make.

.....

.....

.....

.....

.....

[4]

7 Two rectangular picture frames are mathematically similar.

- (a) The areas of the frames are 350 cm^2 and 1134 cm^2 .
The width of the smaller frame is 17.5 cm.

Calculate the width of the larger frame.

..... cm [3]

- (b) A picture in the smaller frame has length 15 cm and width 10.5 cm, both correct to the nearest 5 mm.

Calculate the upper bound for the area of this picture.

..... cm^2 [2]

- (c) In a sale, the price of a large frame is reduced by 18%.
Parthi pays \$166.05 for 5 large frames in the sale.

Calculate the original price of one large frame.

\$ [2]

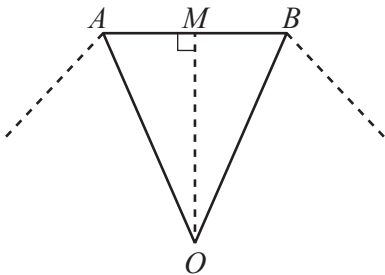
- (d) Parthi advertises a large frame for a price of \$57 or 48.20 euros.
The exchange rate is \$1 = 0.88 euros.

Calculate the difference between these prices, in dollars and cents, correct to the nearest cent.

\$ [3]

33. Question part 1/2 | 0580 May-June 2022 P4 V1 Q5

- 5 (a) $ABCDEFGH$ is a regular octagon with sides of length 6 cm.
The diagram shows part of the octagon.
 O is the centre of the octagon and M is the midpoint of AB .



NOT TO
SCALE

- (i) (a) Show that angle OAM is 67.5° .

[2]

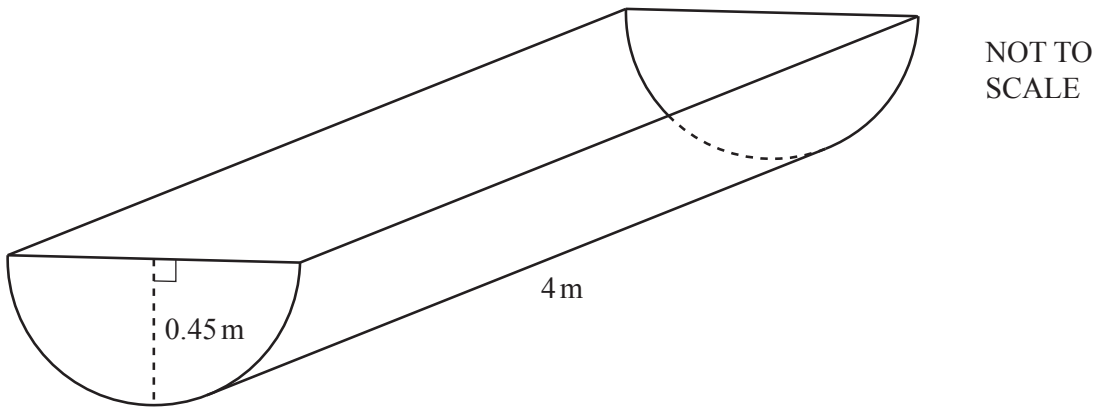
- (b) Calculate the area of the octagon.

..... cm^2 [4]

- (ii) Find the area of the circle that passes through the vertices of the octagon.

..... cm^2 [3]

(b)

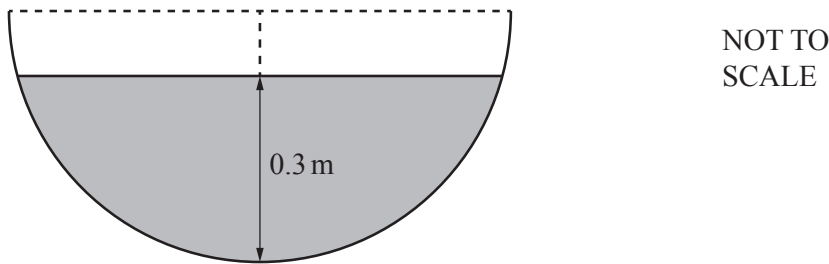


The diagram shows a horizontal container for water with a uniform cross-section.
The cross-section is a semicircle.
The radius of the semicircle is 0.45 m and the length of the container is 4 m.

(i) Calculate the volume of the container.

..... m³ [2]

(ii)



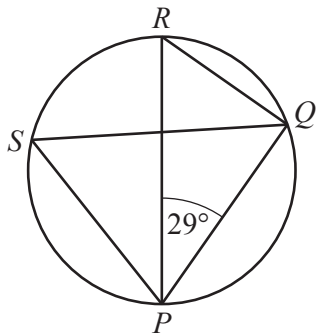
The greatest depth of the water in the container is 0.3 m.
The diagram shows the cross-section.

Calculate the number of litres of water in the container.
Give your answer correct to the nearest integer.

..... litres [6]

34. Question | 0580 May-June 2022 P4 V2 Q2

2 (a)



NOT TO
SCALE

The points P , Q , R and S lie on a circle with diameter PR .

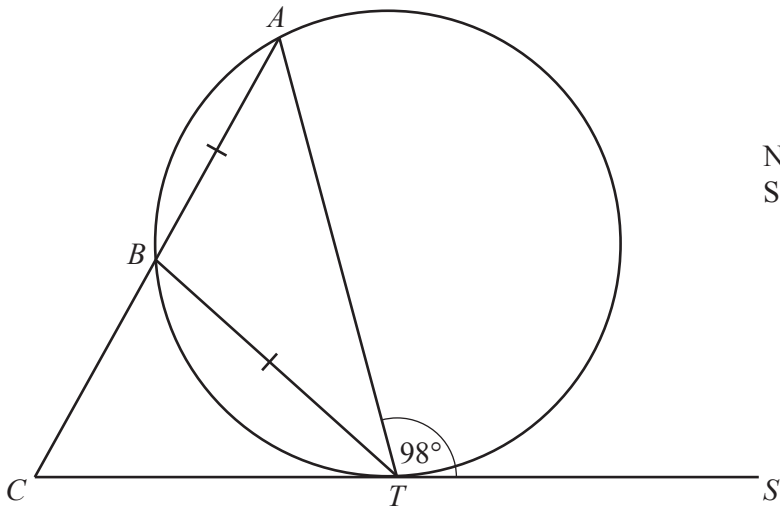
Work out the size of angle PSQ , giving a geometrical reason for each step of your working.

.....

.....

..... [3]

(b)



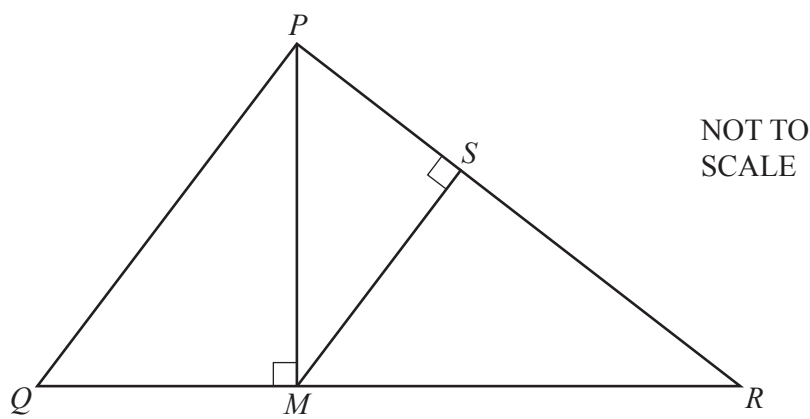
NOT TO
SCALE

The points A , B and T lie on a circle and CTS is a tangent to the circle at T .
 ABC is a straight line and $AB = BT$.
Angle $ATS = 98^\circ$.

Work out the size of angle ACT .

Angle $ACT =$ [4]

9 (a)

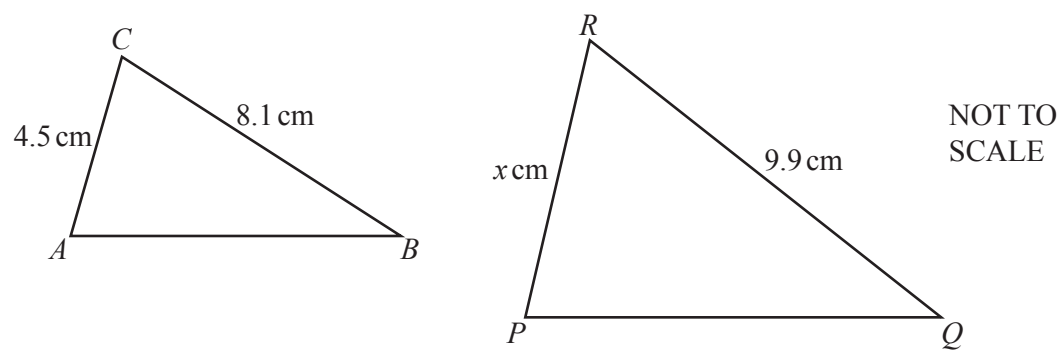


In triangle PQR , M lies on QR and S lies on PR .

Explain, giving reasons, why triangle PMR is similar to triangle MSR .

.....
.....
..... [3]

(b)



Triangle ABC is similar to triangle PQR .

(i) Find the value of x .

$x =$ [2]

(ii) The area of triangle PQR is 25 cm^2 .

Calculate the area of triangle ABC .

..... cm^2 [2]

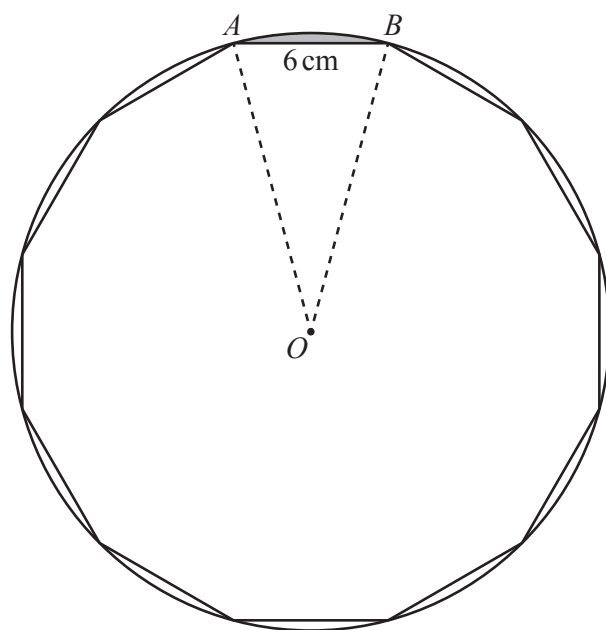
36. Question part 1/2 | 0580 May-June 2022 P4 V3 Q4

4 A regular 12-sided polygon has side length 6 cm.

(a) Show that one interior angle of the polygon is 150° .

[1]

(b) The polygon is enclosed by a circle, centre O , so that each vertex touches the circumference of the circle.

NOT TO
SCALE

(i) Show that the radius, AO , of the circle is 11.6 cm, correct to 1 decimal place.

[3]

(ii) Calculate

(a) the circumference of the circle,

..... cm [2]

(b) the perimeter of the shaded **minor** segment formed by the chord AB .

..... cm [2]

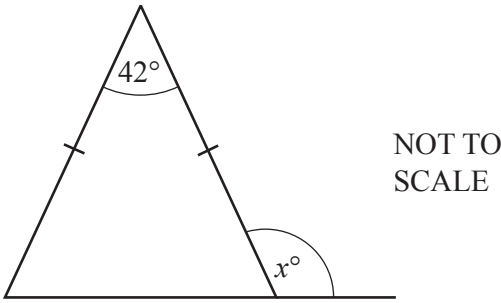
(c) The regular 12-sided polygon is the cross-section of a prism of length 2 cm.

Calculate the volume of the prism.

..... cm³ [3]

37. Question part 1/2 | 0580 May-June 2023 P4 V2 Q1

1 (a)

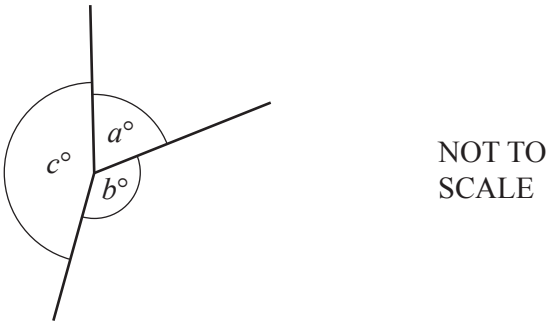


The diagram shows an isosceles triangle with the base extended.
Find the value of x .

$x = \dots\dots\dots$ [3]

(b) The diagram shows three lines meeting at a point.
The ratio $a : b : c = 3 : 4 : 5$.

Find the value of c .



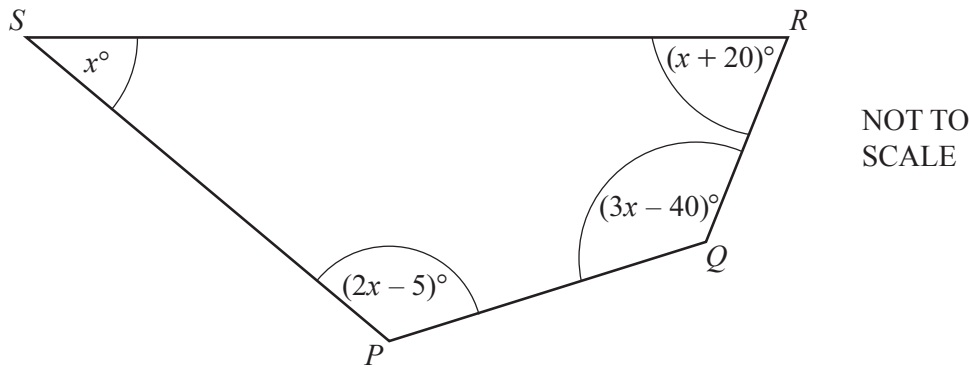
$c = \dots\dots\dots$ [3]

(c) A regular pentagon has an exterior angle, d .
A regular hexagon has an interior angle, h .

Find the fraction $\frac{d}{h}$.
Give your answer in its simplest form.

$\dots\dots\dots$ [4]

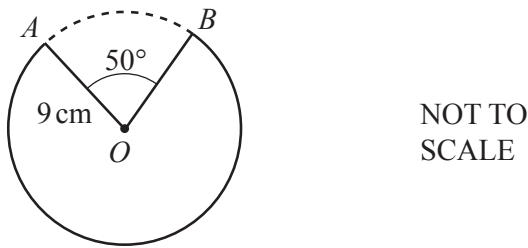
(d)



Show that $PQRS$ is a cyclic quadrilateral.

[5]

(e)



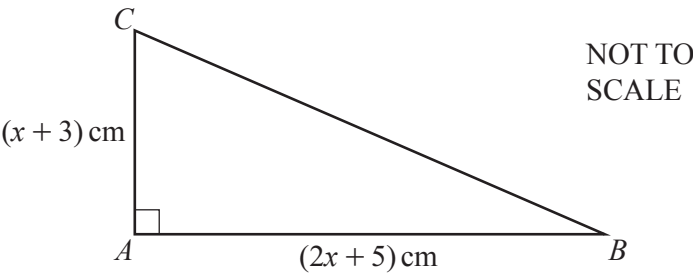
The diagram shows a circle of radius 9 cm , centre O .
The minor sector AOB , with sector angle 50° , is removed from the circle.

Calculate the length of the major arc AB .

..... cm [3]

38. Question part 1/2 | 0580 May-June 2023 P4 V2 Q3

3



The diagram shows a right-angled triangle ABC .

(a) (i) The area of the triangle is 60 cm^2 .

Show that $2x^2 + 11x - 105 = 0$.

[3]

(ii) Solve by factorisation.

$$2x^2 + 11x - 105 = 0$$

$x = \dots\dots\dots$ or $x = \dots\dots\dots$ [3]

(iii) Calculate angle ACB .

$\dots\dots\dots$ [3]

38. Question part 2/2 | 0580 May-June 2023 P4 V2 Q3

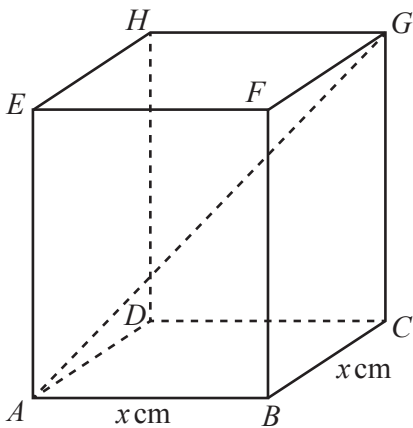
- (b) Triangle ABC is similar to triangle DEF .
Triangle DEF has an area of 93.75 cm^2 .
- (i) Find the size of the smallest angle of triangle DEF .

..... [1]

- (ii) Find the length of the shortest side of triangle DEF .

..... cm [3]

10 (a)



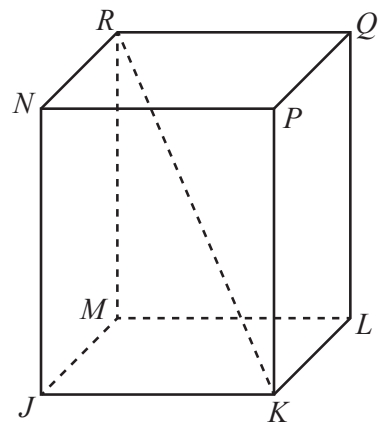
NOT TO
SCALE

$ABCDEFGH$ is a cuboid with a square base of side x cm.
 $CG = 20$ cm and $AG = 28$ cm.

Calculate the value of x .

$x = \dots\dots\dots$ [4]

(b)



NOT TO
SCALE

The diagram shows a different cuboid $JKLMNPQR$.
 $MR = 30\text{ cm}$ correct to the nearest centimetre.
 $KR = 37\text{ cm}$ correct to the nearest centimetre.

Calculate the lower bound of the angle between KR and the base $JKLM$ of the cuboid.

..... [4]

- 3 (a) The scale drawing shows two sides, AB and BC , of a field.
The scale is 5 centimetres represents 200 metres.



Scale: 5 cm to 200 m

- (i) Measure angle ABC .

Angle $ABC = \dots\dots\dots$ [1]

- (ii) X is a point on BC .
 $BX = 332$ m.

Mark the point X on the diagram. [2]

- (iii) Find the scale in the form $1 : n$.

1: $\dots\dots\dots$ [2]

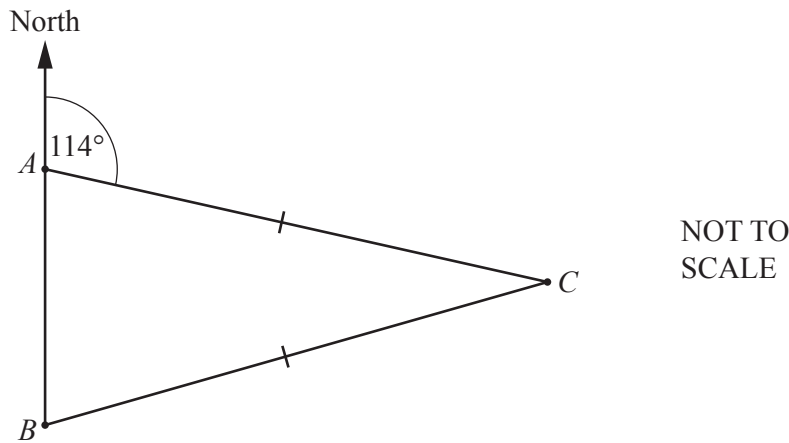
- (b) A bronze statue is 4.5 m high and has a mass of 195 200 kg.
The density of bronze is 8000 kg/m^3 .
The volume of a mathematically similar model of the statue is 0.385 m^3 .

Calculate the height of the model.
[Density = Mass $\div$ Volume]

$\dots\dots\dots$ m [5]

41. Question part 1/2 | 0580 May-June 2023 P4 V3 Q4

4 (a)

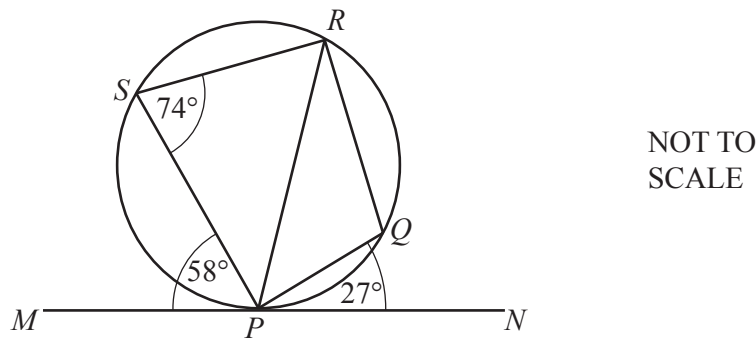


A, B and C are three towns and the bearing of C from A is 114° .
 B is due south of A and $AC = BC$.

Calculate the bearing of B from C .

..... [3]

(b)



P, Q, R and S lie on a circle.
 MPN is a tangent to the circle at P .
Angle $MPS = 58^\circ$, angle $PSR = 74^\circ$ and angle $QPN = 27^\circ$.

(i) Find angle PRS .

Angle $PRS =$ [1]

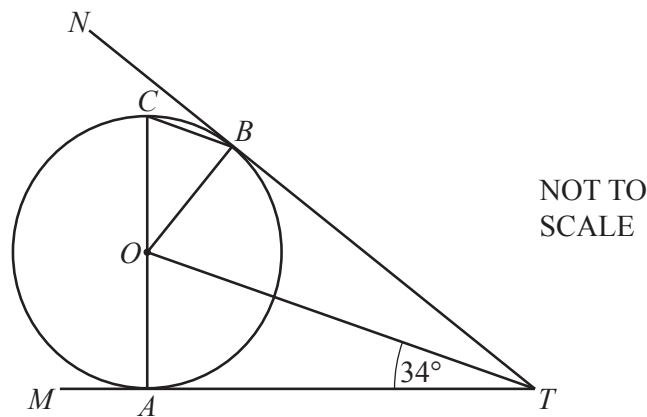
(ii) Find angle PQR .

Angle $PQR =$ [1]

(iii) Find angle RPQ .

Angle $RPQ =$ [2]

(c)



A, B and C lie on a circle, centre O , with diameter AC .
 TAM and TBN are tangents to the circle and angle $ATO = 34^\circ$.

Using values and geometrical reasons, complete these statements to show that CB is parallel to OT .

In triangles AOT and BOT , OT is common.
Angle $OAT = \text{angle } OBT = 90^\circ$ because

.....

$AT = BT$ because

.....

Triangle AOT is congruent to triangle BOT because of congruence criterion

Angle $AOT = \text{angle } BOT = 56^\circ$ because angles in a triangle add up to 180° .

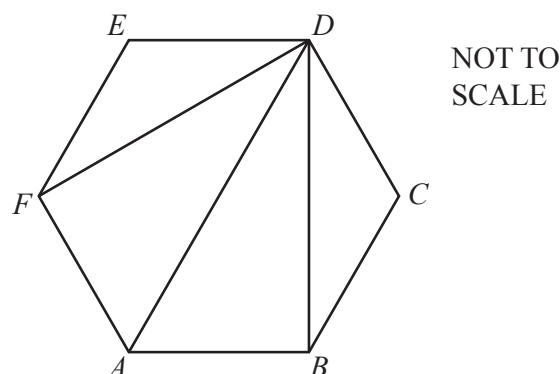
Angle $BOC = \dots\dots\dots^\circ$ because

Angle $OBC = \dots\dots\dots^\circ$ because

.....

CB is parallel to OT because

10 (a)



$ABCDEF$ is a regular hexagon.
 DF , DA and DB are diagonals.

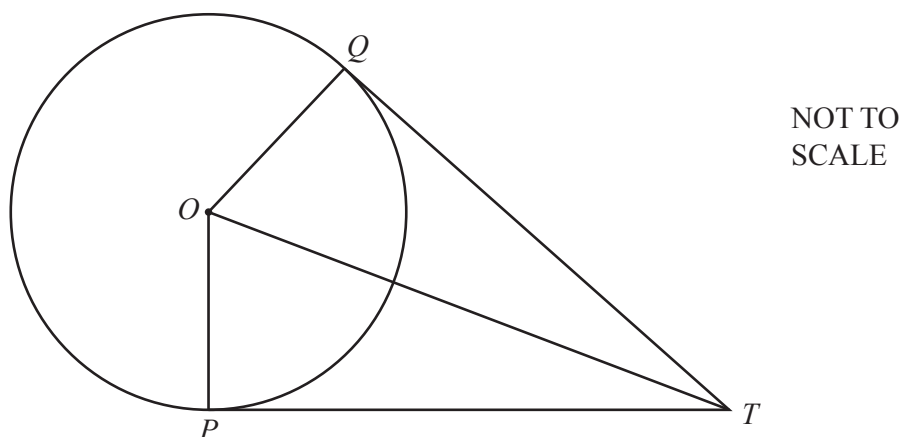
Complete the following statements using three different triangles.

Triangle DEF is congruent to triangle

Triangle is congruent to triangle

[2]

(b)



P and Q are points on the circle with centre O .
 TP and TQ are tangents to the circle from the point T .

Complete the following statements and reasons.

In triangles OPT and OQT

$OP = \dots\dots\dots$ because each is a radius of the circle

OT is a common side

Angle $OPT = \text{angle } \dots\dots\dots = 90^\circ$ because

Triangles OPT and OQT are congruent using the criterion

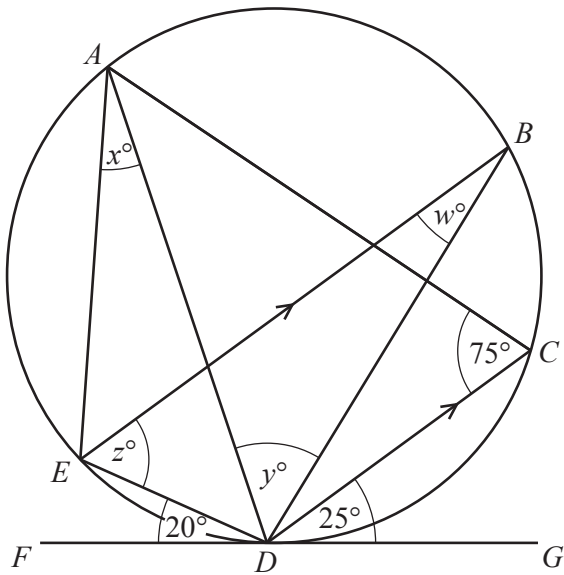
This proves that the tangents TP and TQ are

[5]

4 (a) Find the size of one interior angle of a regular 10-sided polygon.

..... [2]

(b)



NOT TO
SCALE

The points A, B, C, D and E lie on a circle.
 FG is a tangent to the circle at D .
 EB is parallel to DC .

Find the value of each of w, x, y and z .

$w =$

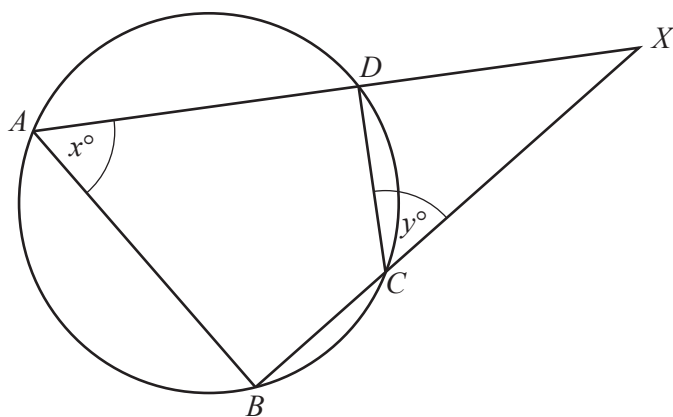
$x =$

$y =$

$z =$ [5]

44. Question part 1/2 | 0580 Feb-March 2024 P4 V2 Q2

2

NOT TO
SCALE

A , B , C and D are points on a circle.
 ADX and BCX are straight lines.
Angle $BAD = x^\circ$ and angle $DCX = y^\circ$.

- (a) Explain why $x = y$.
Give a geometrical reason for each statement you make.

[2]

- (b) Show that triangle ABX is similar to triangle CDX .

[2]

44. Question part 2/2 | 0580 Feb-March 2024 P4 V2 Q2

(c) $AD = 15\text{ cm}$, $DX = 9\text{ cm}$ and $CX = 12\text{ cm}$.

(i) Find BC .

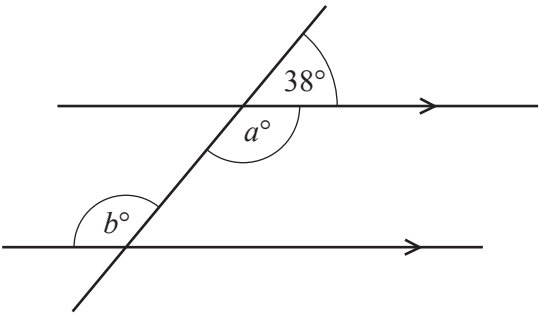
$BC = \dots\dots\dots\text{ cm}$ [3]

(ii) Complete the statement.

The ratio area of triangle ABX : area of triangle $CDX = \dots\dots\dots : 1$. [1]

45. Question part 1/2 | 0580 May-June 2024 P4 V2 Q2

2 (a)



NOT TO
SCALE

The diagram shows a straight line intersecting two parallel lines.

Find the value of a and the value of b .

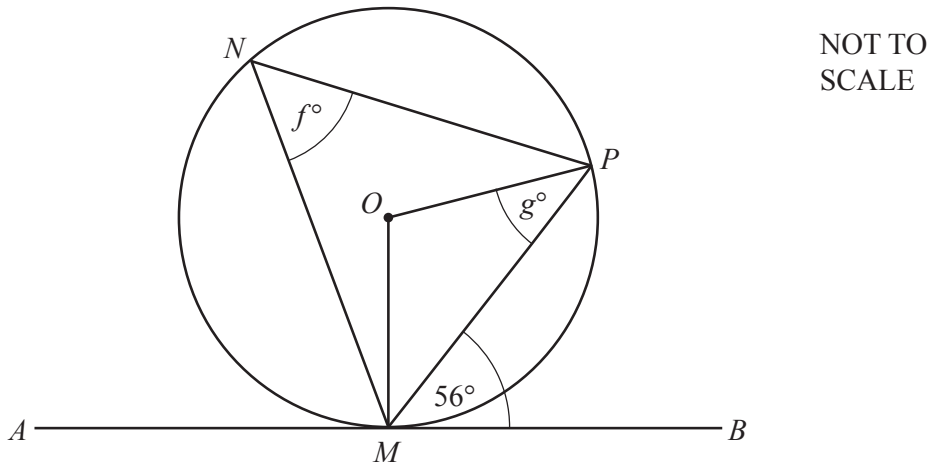
$a =$

$b =$ [2]

(b) Calculate the interior angle of a regular 12-sided polygon.

..... [2]

(c)

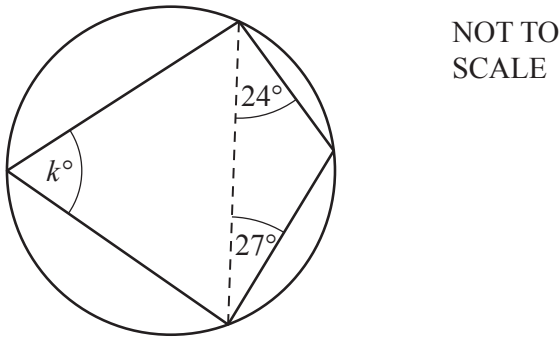


The diagram shows a circle, centre O .
The points M , N and P lie on the circumference of the circle.
 AMB is a tangent to the circle at M .

Find the value of f and the value of g .

$f =$
 $g =$ [3]

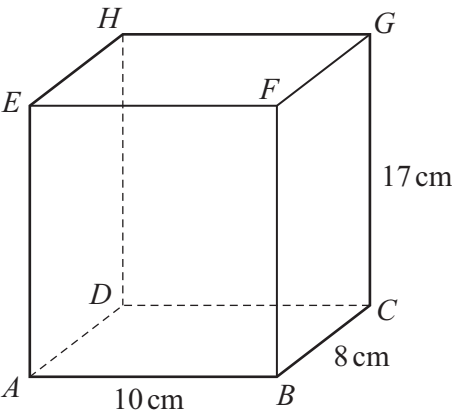
(d)



The diagram shows a cyclic quadrilateral.
Find the value of k .

$k =$ [2]

9



NOT TO
SCALE

$ABCDEFGH$ is a solid cuboid.
 $AB = 10\text{ cm}$, $BC = 8\text{ cm}$ and $CG = 17\text{ cm}$.

(a) Work out the volume of the cuboid.

..... cm^3 [1]

(b) Work out the total surface area of the cuboid.

..... cm^2 [3]

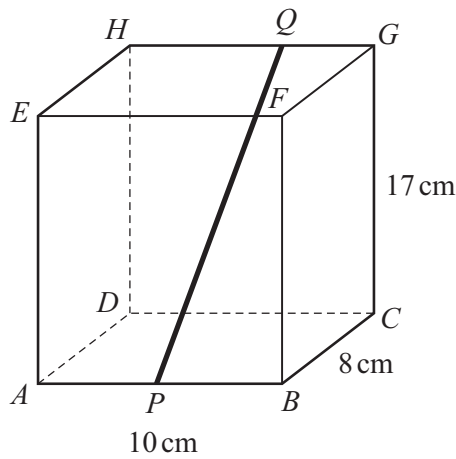
(c) Calculate the angle between GA and the base $ABCD$.

..... [4]

46. Question part 2/2 | 0580 Oct-Nov 2024 P4 V1 Q9



- (d) A straight rod PQ is placed inside the cuboid.
One end of the rod, P , is placed at the midpoint of AB .
The other end of the rod, Q , rests on GH .
 $HQ : QG = 4 : 1$.



NOT TO
SCALE

Calculate the length of the rod PQ .

..... cm [4]

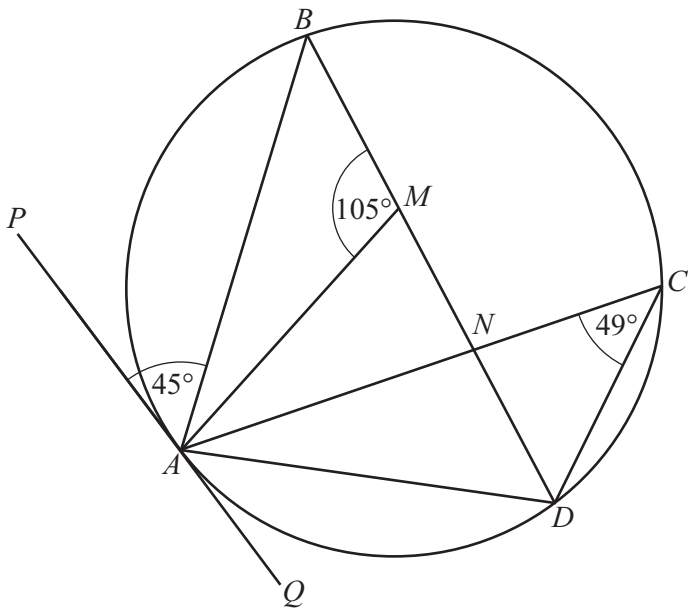
47. Question part 1/2 | 0580 Oct-Nov 2024 P4 V2 Q4

- 4 (a) The angles of a quadrilateral are w° , x° , y° and z° .
The ratio $w : (x + y + z) = 3 : 5$.

Find the value of w .

$w =$ [2]

(b)



NOT TO
SCALE

A, B, C and D are points on a circle.
 PQ is the tangent to the circle at A .
 $BMND$ is a straight line.
Angle $ACD = 49^\circ$, angle $AMB = 105^\circ$ and angle $PAB = 45^\circ$.

- (i) Find angle BAM .

Angle $BAM =$ [2]

- (ii) (a) Find angle BAD .

Angle $BAD =$ [2]

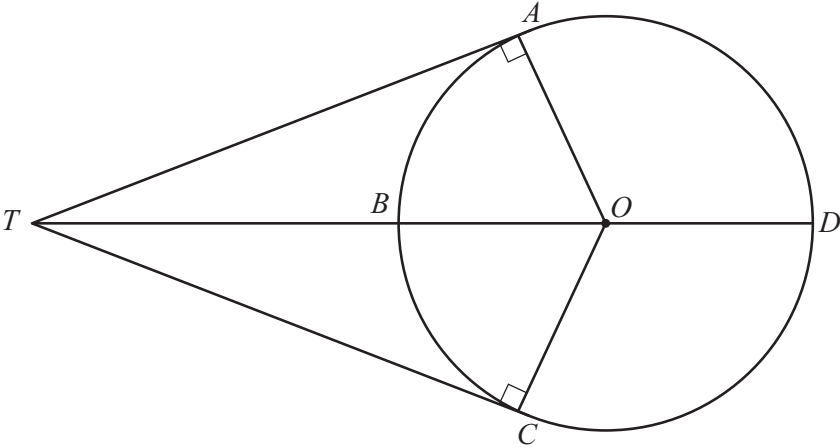
- (b) Give a geometrical reason why BD is **not** the diameter of the circle.

.....
..... [1]

47. Question part 2/2 | 0580 Oct-Nov 2024 P4 V2 Q4



(c)



NOT TO
SCALE

A, B, C and D are points on a circle, centre O .
 TA and TC are tangents to the circle.
 $OA = 6.75\text{ cm}$ and $OT = 11.5\text{ cm}$.

(i) Show that angle $AOC = 108.12^\circ$, correct to 2 decimal places.

[3]

(ii) Calculate the length of the **minor** arc ABC .

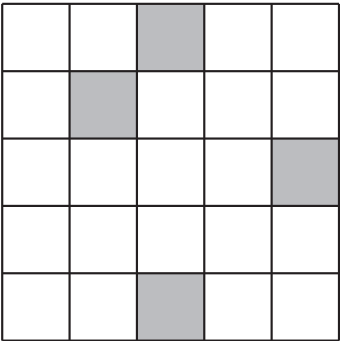
..... cm [2]

(iii) Calculate the area of the **major** sector $OCDA$.

..... cm² [3]

48. Question | 0580 Feb-March 2025 P4 V2 Q3

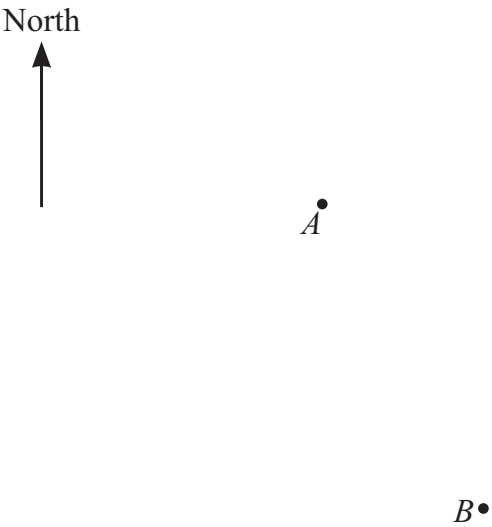
3



Shade **two** more small squares to make a pattern with two lines of symmetry. [1]

49. Question | 0580 Feb-March 2025 P4 V2 Q8

8 The scale drawing shows the positions of boat *A* and boat *B*.
The scale is 1 cm represents 0.5 km.



Scale: 1 cm to 0.5 km

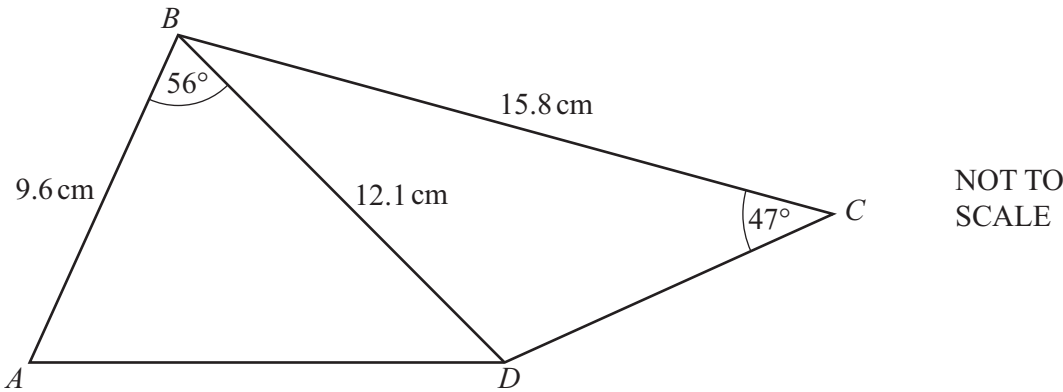
(a) Find the actual distance between boat *A* and boat *B*.
..... km [2]

(b) Lighthouse *L* lies to the east of boats *A* and *B*.
L is 4.4 km from boat *A* and 3.3 km from boat *B*.

Using a ruler and compasses only, construct and label the position of *L*. [3]

50. Question | 0580 May-June 2025 P4 V1 Q17

17



The diagram shows a quadrilateral $ABCD$.

(a) Calculate AD .

$AD = \dots\dots\dots\text{ cm}$ [3]

(b) Calculate the obtuse angle BDC .

Angle $BDC = \dots\dots\dots$ [4]

(c) Calculate the area of the quadrilateral.

$\dots\dots\dots\text{ cm}^2$ [3]

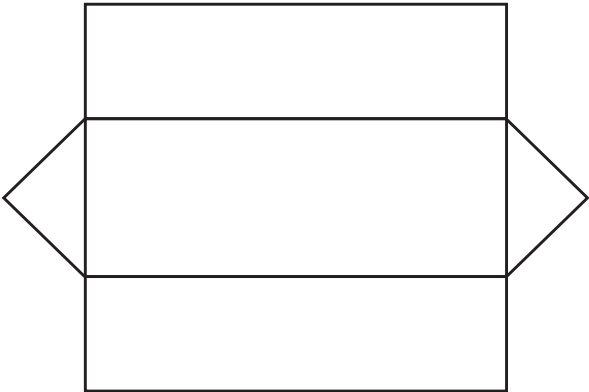
51. Question | 0580 May-June 2025 P4 V2 Q1

- 1
- A quadrilateral has these properties
- the diagonals are the only lines of symmetry
 - it has rotational symmetry of order 2.

Write down the mathematical name of this quadrilateral.

..... [1]

2



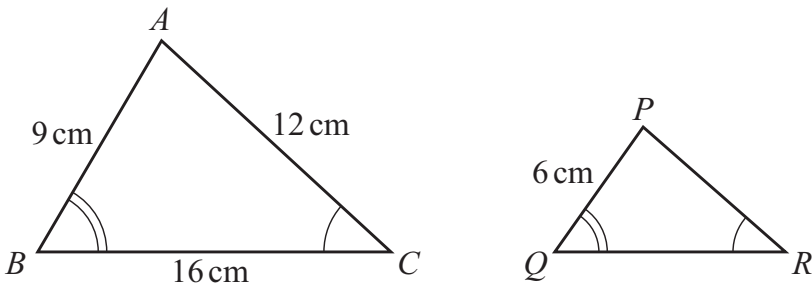
The diagram shows the net of a solid.

Write down the mathematical name of this solid.

..... [1]

53. Question | 0580 May-June 2025 P4 V2 Q13

13



NOT TO
SCALE

Triangle ABC and triangle PQR are mathematically similar.

(a) Calculate the length of PR .

$PR = \dots\dots\dots\text{cm}$ [2]

(b) Triangle ABC and triangle PQR are the cross-sections of two prisms.
These prisms are mathematically similar.
The volume of the smaller prism is $1\,120\text{ cm}^3$.

Calculate the volume of the larger prism.

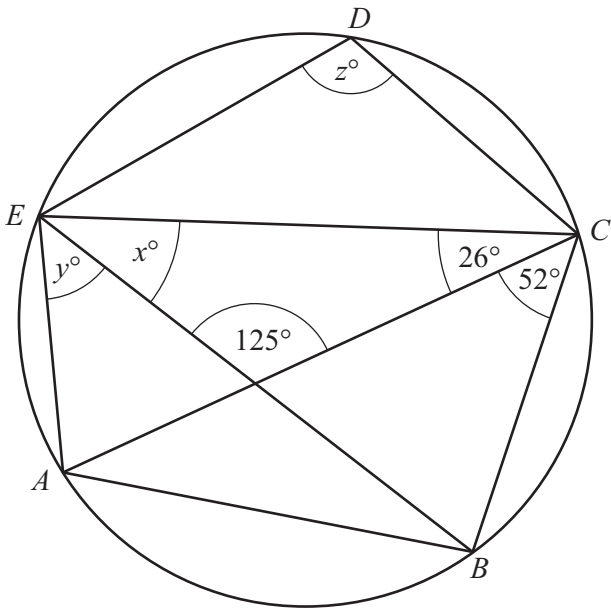
$\dots\dots\dots\text{ cm}^3$ [2]

54. Question | 0580 May-June 2025 P4 V2 Q15

15 The interior angle of a regular polygon is 172° .

Find the number of sides of this polygon.

$\dots\dots\dots$ [2]



NOT TO
SCALE

A, B, C, D and E lie on a circle.

Find the values of x, y and z .

$x =$

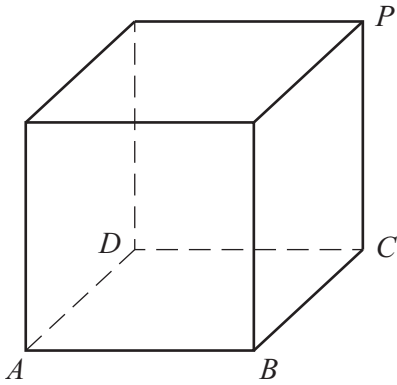
$y =$

$z =$

[4]

56. Question | 0580 May-June 2025 P4 V2 Q27

27



NOT TO
SCALE

The diagram shows a cube.

Calculate the angle between the diagonal AP and the base $ABCD$.

..... [4]

57. Question | 0580 May-June 2025 P4 V3 Q2

2 In triangle ABC , $AC = 21$ m and $BC = 15.9$ m.

Using a ruler and compasses only, complete the scale drawing of the triangle.
Use a scale of 1 cm to represent 3 m.
The side AB is drawn for you.



Scale : 1 cm to 3 m
[3]

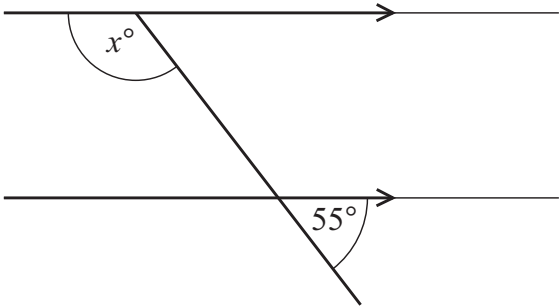
58. Question | 0580 Oct-Nov 2025 P4 V1 Q1

- 1 A quadrilateral has
- rotational symmetry of order 2
 - two diagonals that are the only lines of symmetry.

Write down the geometrical name of this quadrilateral.

..... [1]

3



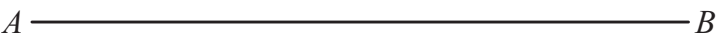
NOT TO
SCALE

The diagram shows two parallel lines and a straight line.

Find the value of x .

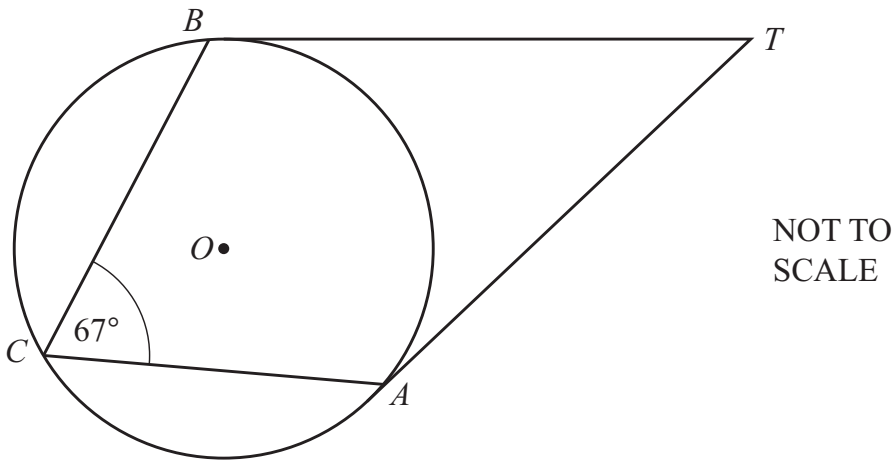
$x = \dots\dots\dots$ [2]

5



- (a) In triangle ABC , $AB = 8$ cm, $AC = 7$ cm and $BC = 5$ cm.
- Using a ruler and compasses only, construct triangle ABC .
The side AB has been drawn for you. [2]
- (b) Measure angle ACB .
- [1]
- (c) Triangle ABC is a scale drawing of a field.
- (i) The scale is 1 : 10 000.
- Find the actual distance from A to B .
Give your answer in kilometres.
- km [1]
- (ii) B is due east of A .
Find the bearing of A from B .
- [1]

15



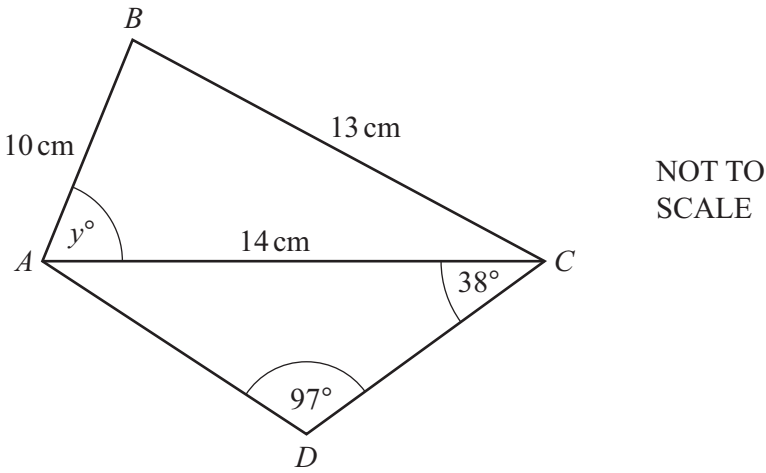
A , B and C lie on a circle, centre O .
 TA and TB are tangents to the circle at A and B .

Calculate angle ATB .

Angle $ATB = \dots\dots\dots$ [3]

62. Question | 0580 Oct-Nov 2025 P4 V1 Q29

29



(a) Calculate the value of y .

$y = \dots\dots\dots$ [3]

(b) Calculate BD .

$BD = \dots\dots\dots\text{ cm}$ [5]

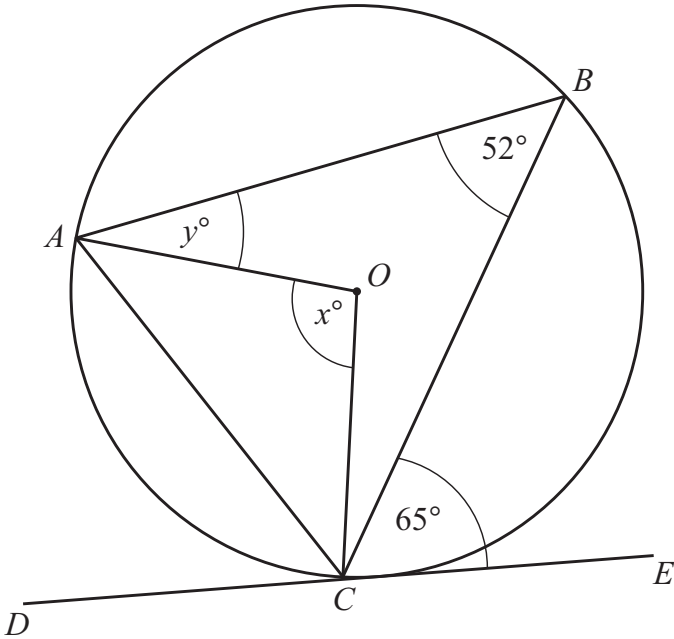
63. Question | 0580 Oct-Nov 2025 P4 V2 Q3

3 Write down the order of rotational symmetry of a regular decagon.

..... [1]

64. Question | 0580 Oct-Nov 2025 P4 V2 Q12

12



NOT TO
SCALE

A, B and C lie on a circle centre O .
 DE is a tangent to the circle at C .
Angle $ABC = 52^\circ$ and angle $BCE = 65^\circ$.

- (a) Find the value of x .
Give a geometrical reason for your answer.

$x =$ because

..... [2]

- (b) Find the value of y .

$y =$ [2]

65. Question | 0580 Oct-Nov 2025 P4 V3 Q4

- 4 (a) The scale diagram shows the position of town A on a map.
Town B is 12 km from town A on a bearing of 080° .

Using a scale of 1 cm represents 2 km, mark the position of town B on the diagram.



Scale: 1 cm to 2 km

[2]

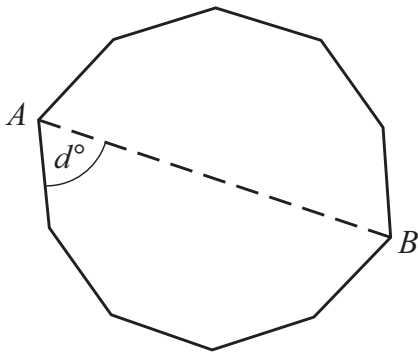
- (b) The bearing of C from D is 130° .

Work out the bearing of D from C .

..... [2]

66. Question | 0580 Oct-Nov 2025 P4 V3 Q5

- 5 (a) The diagram shows a regular decagon.
 AB is a line of symmetry of the decagon.



NOT TO
SCALE

Work out the value of d .

$d = \dots\dots\dots$ [3]

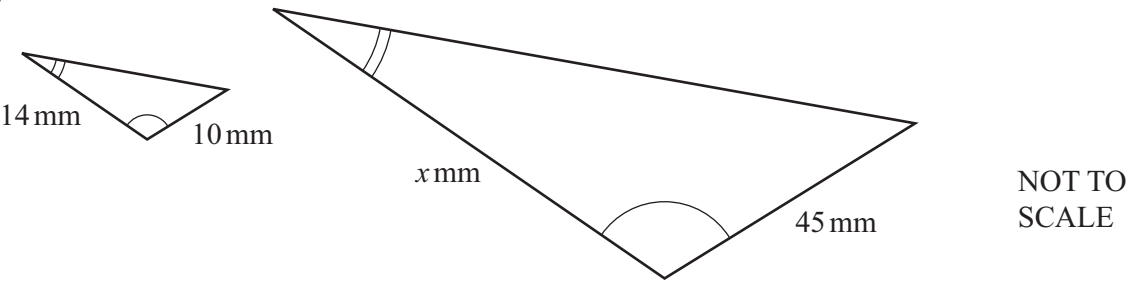
- (b) The exterior angle of a regular polygon with n sides is 45° .

Work out the value of n .

$n = \dots\dots\dots$ [1]

67. Question | 0580 Oct-Nov 2025 P4 V3 Q22

22 (a)



The diagram shows two mathematically similar triangles.

Find the value of x .

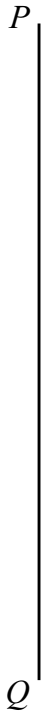
$x =$ [2]

- (b) The surface areas of two mathematically similar containers are 124 cm^2 and 279 cm^2 .
The capacity of the smaller container is 56 ml.

Find the capacity of the larger container.

..... ml [3]

2



In triangle PQR , $QR = 10$ cm and $PR = 11$ cm.

Using a ruler and compasses only, construct triangle PQR .
The line PQ has been drawn for you.

[2]