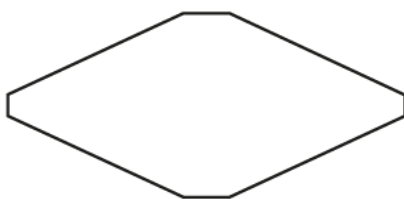1.   Nov/2021/Paper_11/No.3
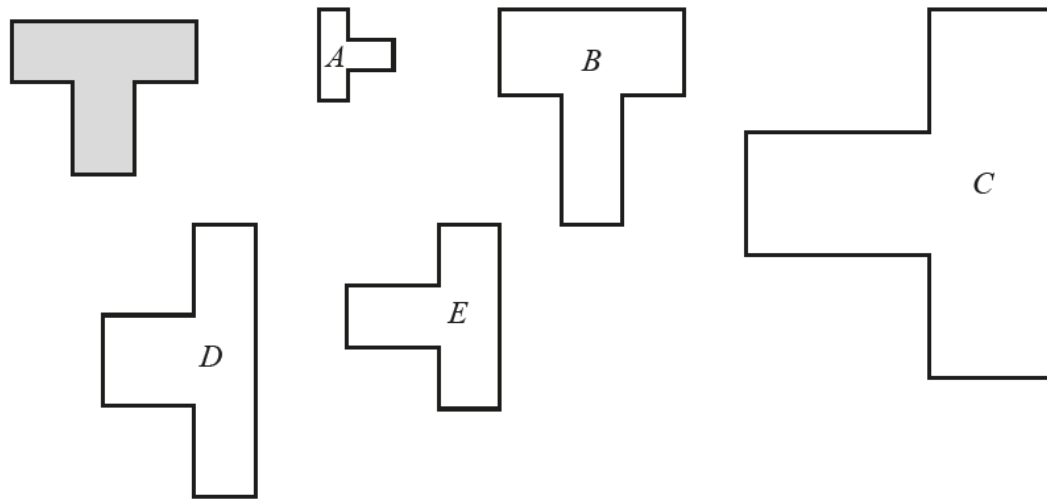

Write down the order of rotational symmetry of this shape.

.... [1]

2.
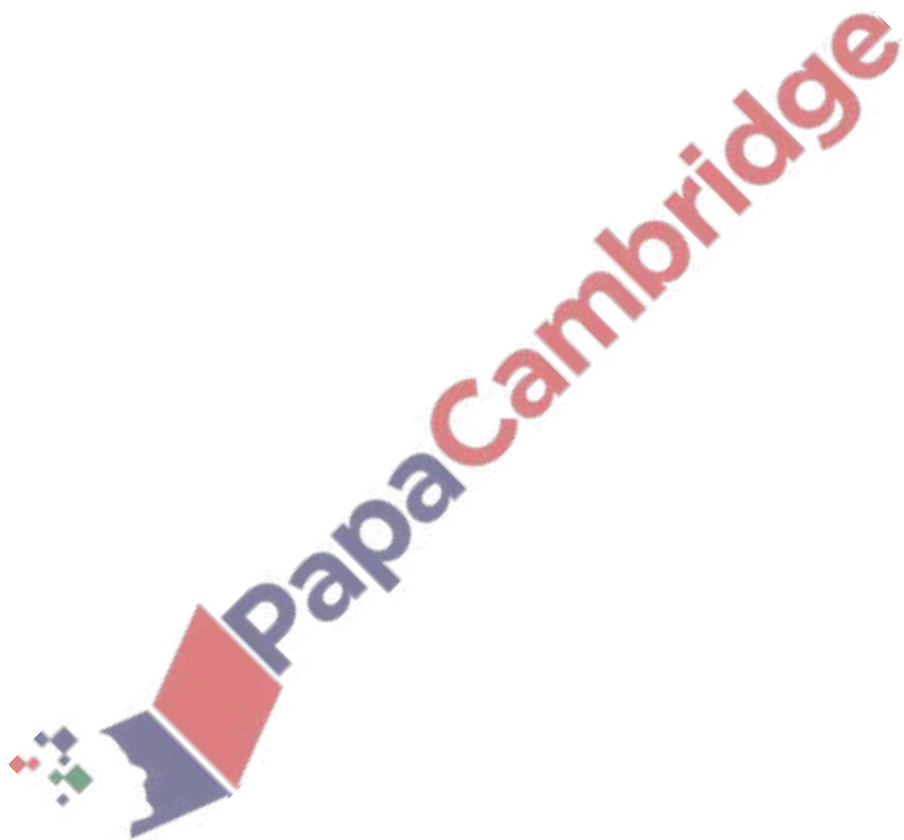
Write down the letter of the shape that is congruent to the shaded shape.

.... [1]
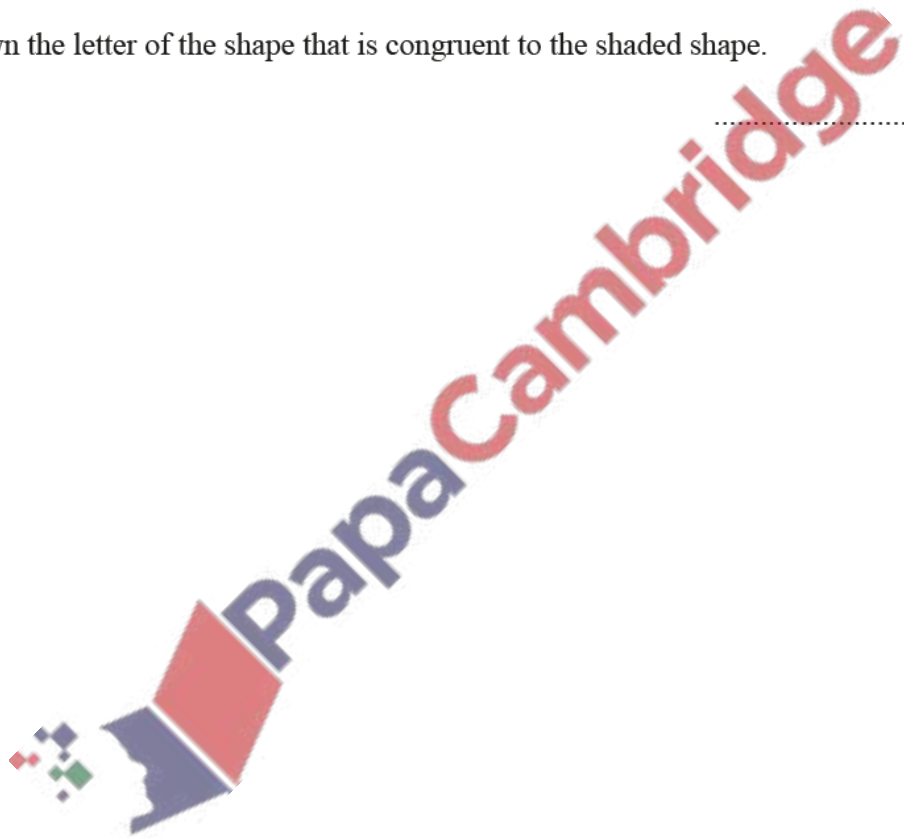
3.

The scale drawing shows the positions of two towns, P and Q.
The scale is 1 cm represents 4 km.

North

Q

North

P

Scale: 1 cm to 4 km

(a) Find the actual distance between town P and town Q.

.... km [2]

(b) Measure the bearing of town Q from town P.

.... [1]
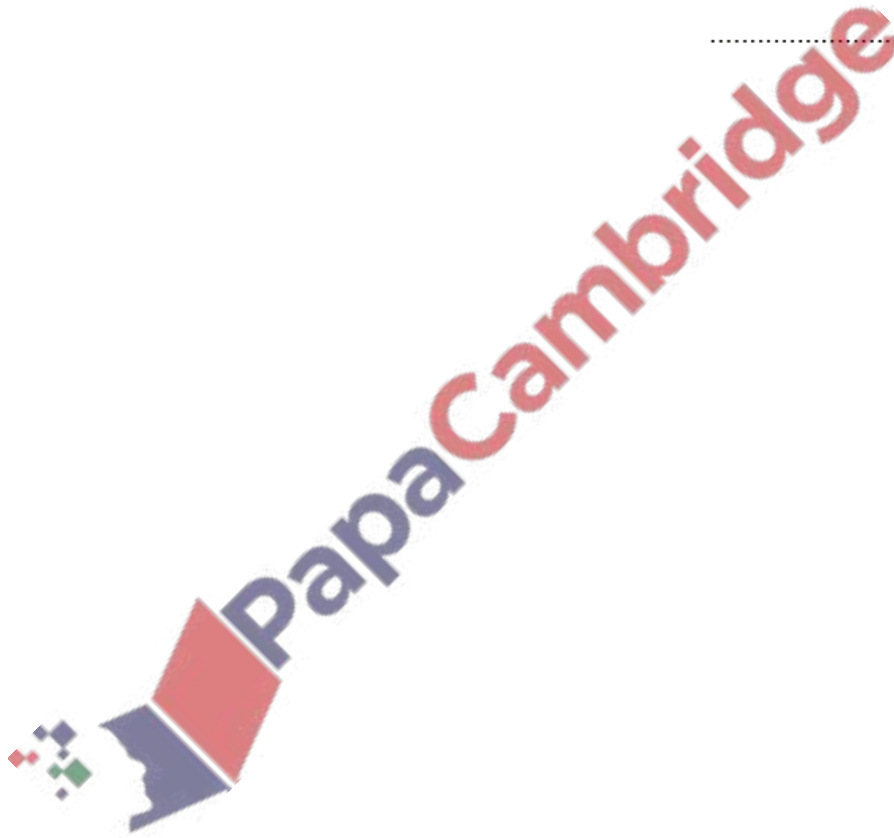
(c) Town X is 28 km from town P on a bearing of 140°.
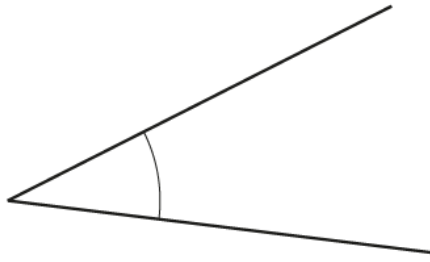
On the scale drawing, mark the position of town X. [2]

3

4.

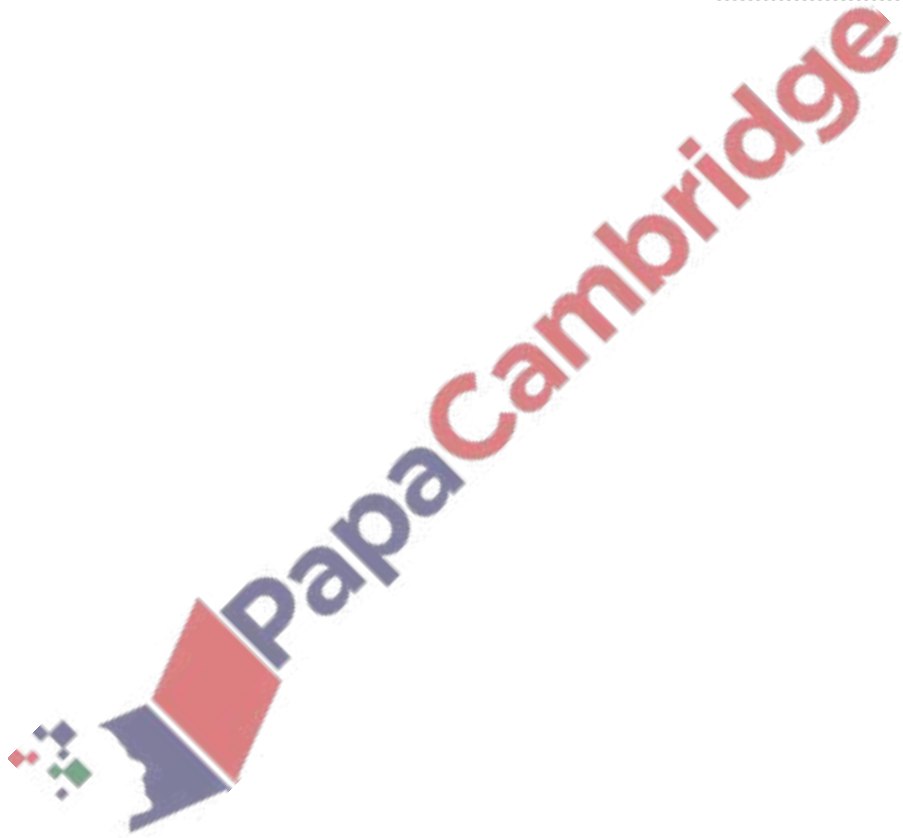Calculate the size of one interior angle of a regular octagon.

.... [2]

5. Nov/2021/Paper_12/No.3

Write down the mathematical name for this type of angle.

.... [1]

6. Nov/2021/Paper_12/No.6

(a) Write down the order of rotational symmetry of a rectangle.
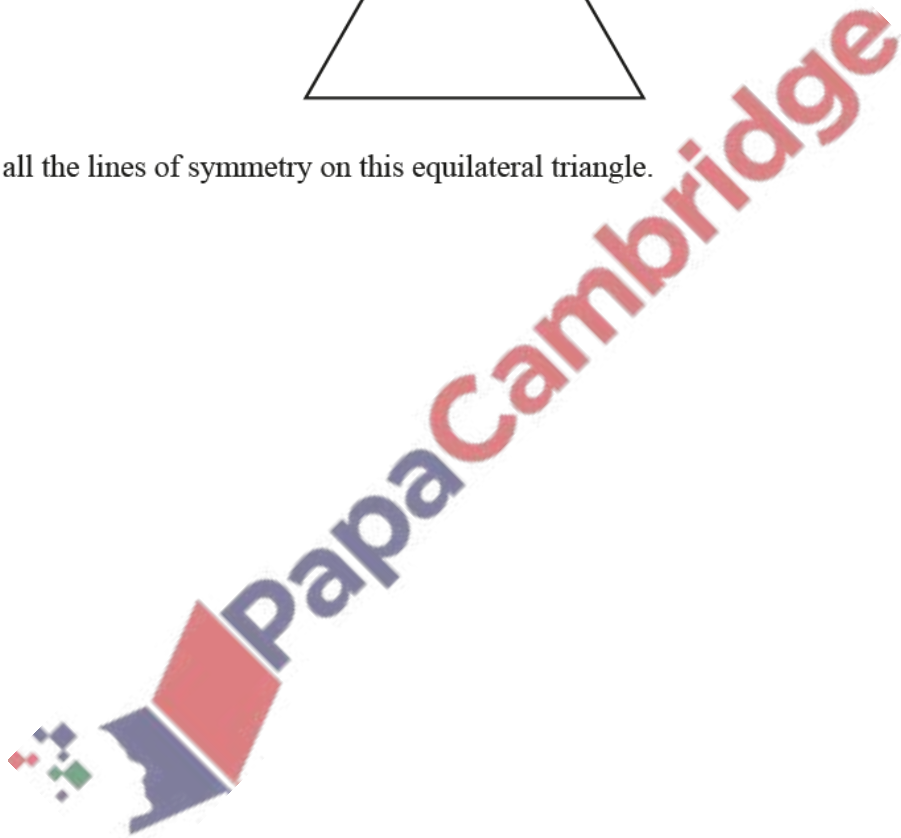
.... [1]

(b)
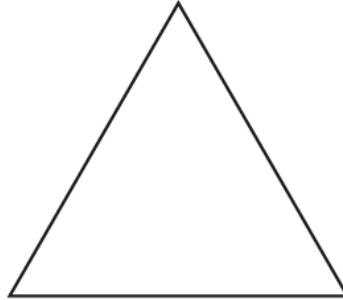
Draw all the lines of symmetry on this equilateral triangle. [2]
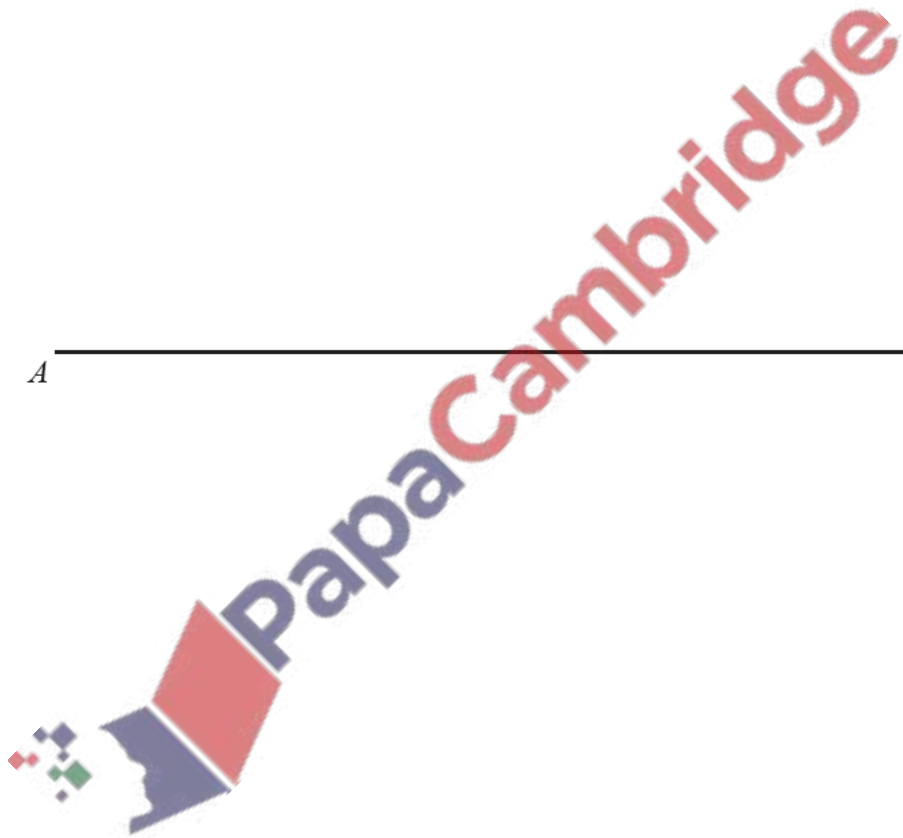
In triangle ABC, $AB = 7\,cm$ and $BC = 5.6\,cm$.

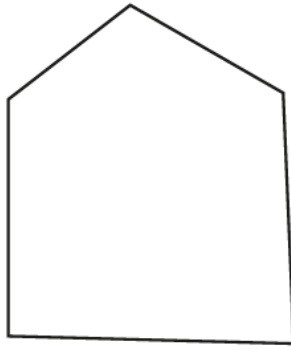**Using a ruler and compasses only**, construct triangle ABC.
Leave in your construction arcs.
The line AC has been drawn for you.

A _____ C
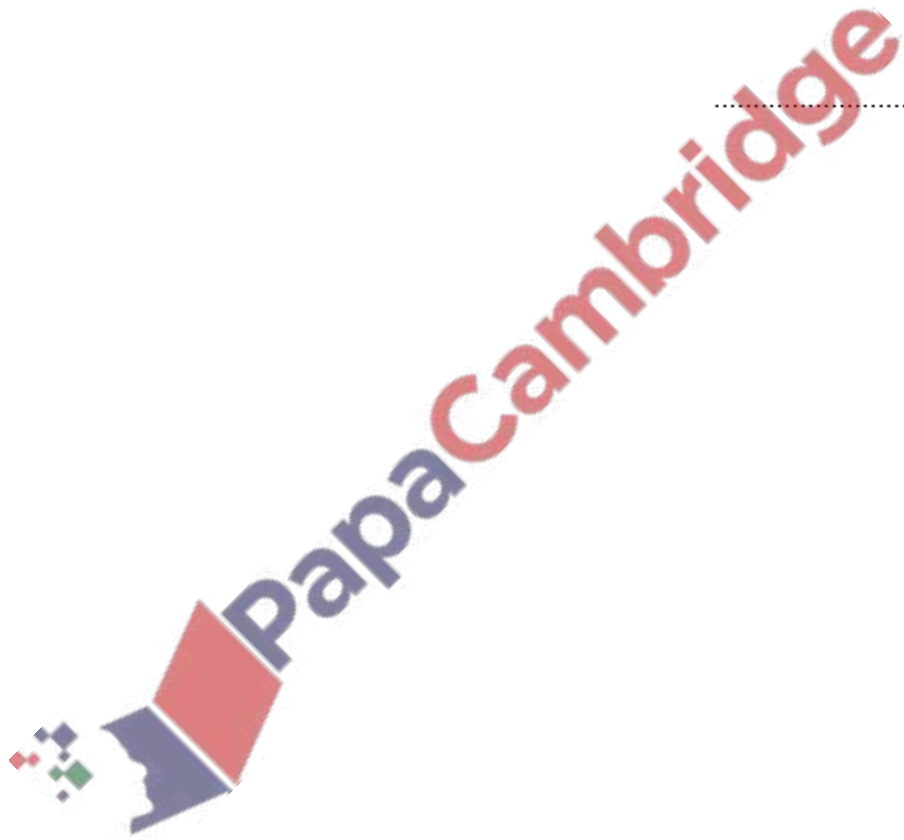
[2]

Write down the mathematical name of this polygon.

.... [1]

3 cm

2.5 cm

5 cm
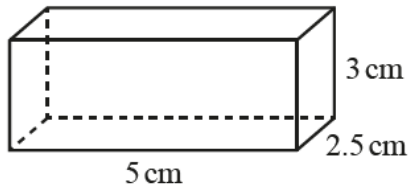
NOT TO
SCALE

The diagram shows a cuboid.

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

[3]
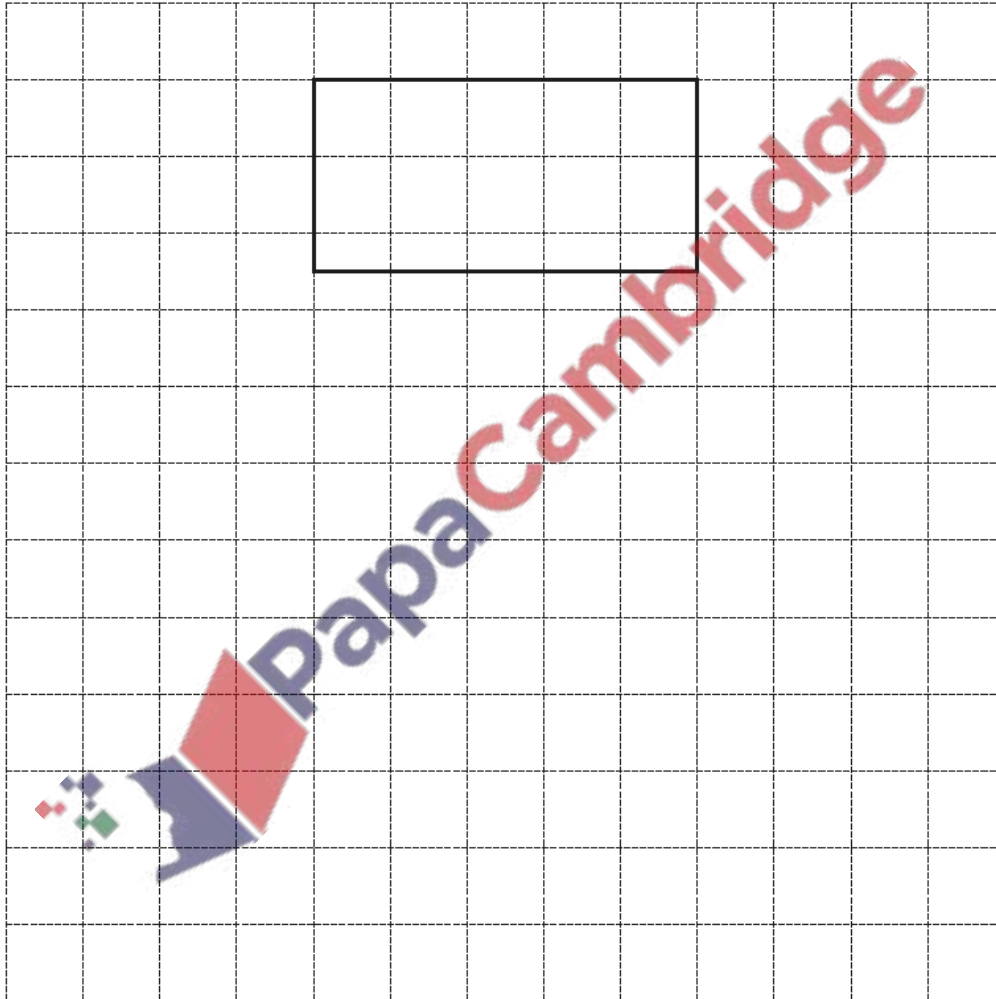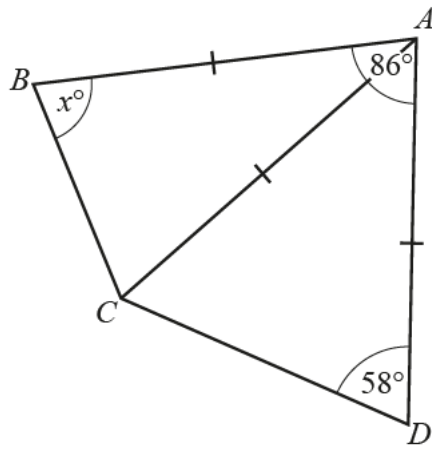
Triangle ABC and triangle ACD are isosceles.
Angle $DAB = 86°$ and angle $ADC = 58°$.

Find the value of x.

$x =$ .... [3]
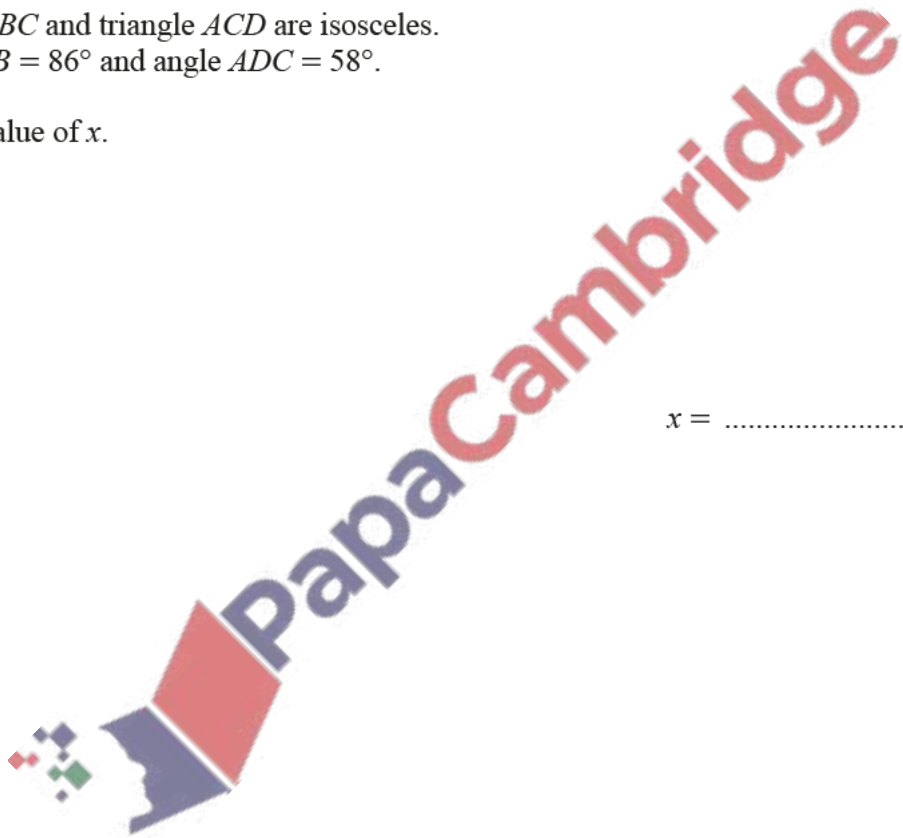
11.

Work out the size of one interior angle of a regular 10-sided polygon.

.... [2]
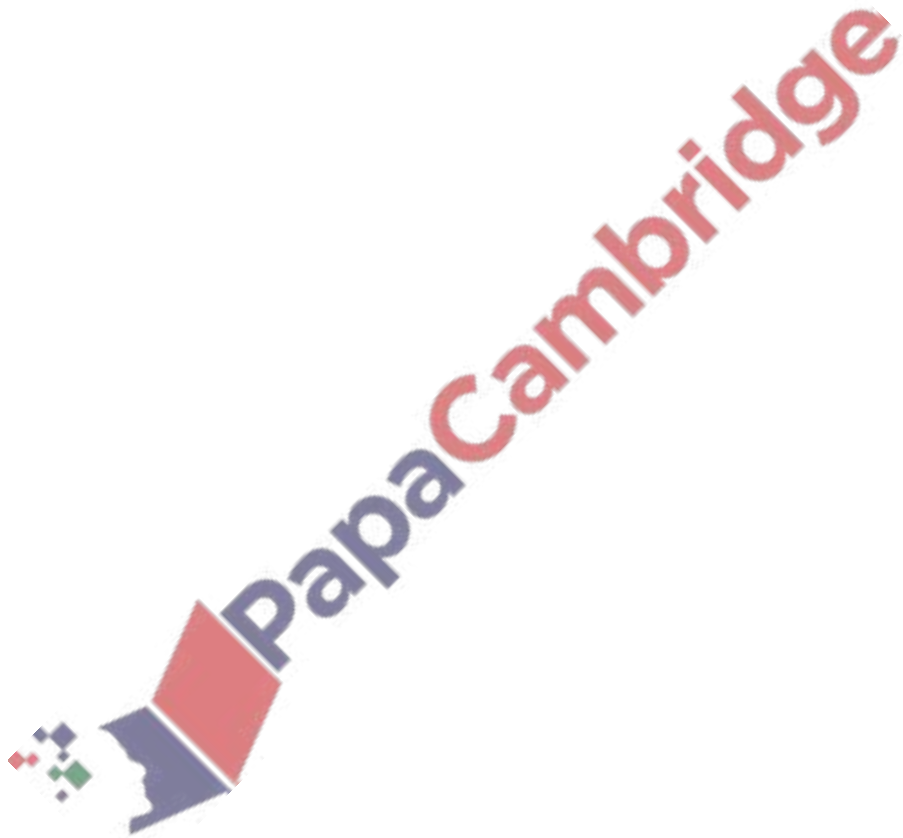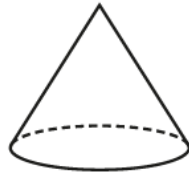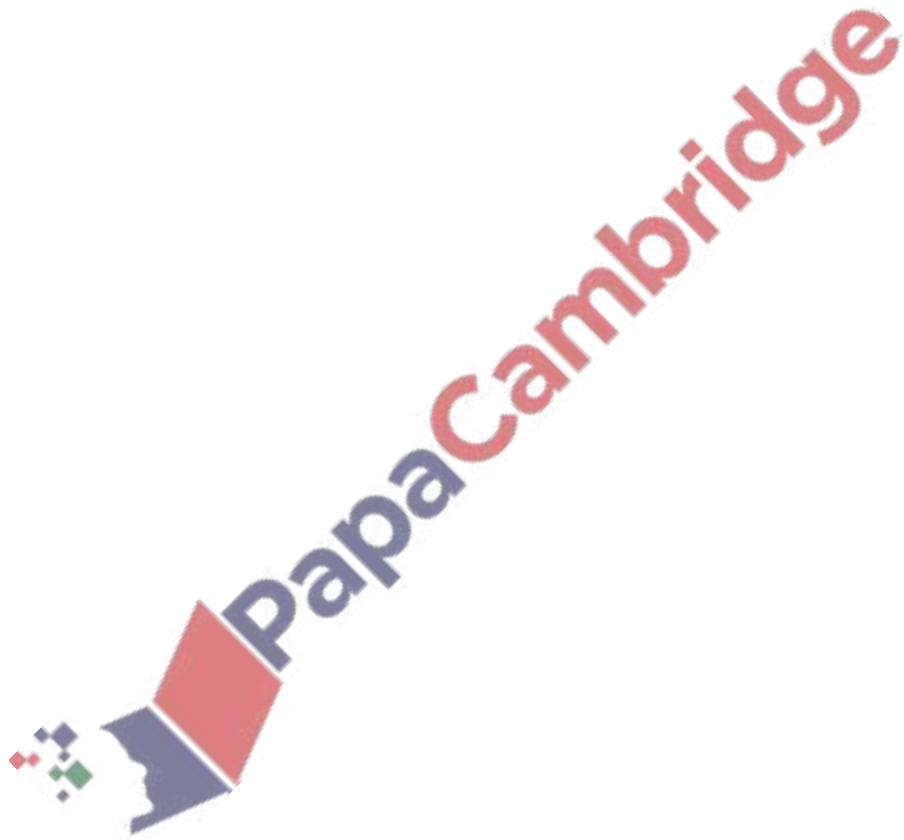
Write down the mathematical name of this solid.

.... [1]
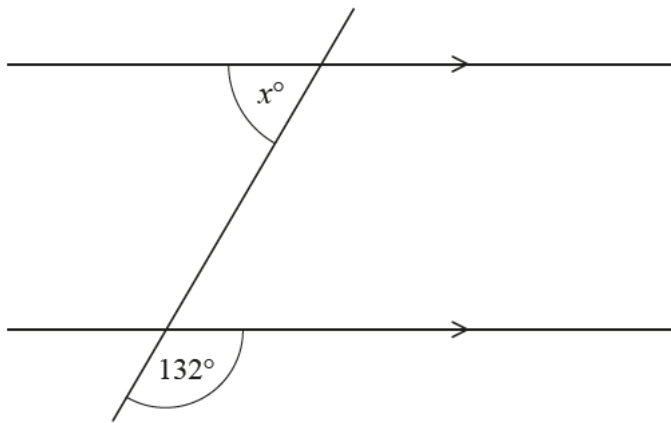
The diagram shows two parallel lines intersecting a straight line.

Find the value of x.

$x =$ .... [2]

14.
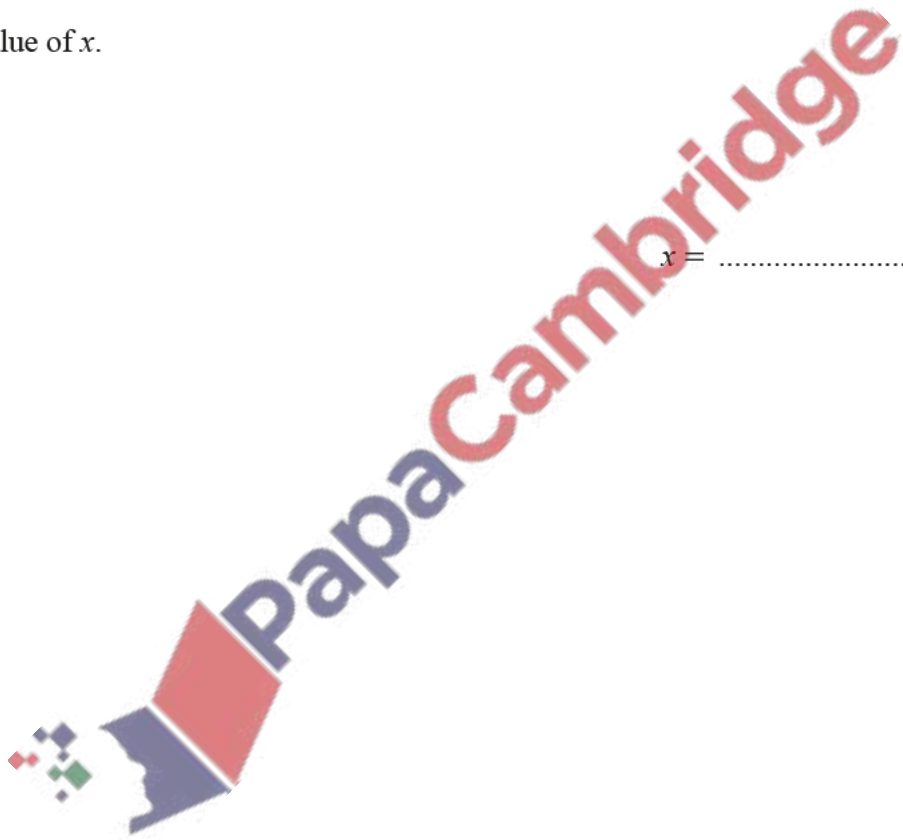
Find the interior angle of a regular 7-sided polygon.

.... [2]
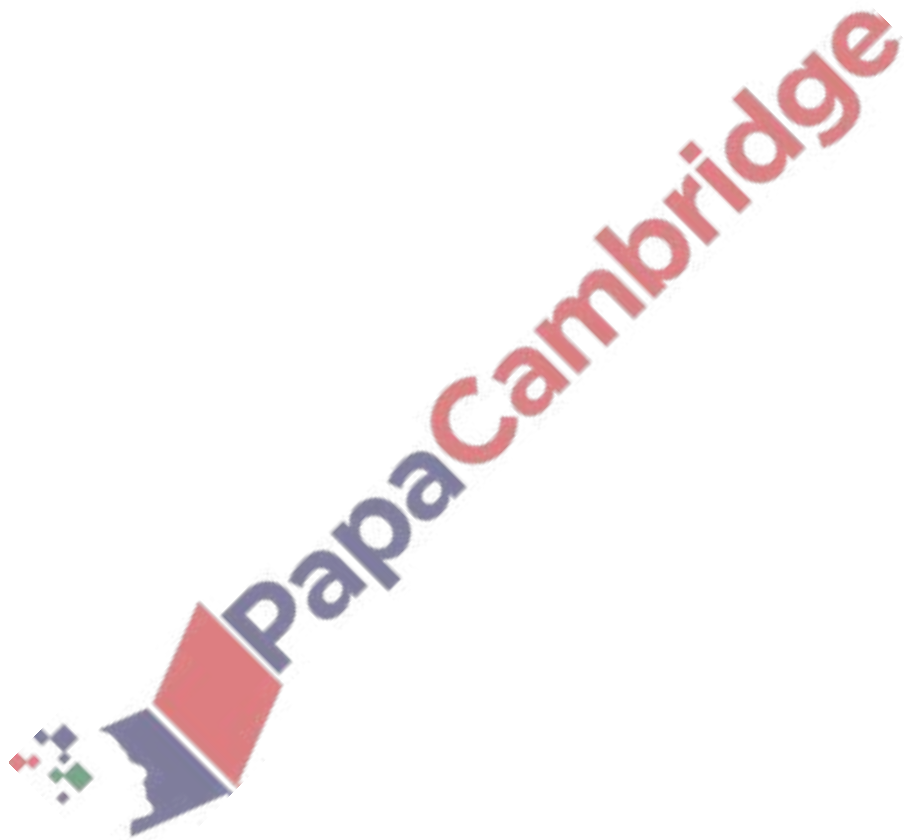
15. Nov/2021/Paper_21/No.6

The scale drawing shows the positions of two towns, P and Q.
The scale is 1 cm represents 4 km.

North

Q

North

P

Scale: 1 cm to 4 km

(a) Find the actual distance between town P and town Q.

.... km **[2]**

(b) Measure the bearing of town Q from town P.

.... **[1]**
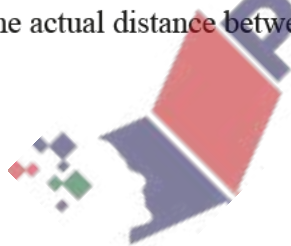
(c) Town X is 28 km from town P on a bearing of 140°.

On the scale drawing, mark the position of town X. **[2]**

15

16.

A regular polygon has an interior angle of 174°.

Find the number of sides of this polygon.

.... [2]

17.
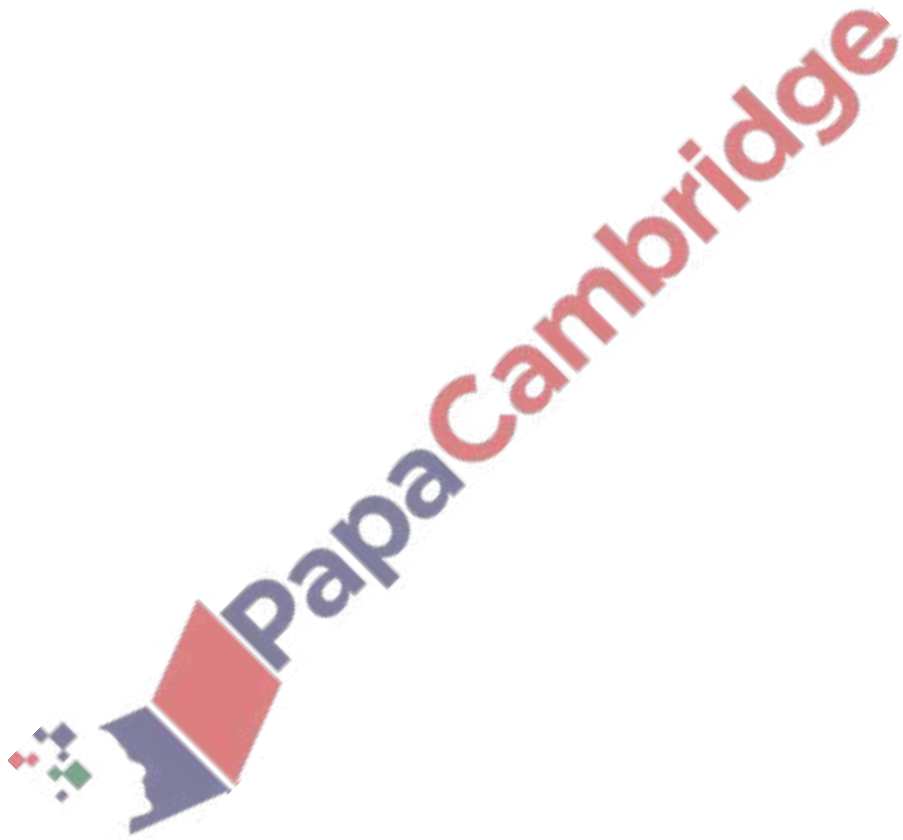
Change 2.15 hours into minutes.

.... min [1]

18.
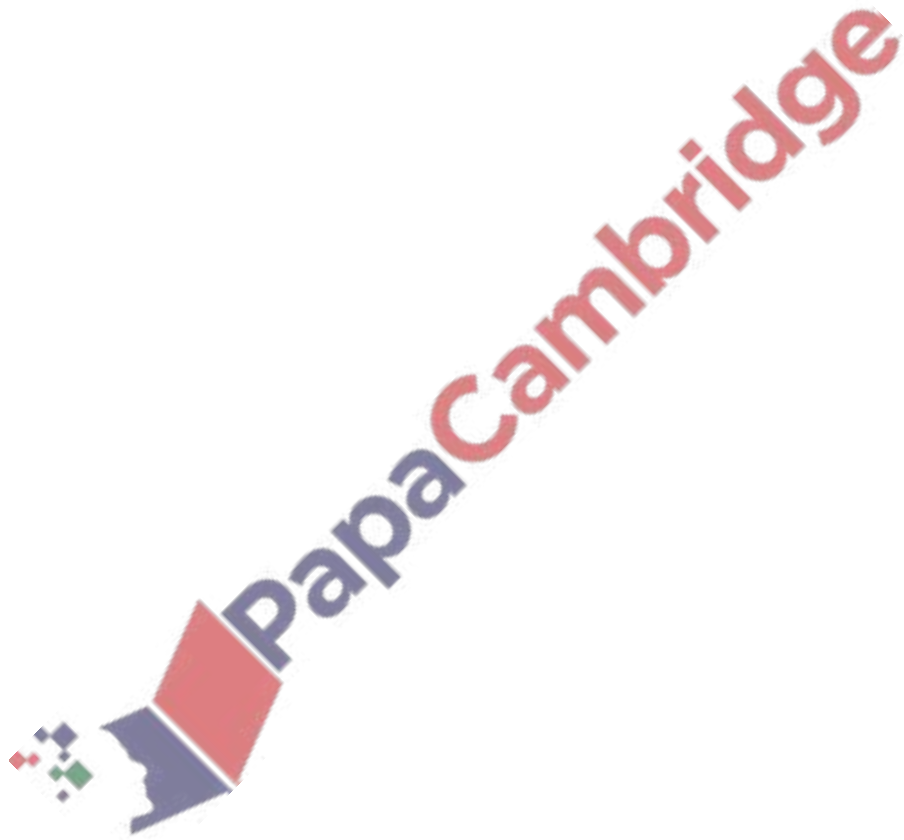
The interior angle of a regular polygon is 156°.

Work out the number of sides of this polygon.

.... [2]
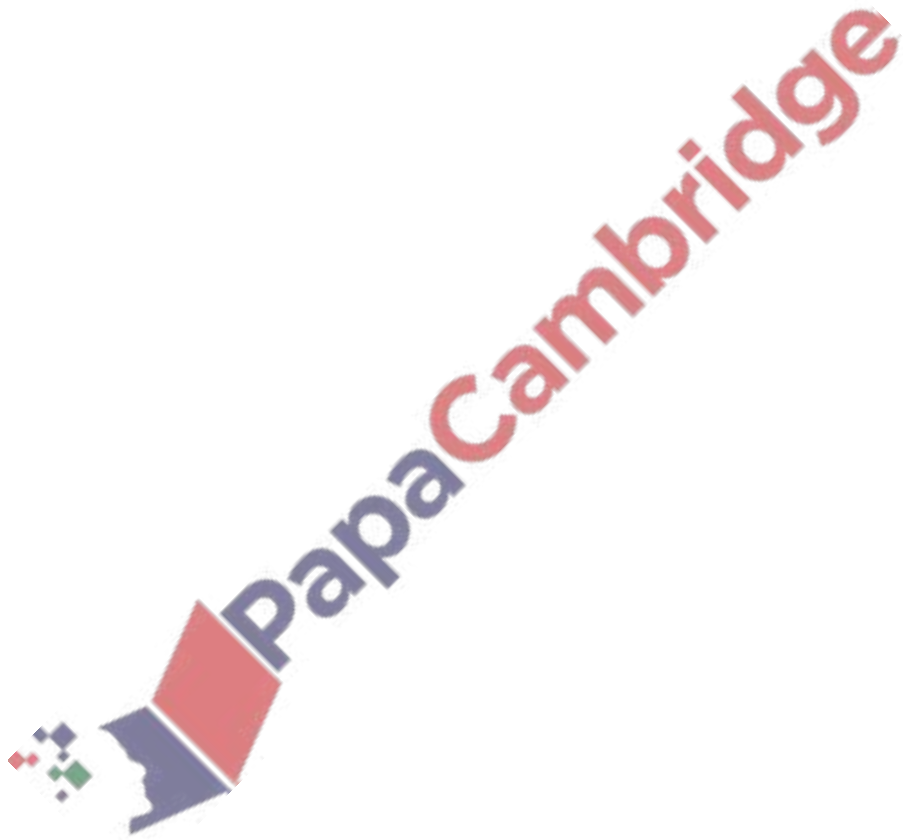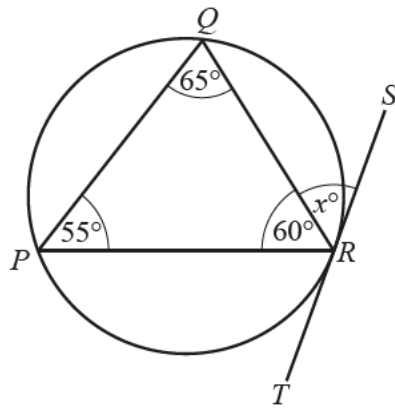
NOT TO SCALE

P, Q and R are points on a circle.
ST is a tangent to the circle at R.

(a) Write down the value of x.
Give a geometrical reason for your answer.

$x =$ .... because...

.... [2]

(b) Another tangent from the point S touches the circle at V.

Give a geometrical reason why triangle SVR is isosceles.

....

.... [1]
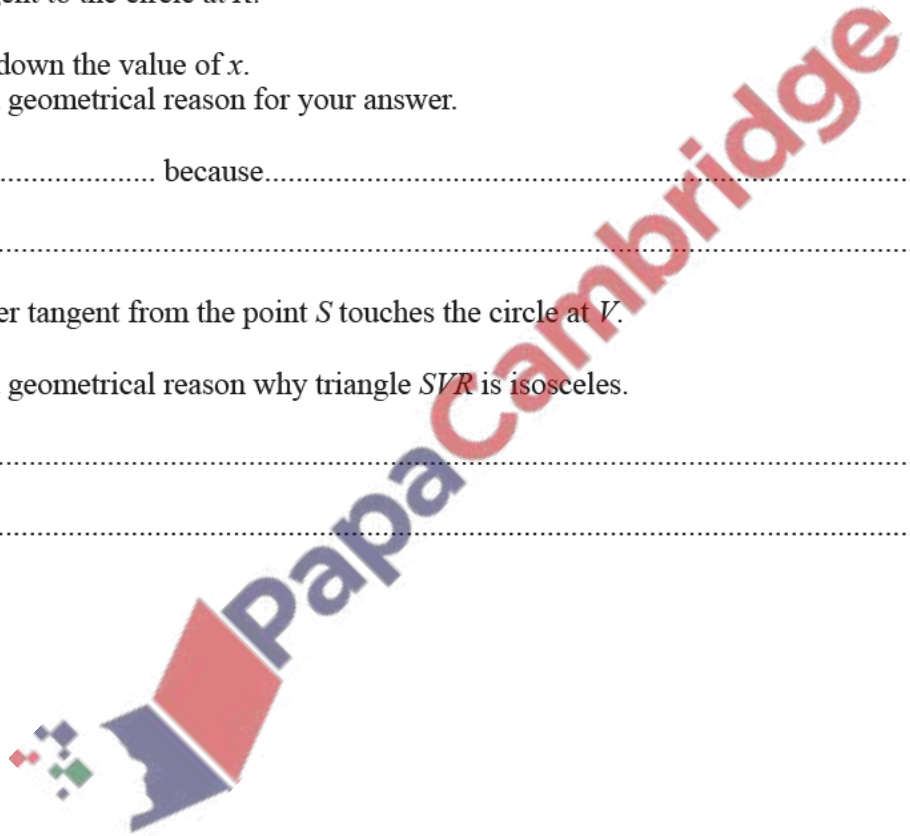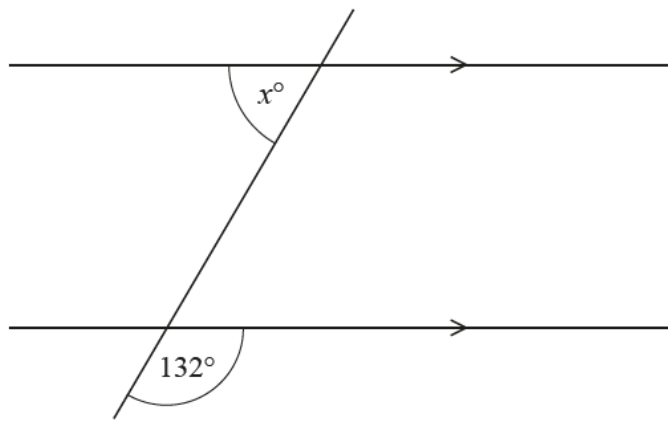
NOT TO
SCALE

The diagram shows two parallel lines intersecting a straight line.

Find the value of x.

$x =$ .... [2]

21.
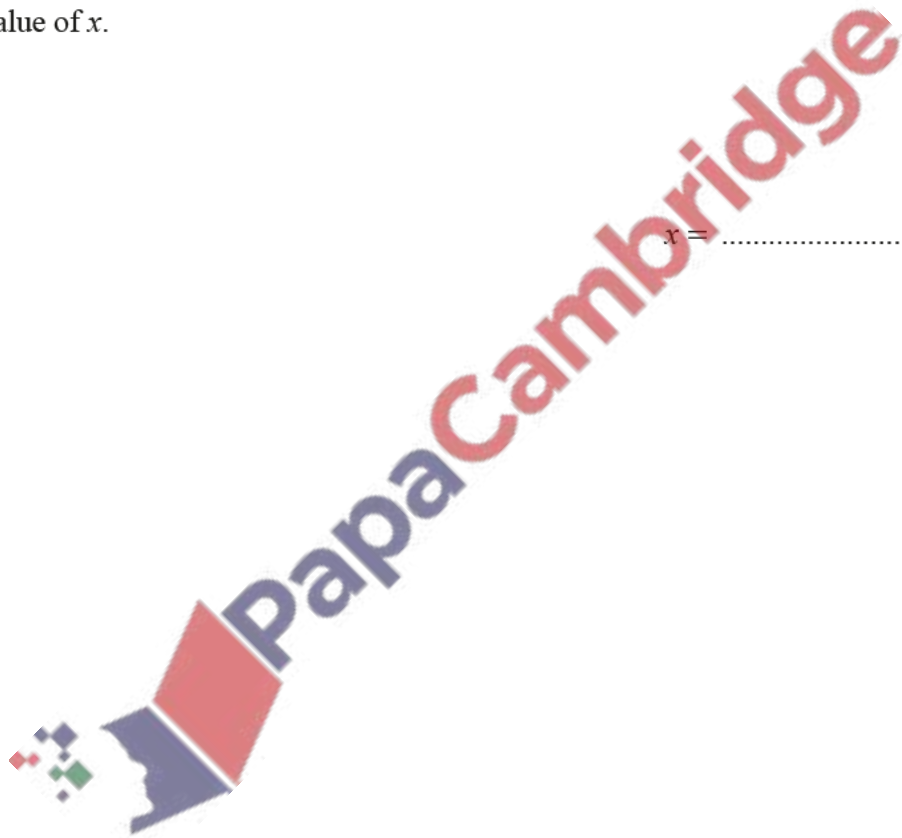
Each interior angle of a regular polygon is 178.5°.

Calculate the number of sides of this polygon.

.... [2]

(a)
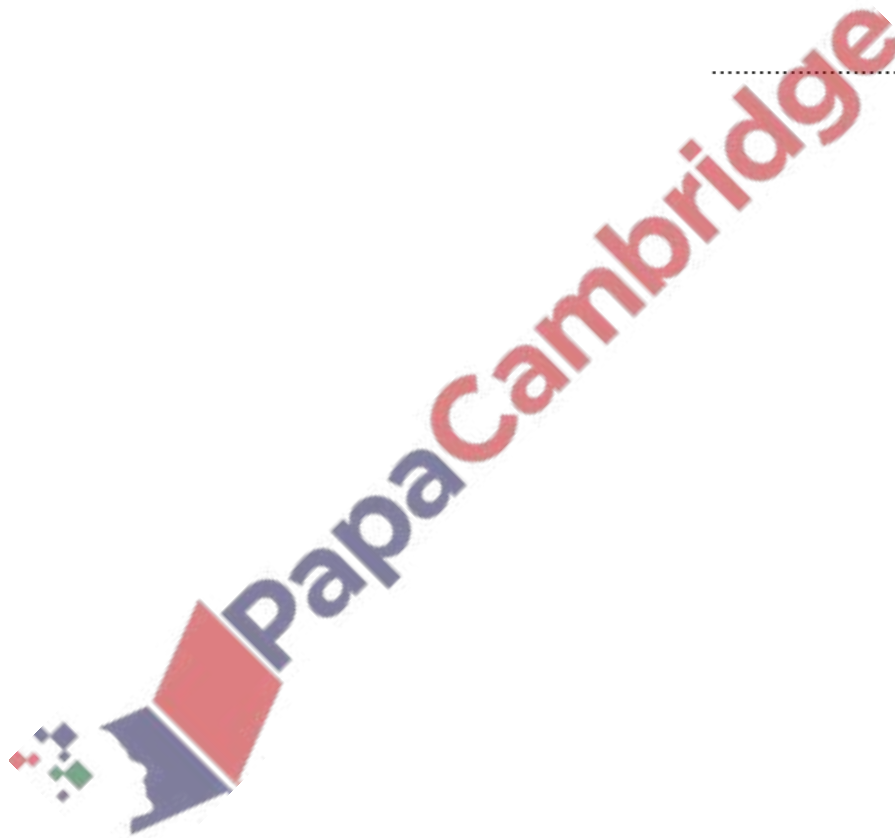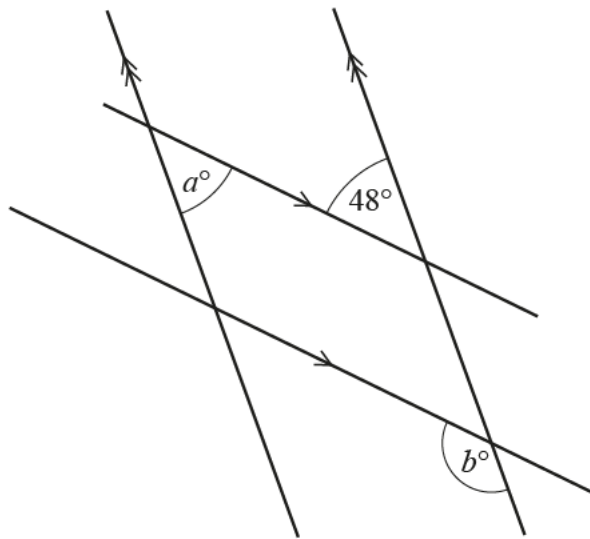
NOT TO SCALE

The diagram shows two pairs of parallel lines.

(i) Find the value of a.

$a = $ .... [1]

(ii) Find the value of b.

$b = $ .... [1]

(b)
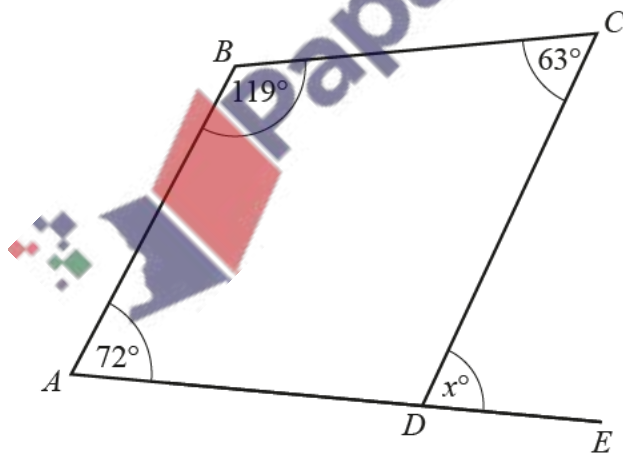
NOT TO SCALE

The diagram shows a quadrilateral $ABCD$ and a straight line ADE.

Work out the value of x.

$x = $ .... [2]

(c)

NOT TO SCALE
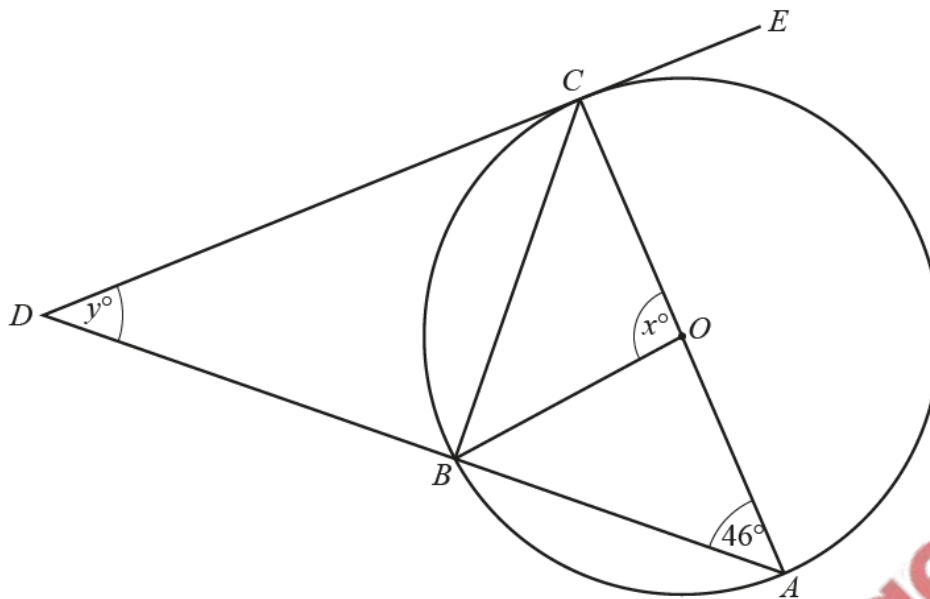
A, B and C are points on the circle, centre O.
AC is a diameter of the circle and ABD is a straight line.
DCE is a tangent to the circle at C.

(i) Write down the mathematical name for the line BC.

.... [1]

(ii) Explain why angle ABC is 90°.

.... [1]

(iii) Find the value of x.

$x =$ .... [2]

(iv) Find the value of y.

$y =$ .... [2]

(a)
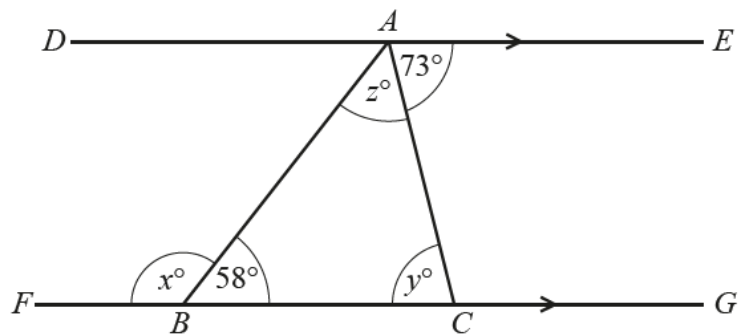
In the diagram, ABC is a triangle.
Line DAE is parallel to line $FBCG$.

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

$x = $ ....

$y = $ ....

$z = $ .... [3]

(b)
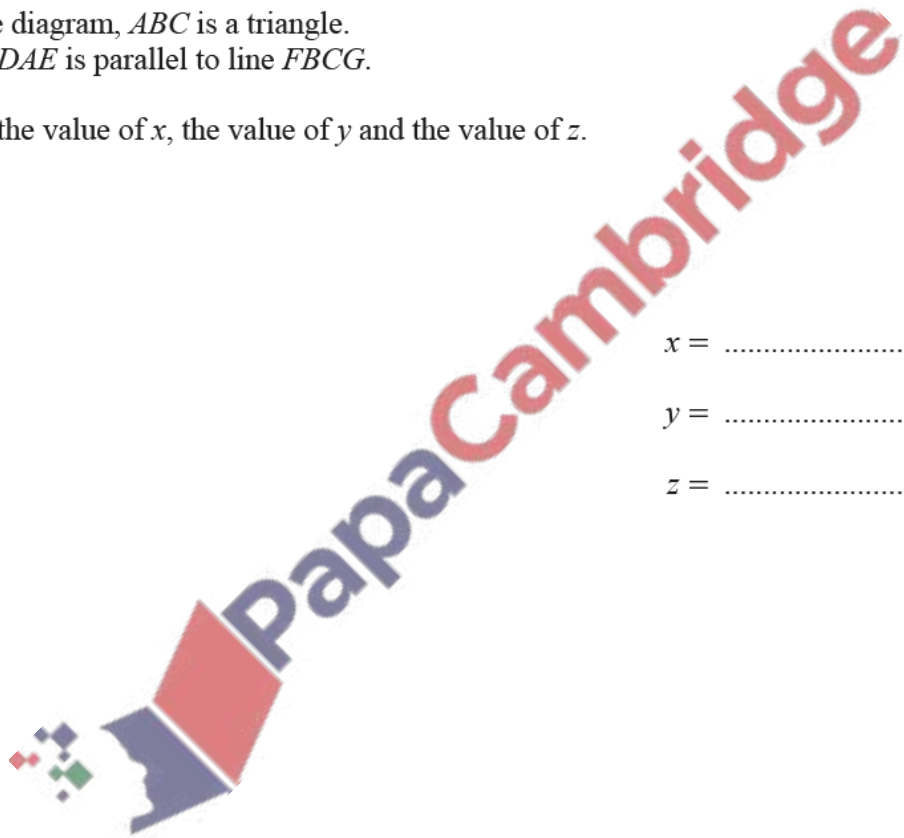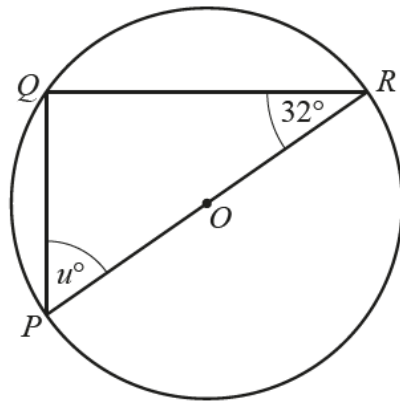
NOT TO SCALE

Points P, Q and R lie on a circle, centre O.

Find the value of u.

$u =$ .... [2]

(c)

6.42 cm

72°
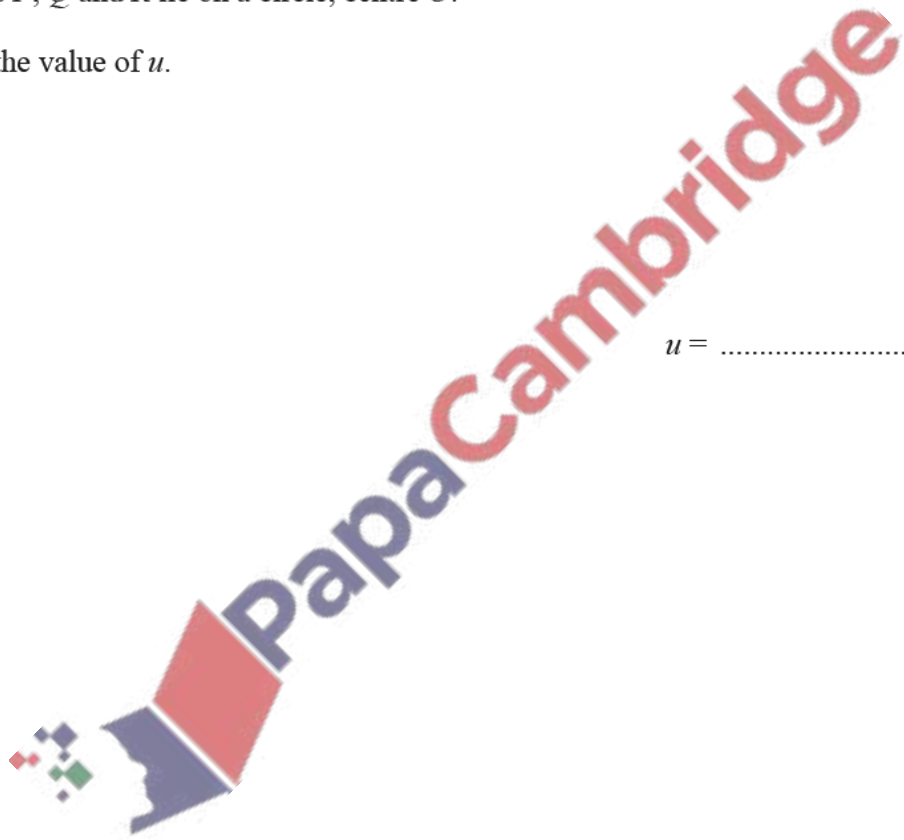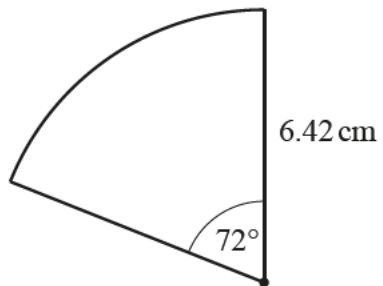
NOT TO
SCALE

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]

(c)

NOT TO
SCALE

The diagram shows a right-angled triangular prism.

Find the volume of the prism.

.... cm^3 [3]
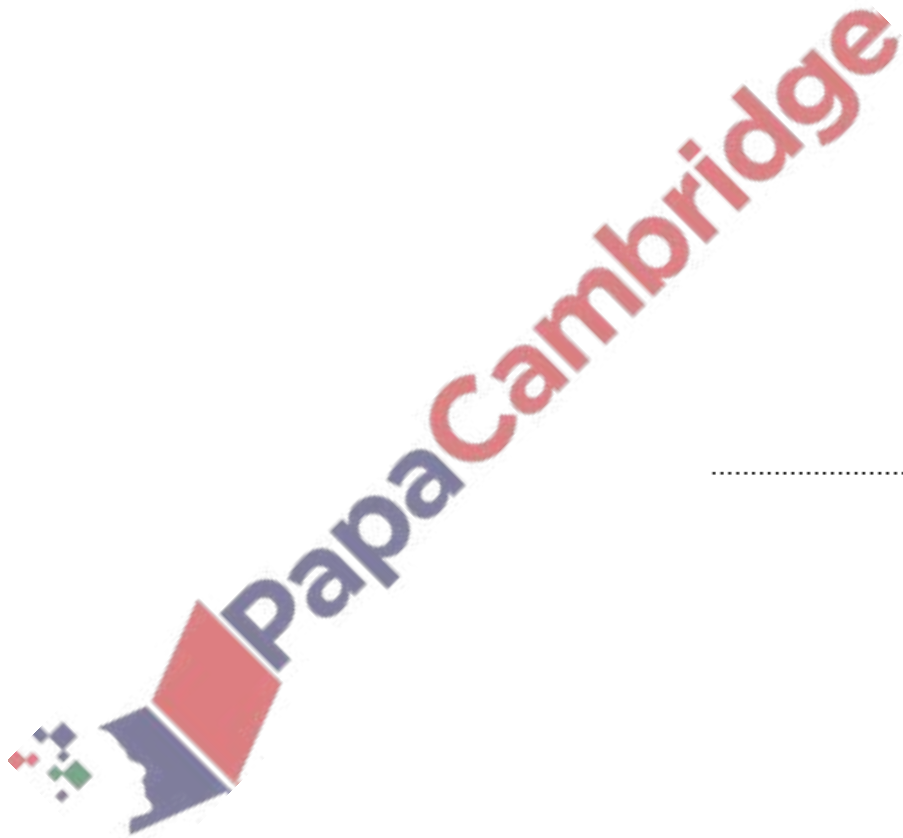
(a) Write down the order of rotational symmetry of each shape.

....
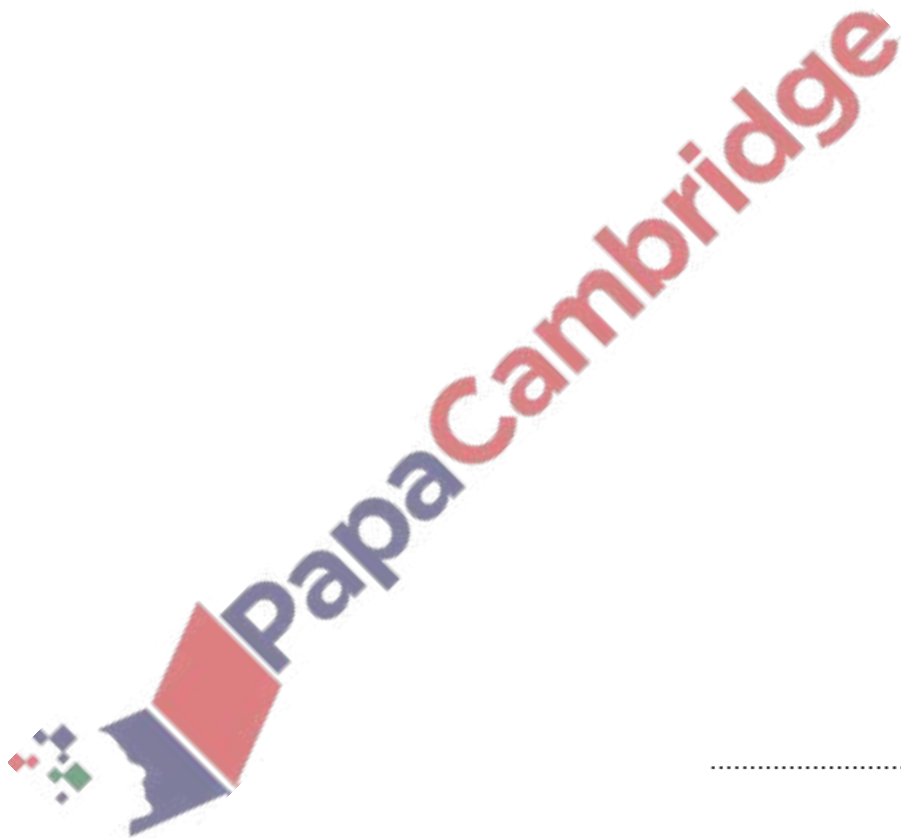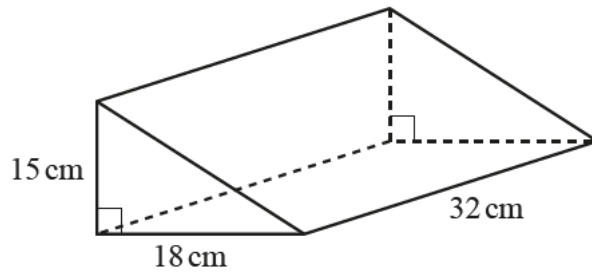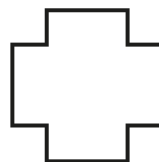
[2]

(b) Triangles A, B and C are shown on the grid.
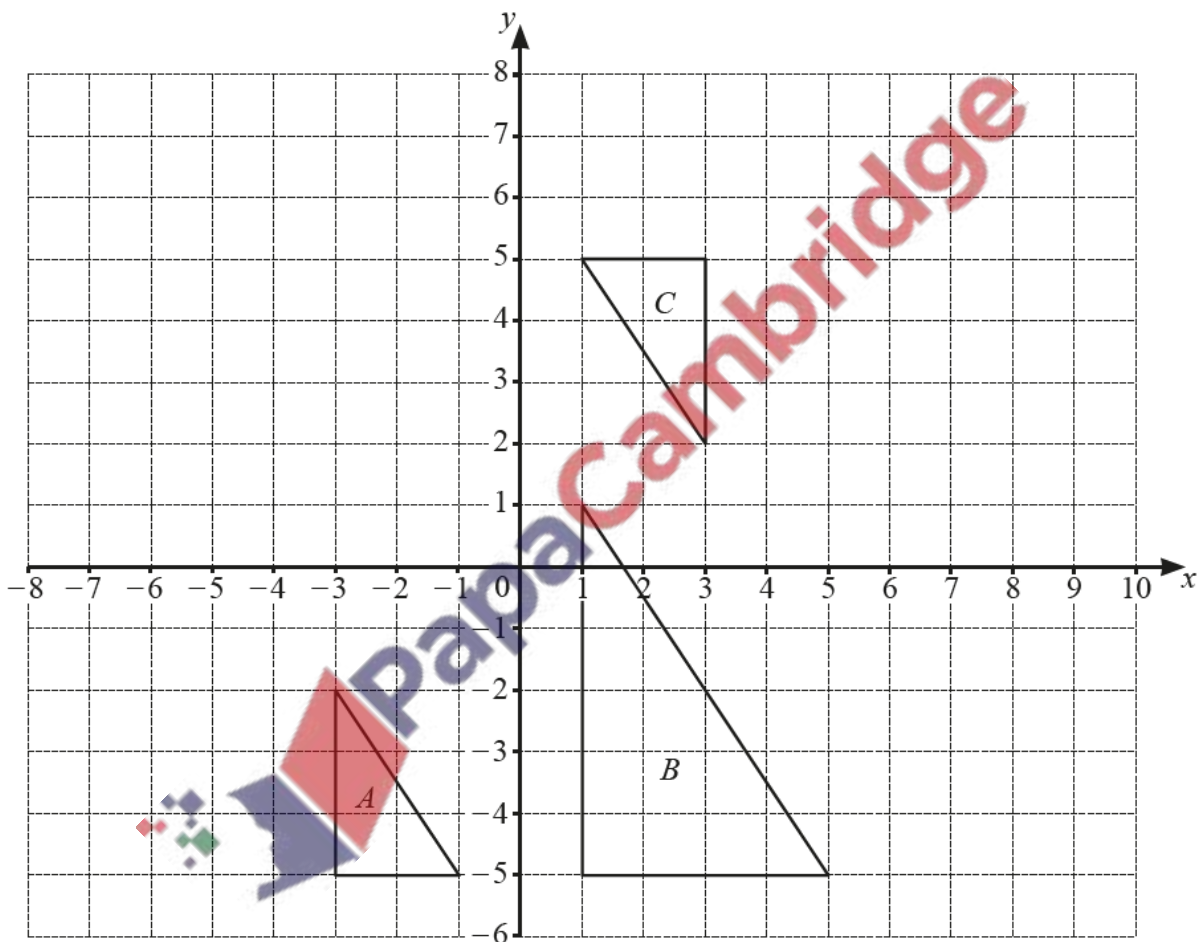
(i) Describe fully the **single** transformation that maps

(a) triangle A onto triangle B,

....

.... [3]

28

(b) triangle A onto triangle C.

....

.... [3]
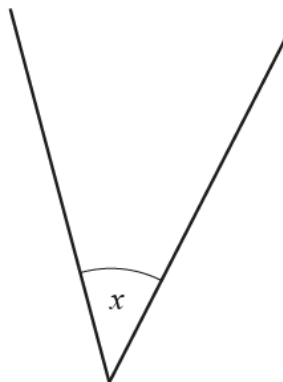
(ii) On the grid, reflect triangle C in the line $x = -1$. [2]

(iii) On the grid, translate triangle C by the vector $\begin{pmatrix} 5 \\ -1 \end{pmatrix}$. [2]
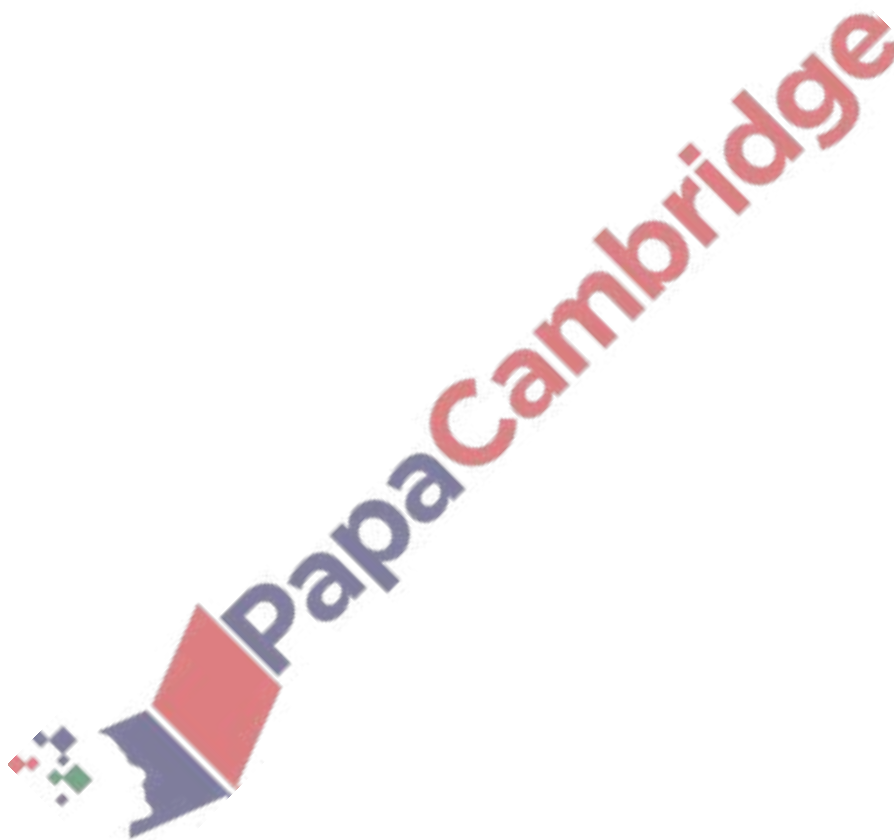
(a)

(i) Measure the size of angle x.

Angle $x =$ .... [1]

(ii) Write down the mathematical name of this type of angle.

.... [1]

(b)
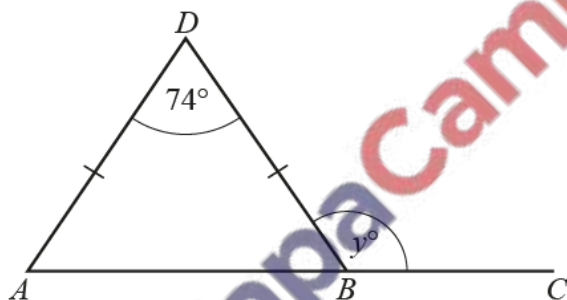
NOT TO SCALE

ABC is a straight line and ABD is an isosceles triangle.

Find the value of y.

$y =$ .... [3]

(c)
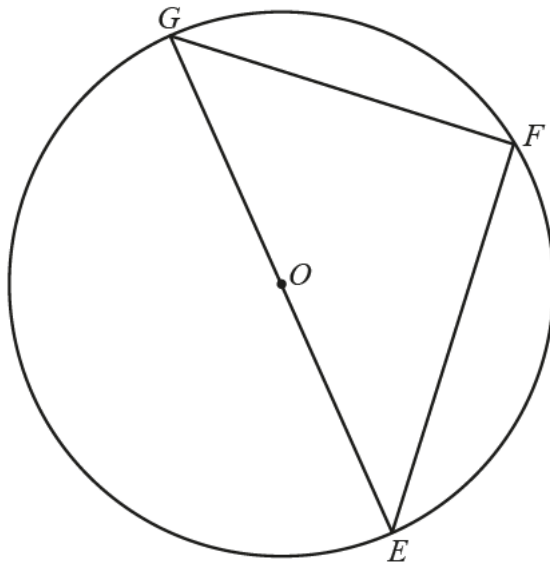
NOT TO SCALE

E, F and G are points on the circle, centre O.
$EG = 12$ cm.

(i) Write down the mathematical name for the line FG.

.... [1]

(ii) Explain why angle EFG is 90°.

.... [1]

(iii) Calculate the area of the circle.

.... cm² [2]
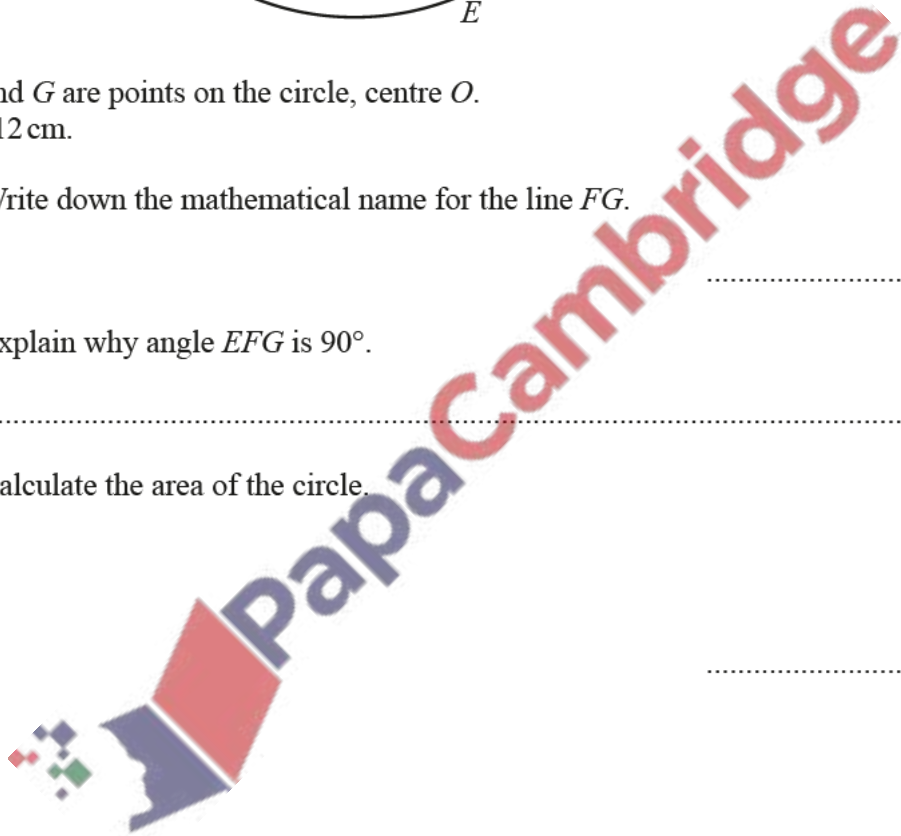
(a) Jean asks 600 people to choose their favourite sport.
The pie chart shows some of this information.
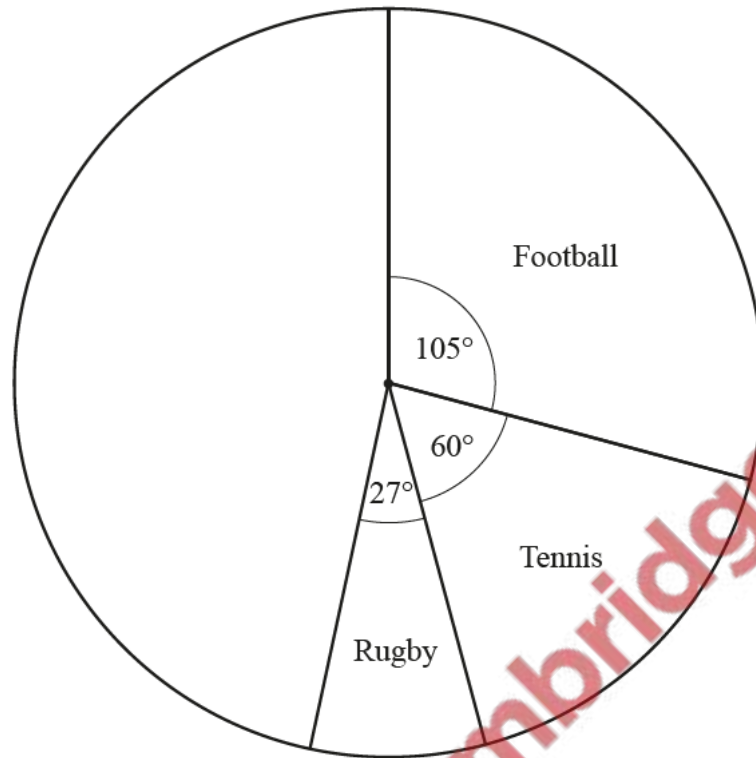
(i) Show that 100 people choose tennis.

[1]

(ii) Work out how many people choose rugby.

.... [2]

(iii) 125 people choose cricket and the rest choose swimming.

Complete the pie chart to show this information.
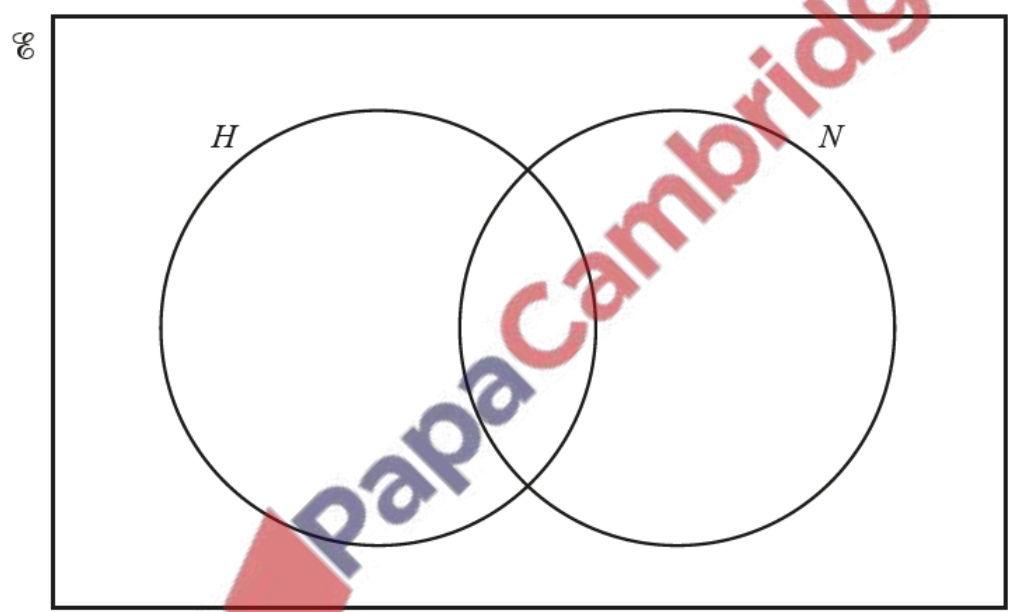
[2]

(iv) One of the 600 people is picked at random.

Find the probability that this person chooses tennis or cricket.
Give your answer as a fraction in its simplest form.

.... [2]

There are 80 people in a group.

H = {people who play hockey}
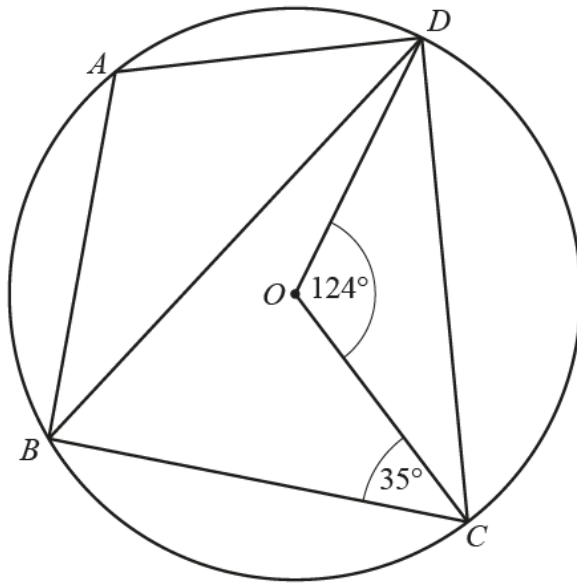N = {people who play netball}

36 people play hockey.
53 people play netball.
8 people do not play hockey or netball.

Complete the Venn diagram. [3]

(a)

NOT TO
SCALE

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

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

Angle $CBD =$ .... because ....

.... [2]

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

Angle $BAD =$ .... because ....

....

.... [4]
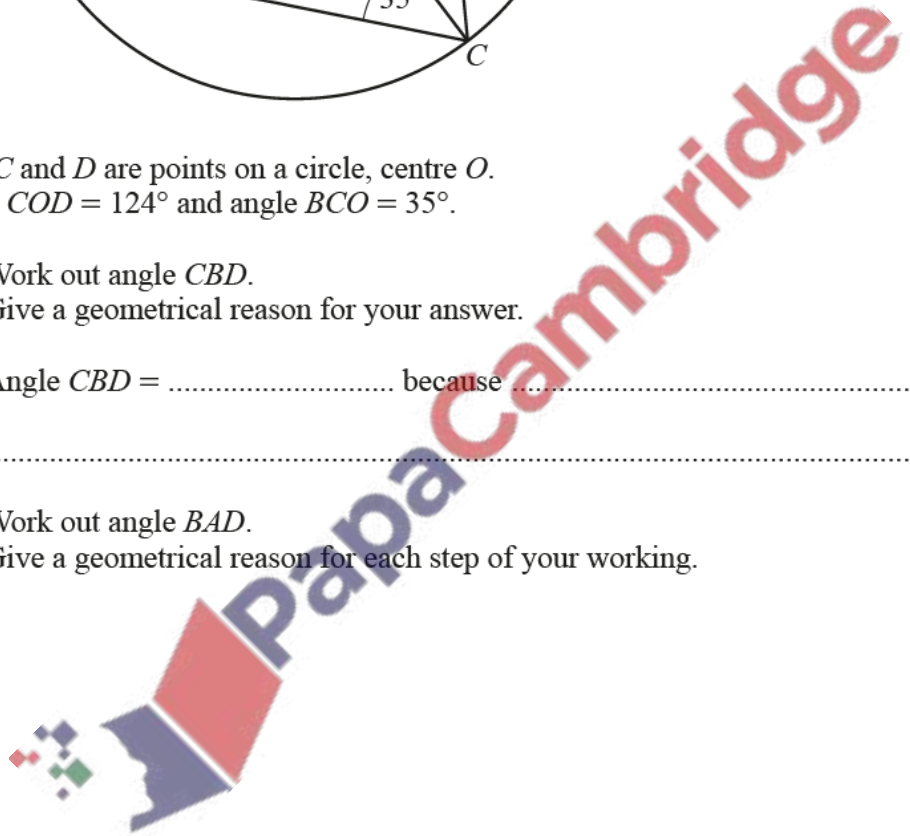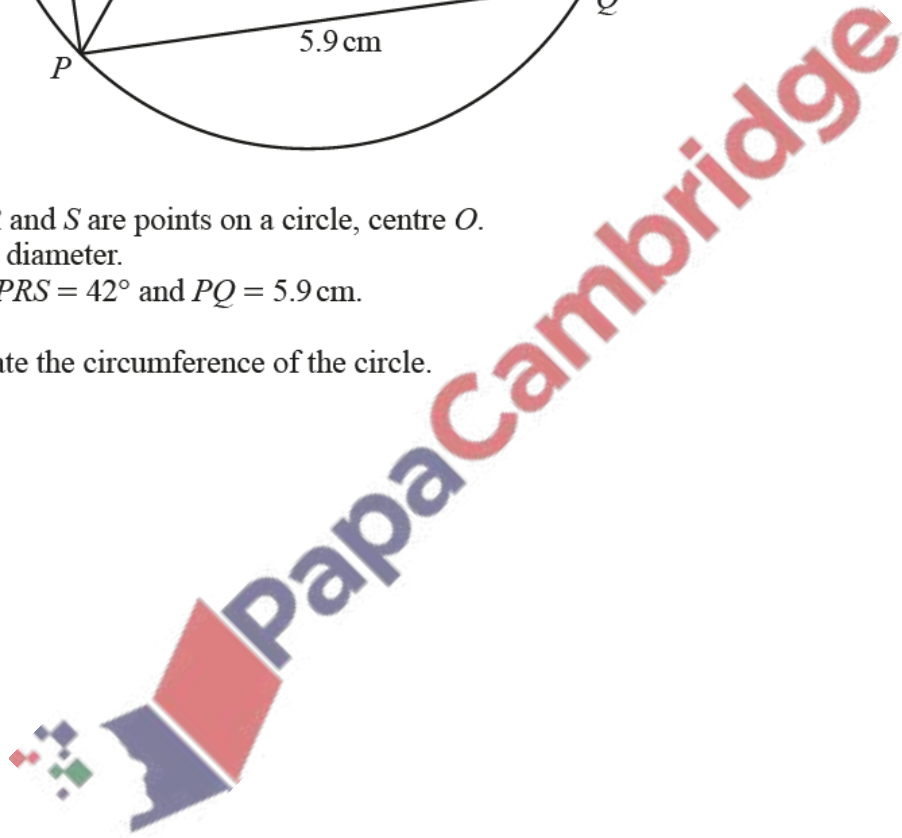
(b)
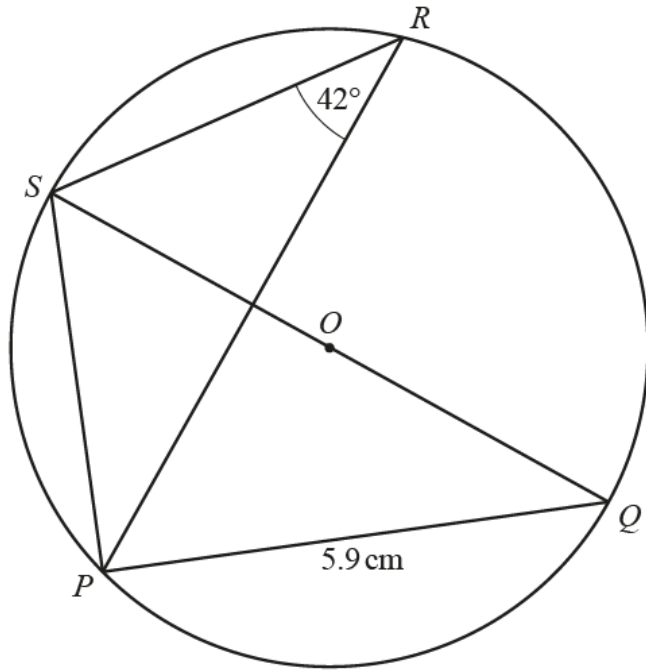
NOT TO
SCALE
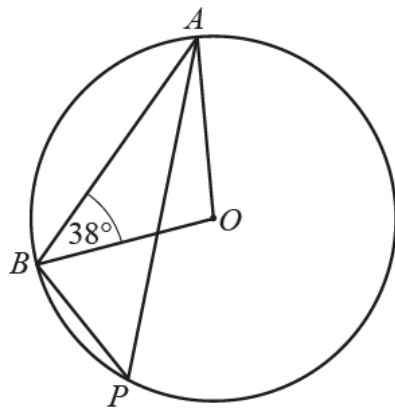
P, Q, R and S are points on a circle, centre O.
QS is a diameter.
Angle $PRS = 42°$ and $PQ = 5.9$ cm.
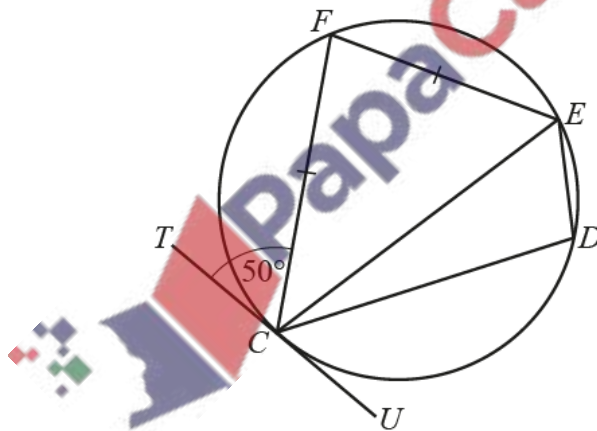
Calculate the circumference of the circle.

.... cm [5]

(a)

NOT TO
SCALE

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

Find angle APB.

Angle $APB =$ .... [3]

(b)

NOT TO
SCALE

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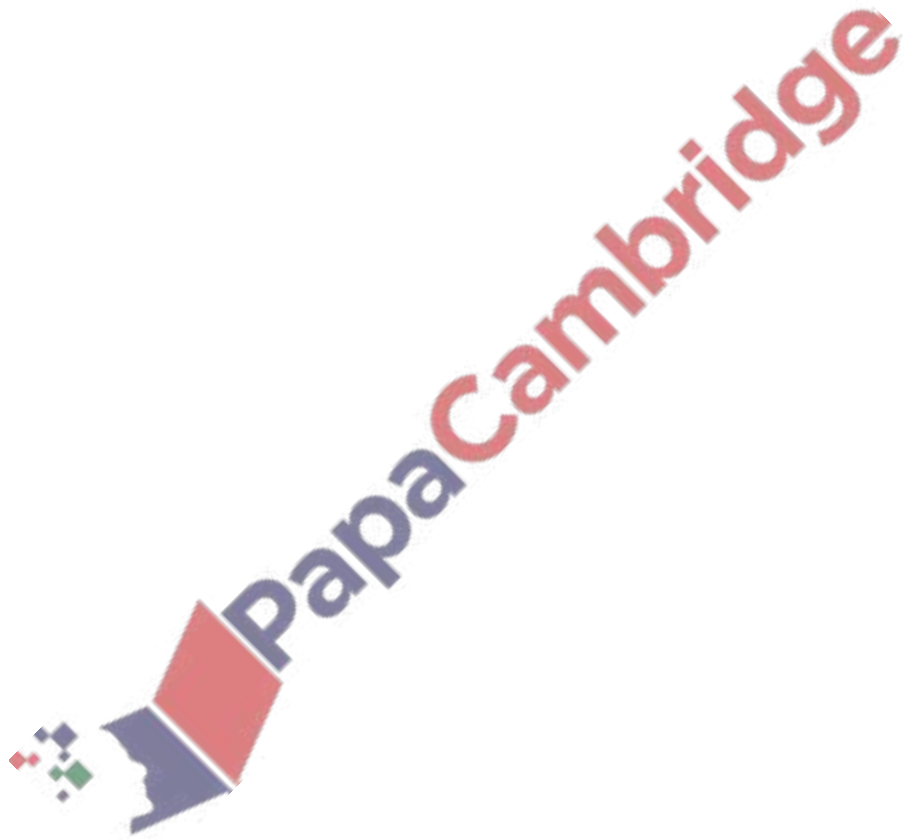TU is a tangent to the circle at C and angle $TCF = 50°$.

Find

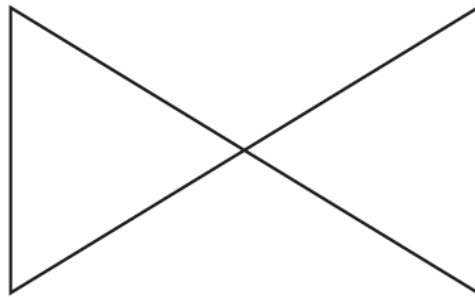**(i)**   angle EFC,

Angle $EFC =$ .... [2]

(ii) angle *CDE*.

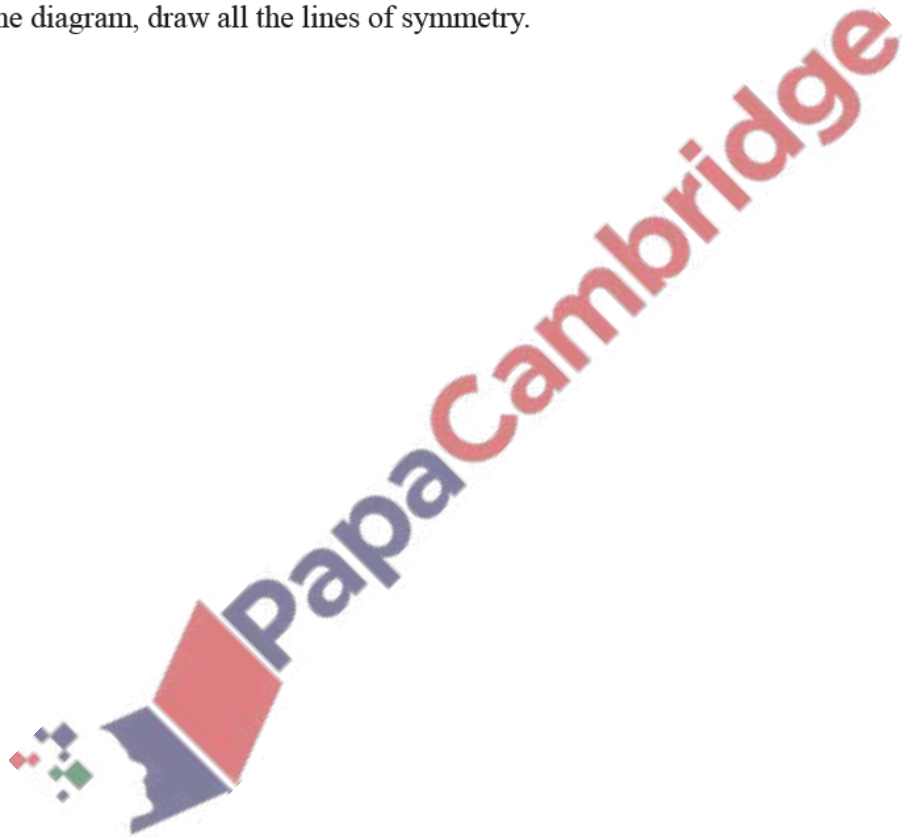Angle *CDE* = ... [1]

(a) Complete this statement.

The diagram has rotational symmetry of order .... [1]

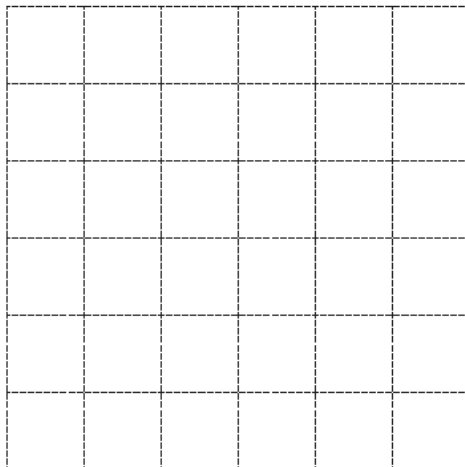**(b)** On the diagram, draw all the lines of symmetry. [2]

31.

(a) On the grid, draw a kite.
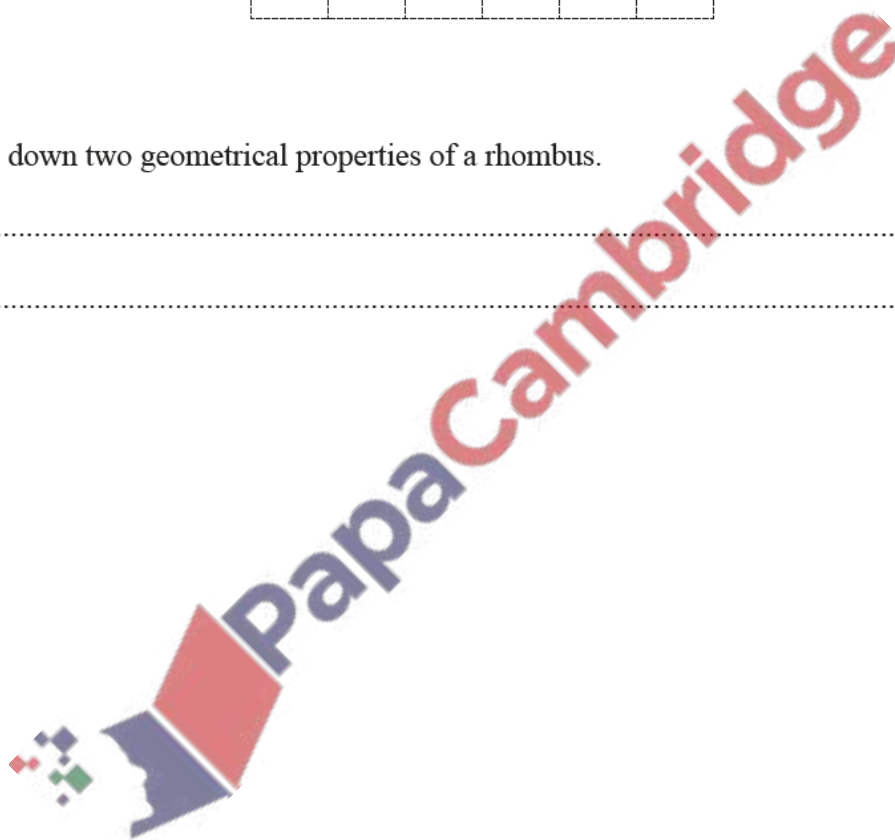
[1]

(b) Write down two geometrical properties of a rhombus.

1. ....

2. .... [2]
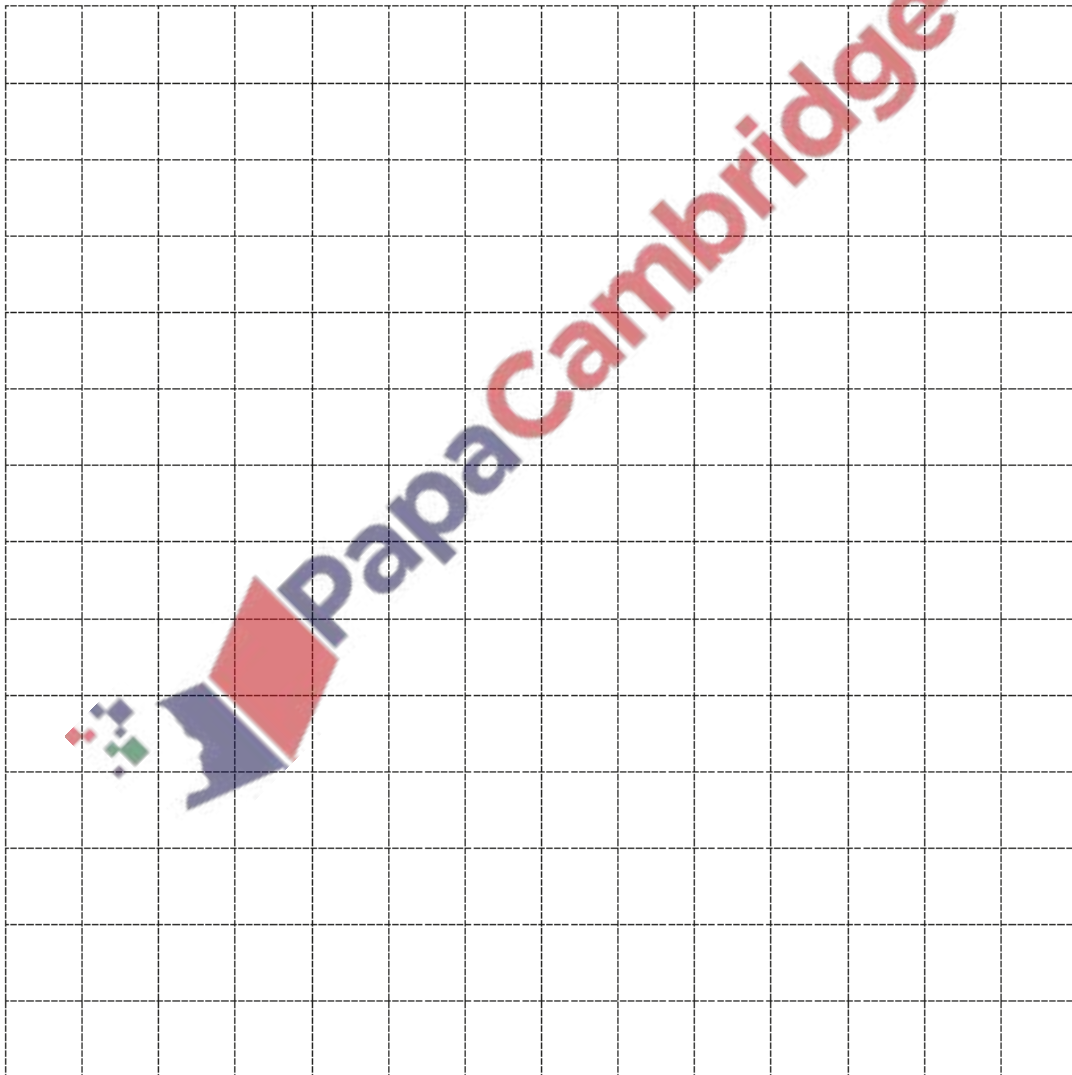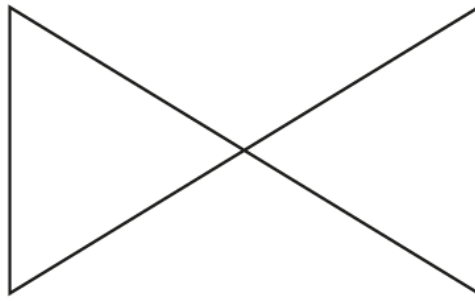
39

NOT TO SCALE

3 cm

4 cm
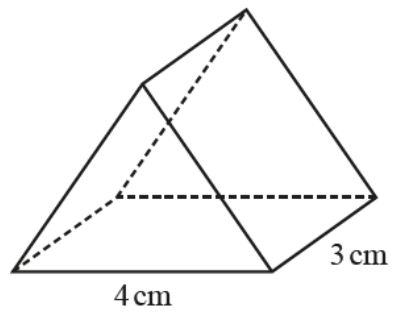
The diagram shows a prism.
The cross-section of the prism is an equilateral triangle.
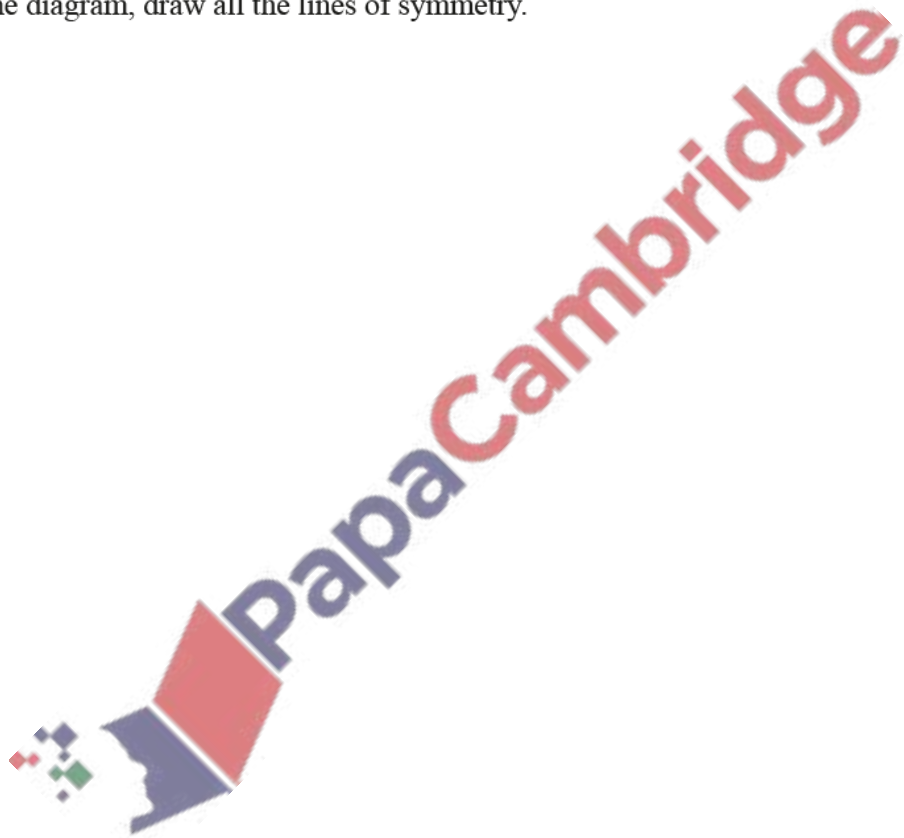
Draw a net of the prism on the $1\,cm^2$ grid.
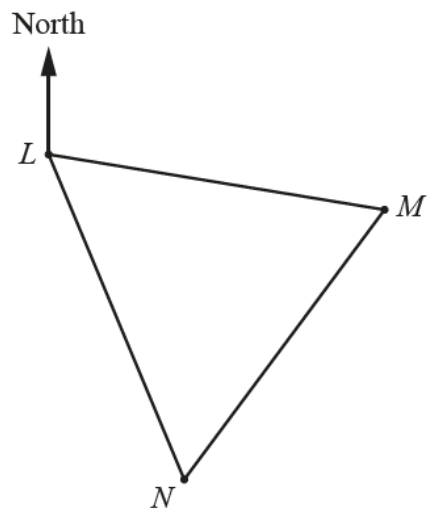

[3]

(a) Complete this statement.

The diagram has rotational symmetry of order .... [1]

(b) On the diagram, draw all the lines of symmetry. [2]

34. March/2021/Paper_22/No.10

North

L

M
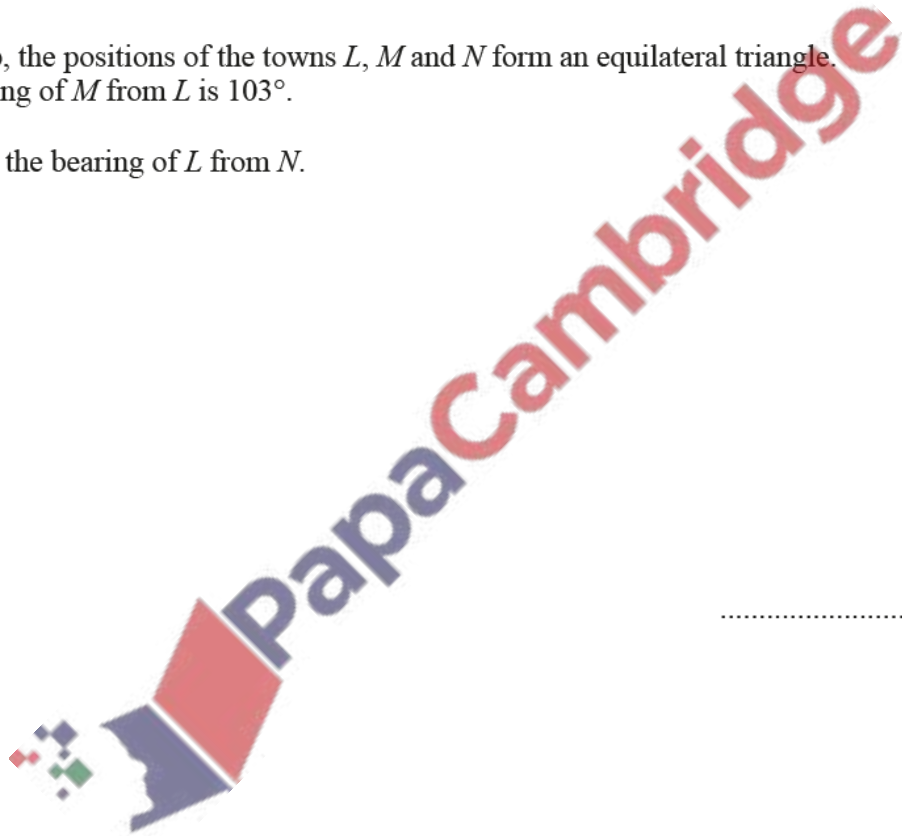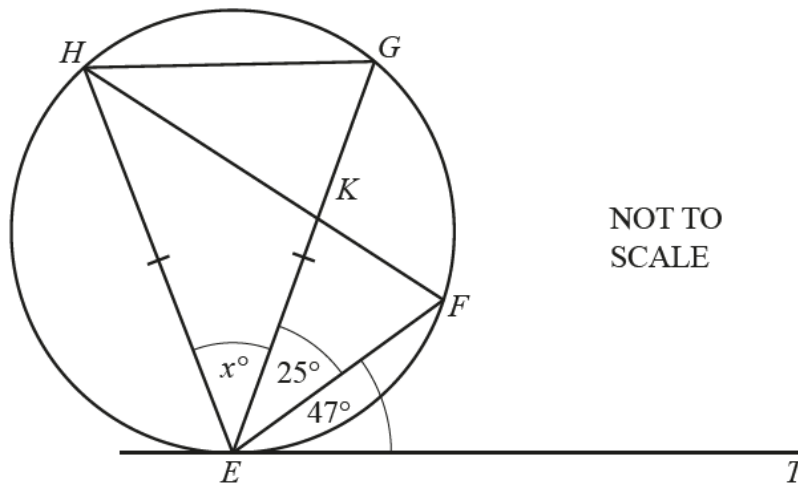
NOT TO
SCALE

N

On a map, the positions of the towns *L*, *M* and *N* form an equilateral triangle.
The bearing of *M* from *L* is 103°.

Work out the bearing of *L* from *N*.

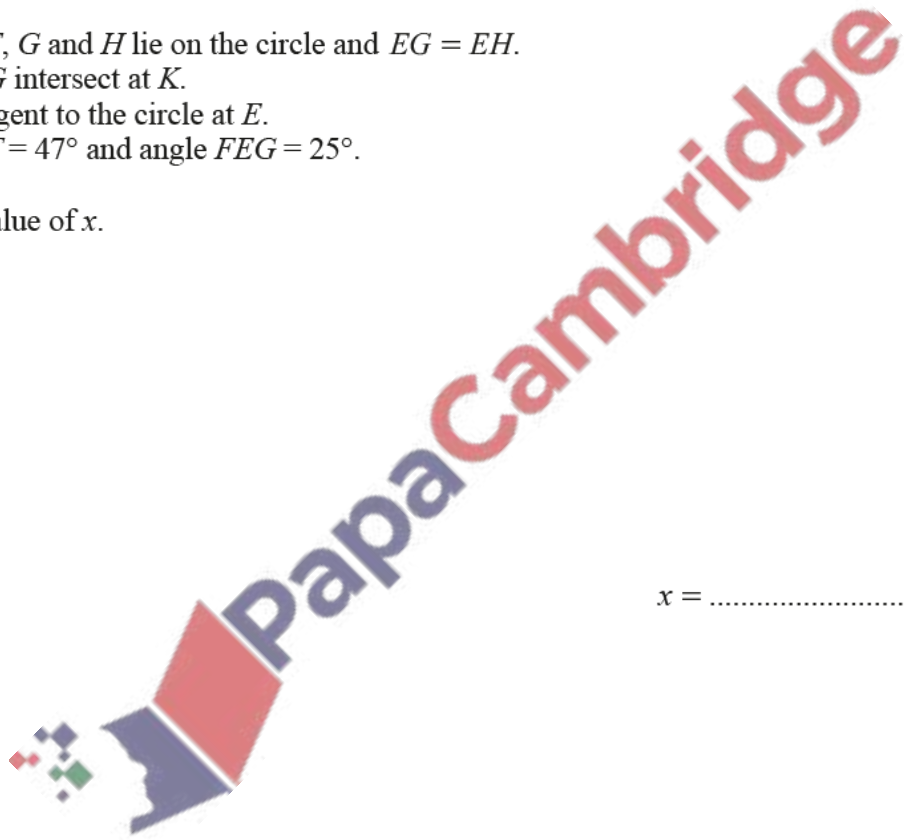.. [2]

NOT TO SCALE

Points E, F, G and H lie on the circle and $EG = EH$.
HF and EG intersect at K.
ET is a tangent to the circle at E.
Angle $FET = 47°$ and angle $FEG = 25°$.

Find the value of x.

$x = $ .... [2]

The scale drawing shows the positions of Kendra's house, *K*, and Latika's house, *L*, on a map.
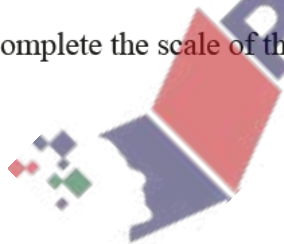
North

•*L*

North

K •

(a) Jesminder's house, *J*, is on a bearing of 036° from *K* and on a bearing of 284° from *L*.

Mark the position of *J* on the map. [2]

(b) The actual distance between *K* and *L* is 9600 metres.

(i) Complete the scale of the map.

1 cm represents .... metres [2]
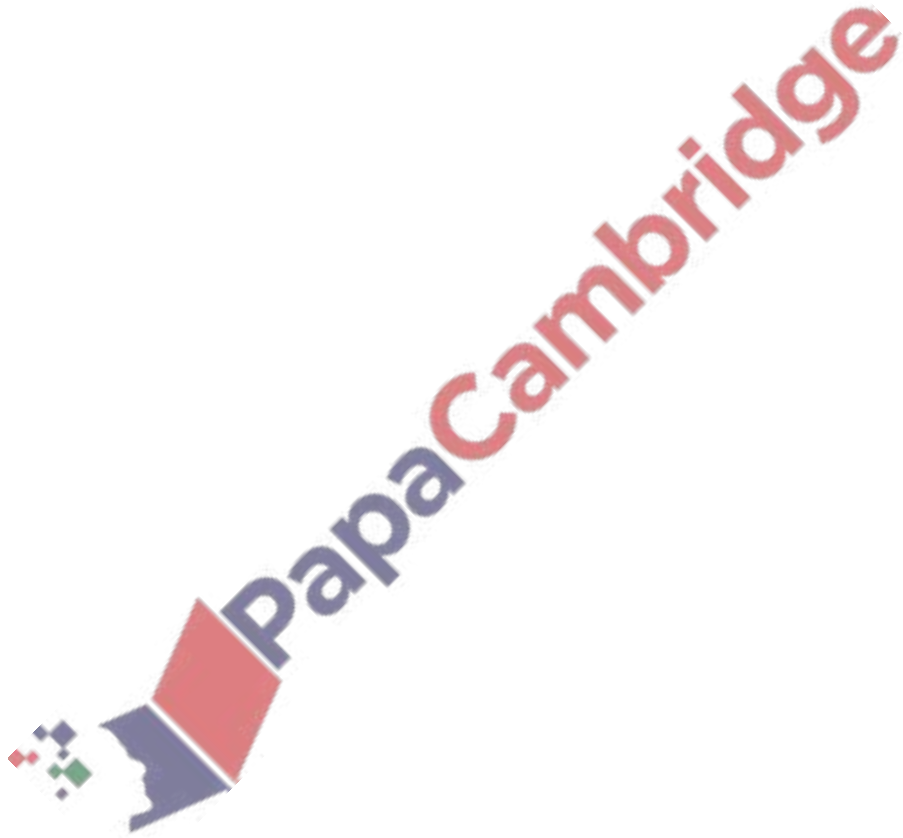
(ii) Kendra walks from K to L at a constant speed of 4.5 km/h.
She leaves K at 10 15.

Work out the time she arrives at L.

.... [3]

(c) (i) Kendra and Latika leave Latika's house at 15 00 to go to the cinema.

    (a) They walk for 20 minutes at a constant speed of 4.5 km/h.

        Work out the distance they walk.

        .... km [1]

    (b) After walking for 20 minutes, they then run a distance of 6 km at a constant speed for 40 minutes.

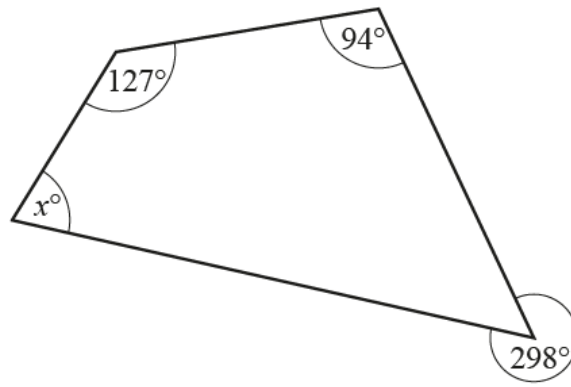   Draw their journey to the cinema on the travel graph.
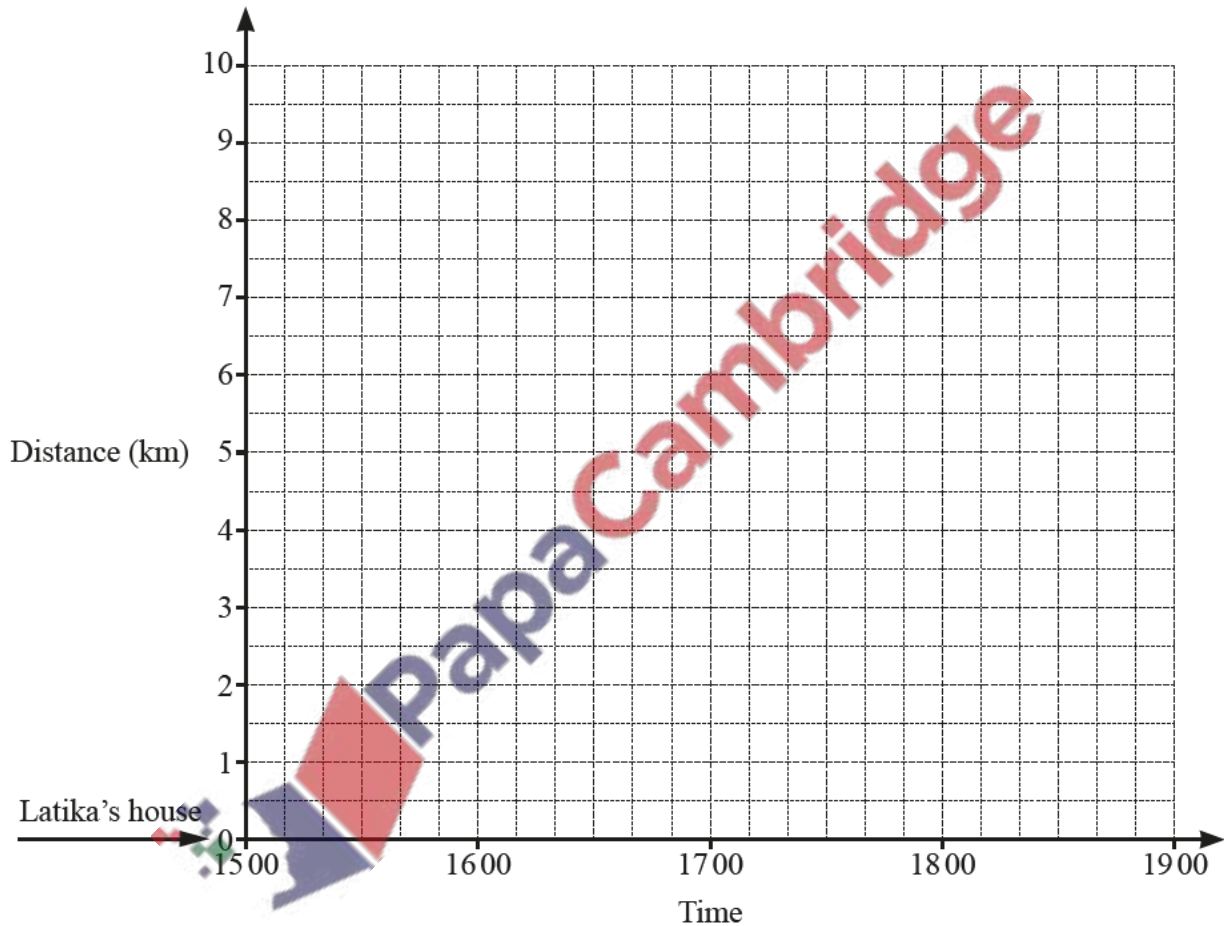
[2]

(ii) Kendra and Latika leave the cinema at 18 05.
They travel back to Latika's house in a taxi at a constant speed of 30 km/h.

Complete the travel graph.

[2]

(b)

94°

127°

x°

298°

NOT TO
SCALE

Work out the value of *x*.
Write down the two geometrical properties needed to find *x*.

1 ....

2 ....

$x =$ .... [4]

(c)

P
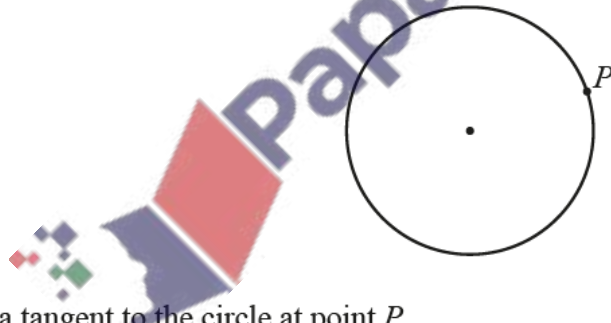
Draw a tangent to the circle at point *P*. [1]

(d) The exterior angle of a regular polygon is 24°.

Work out the number of sides of this polygon.

.... [1]

(a)
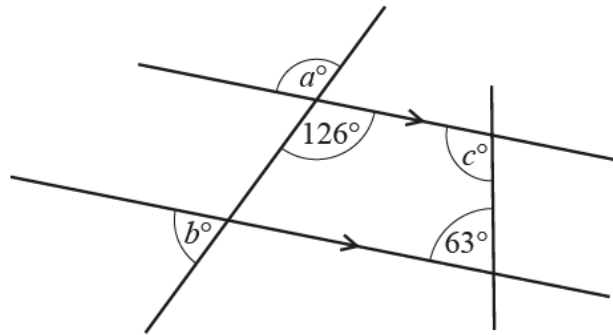
NOT TO SCALE

The diagram shows two straight lines intersecting two parallel lines.

Find the values of a, b and c.

$a =$ ....

$b =$ ....

$c =$ .... [3]

(b)
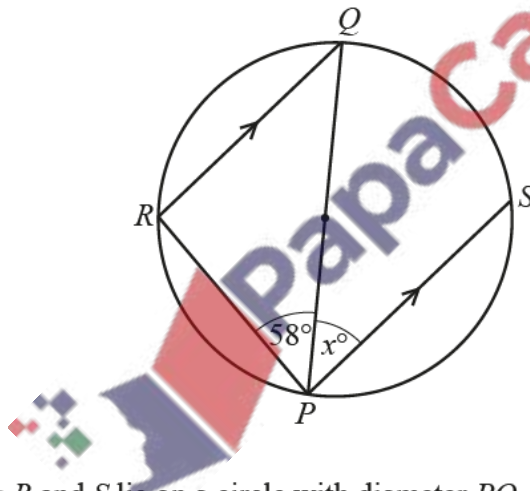
NOT TO SCALE

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

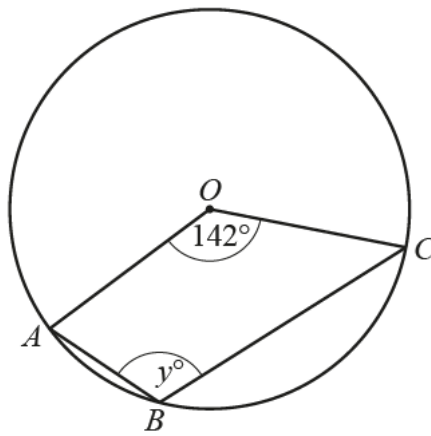Find the value of x, giving a geometrical reason for each stage of your working.

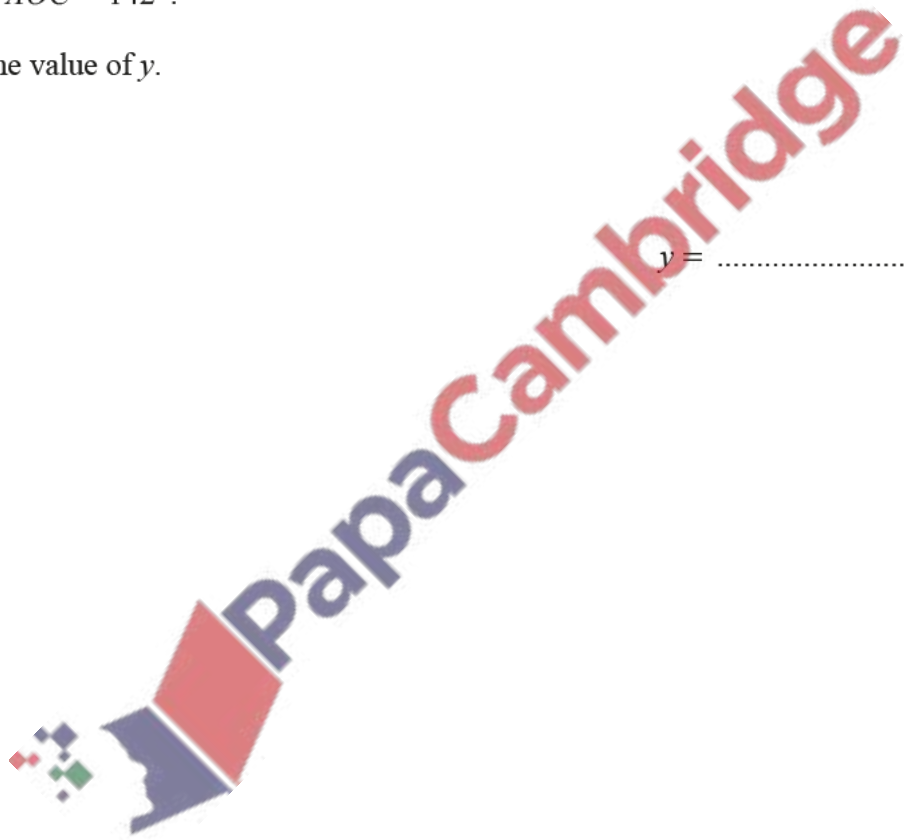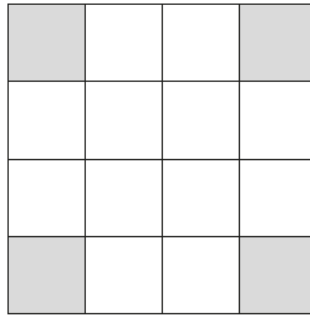..

....

....

$x =$ .... [3]

(c)

NOT TO SCALE

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

Find the value of y.

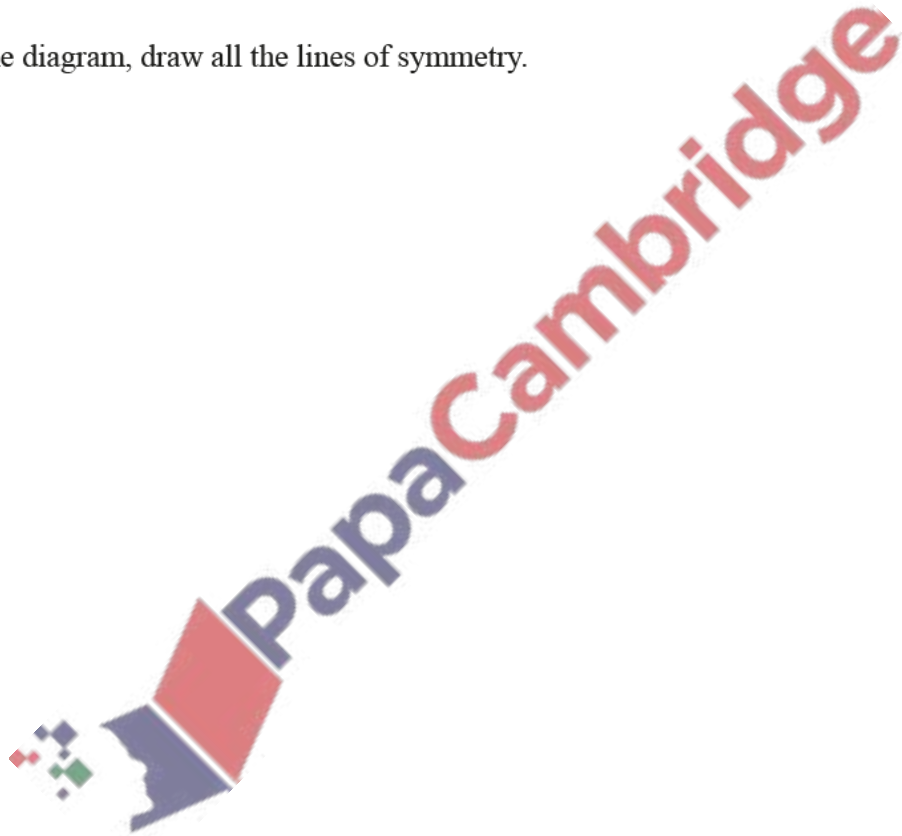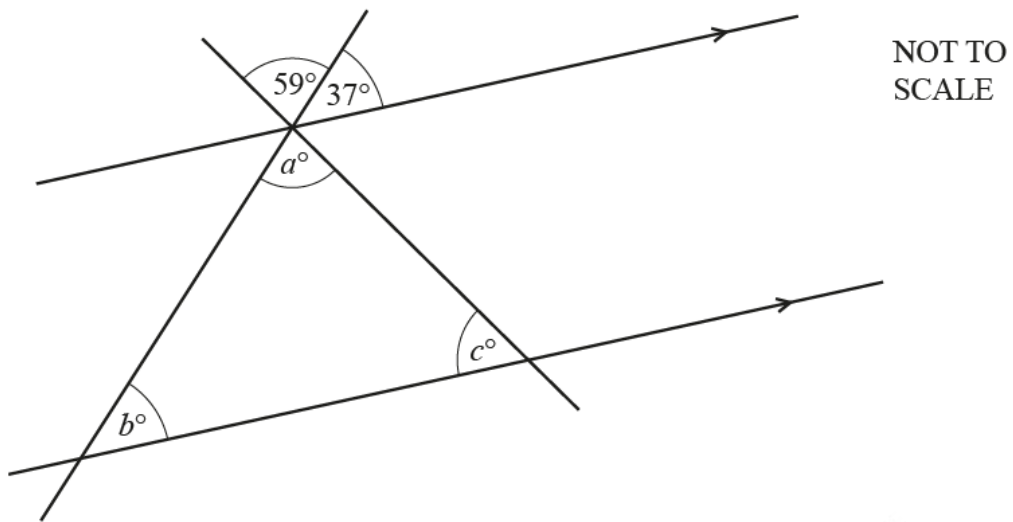$y =$ .... [2]

(a) Write down the order of rotational symmetry of this diagram.

.... [1]

(b) On the diagram, draw all the lines of symmetry. [2]

NOT TO SCALE

The diagram shows two parallel lines intersected by two straight lines.

Find the values of a, b and c.

$a =$ ....
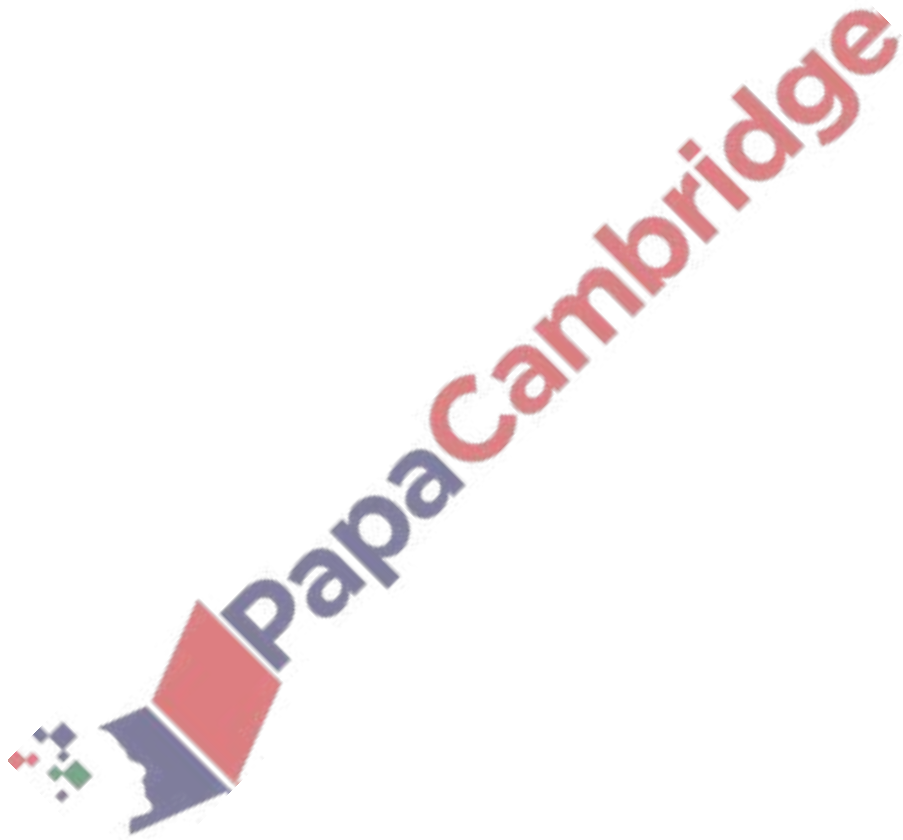
$b =$ ....

$c =$ .... [3]

41.

(a) Write down the mathematical name for a polygon with 5 sides.

.... [1]

(b) Work out the interior angle of a regular 18-sided polygon.

.... [2]
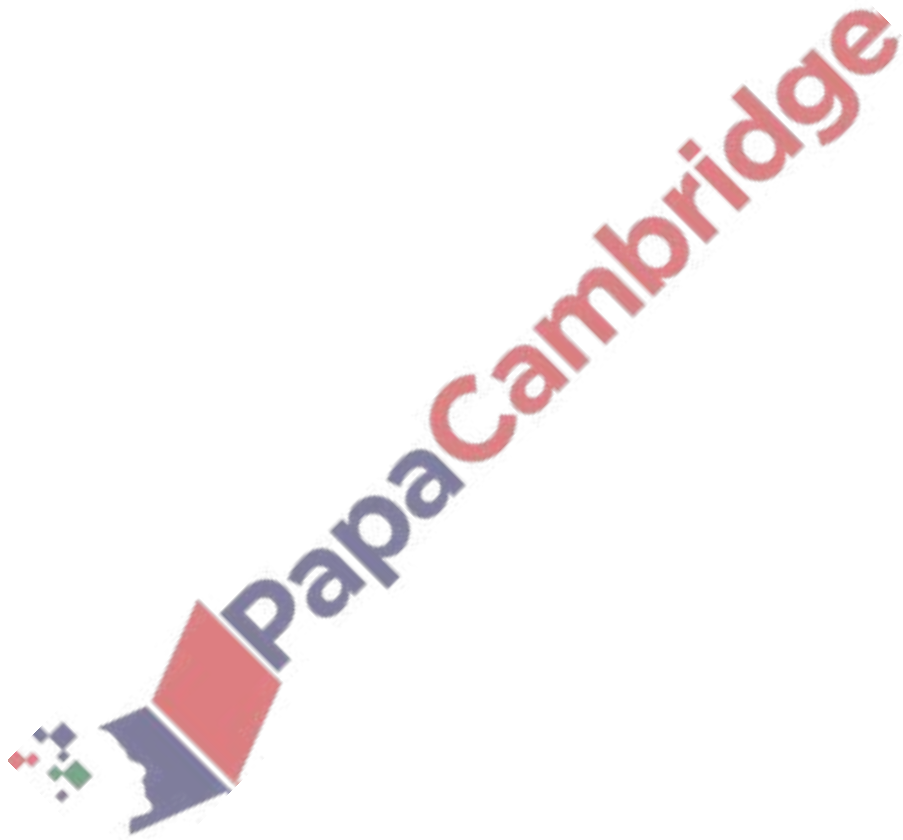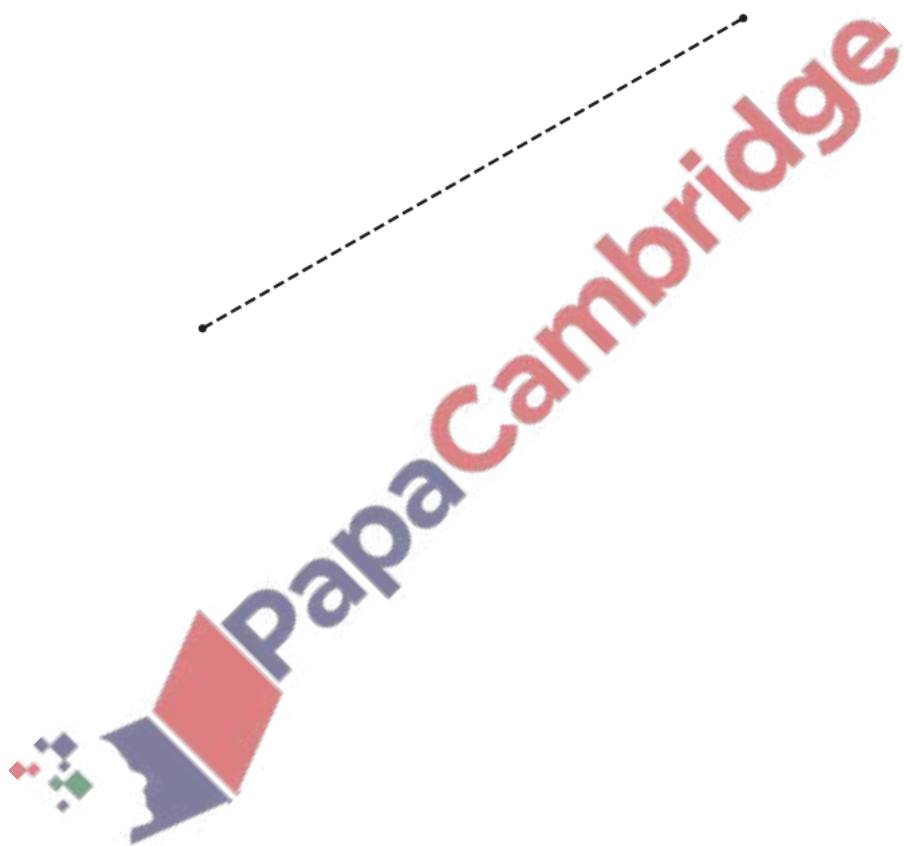
53
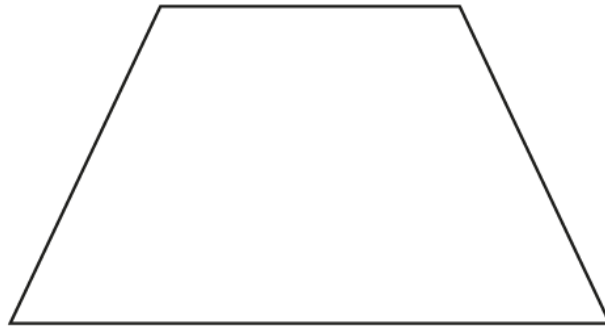
Draw the line of symmetry on this shape. [1]

A rhombus has side length 6.5 cm.
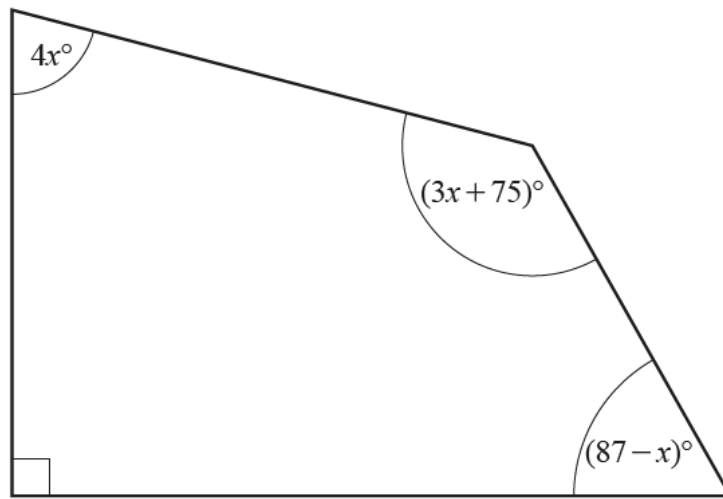The rhombus can be constructed by drawing two triangles.

Using a ruler and compasses only, construct the rhombus.
Leave in your construction arcs.
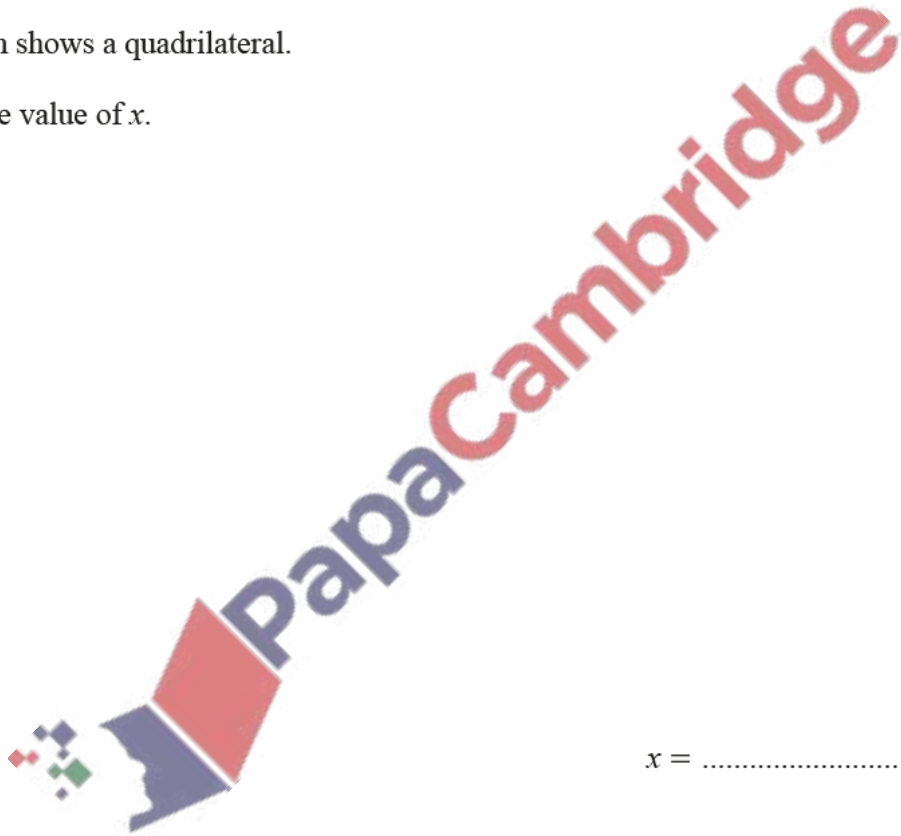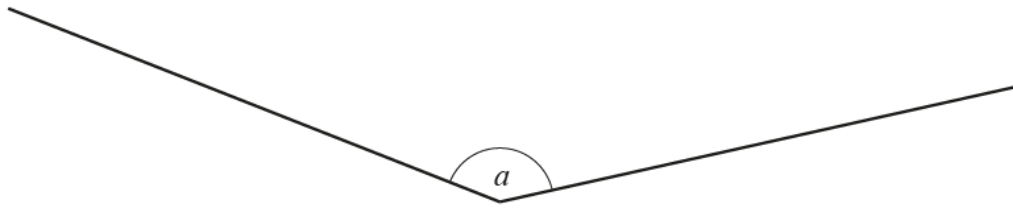One diagonal of the rhombus has been drawn for you.

[2]

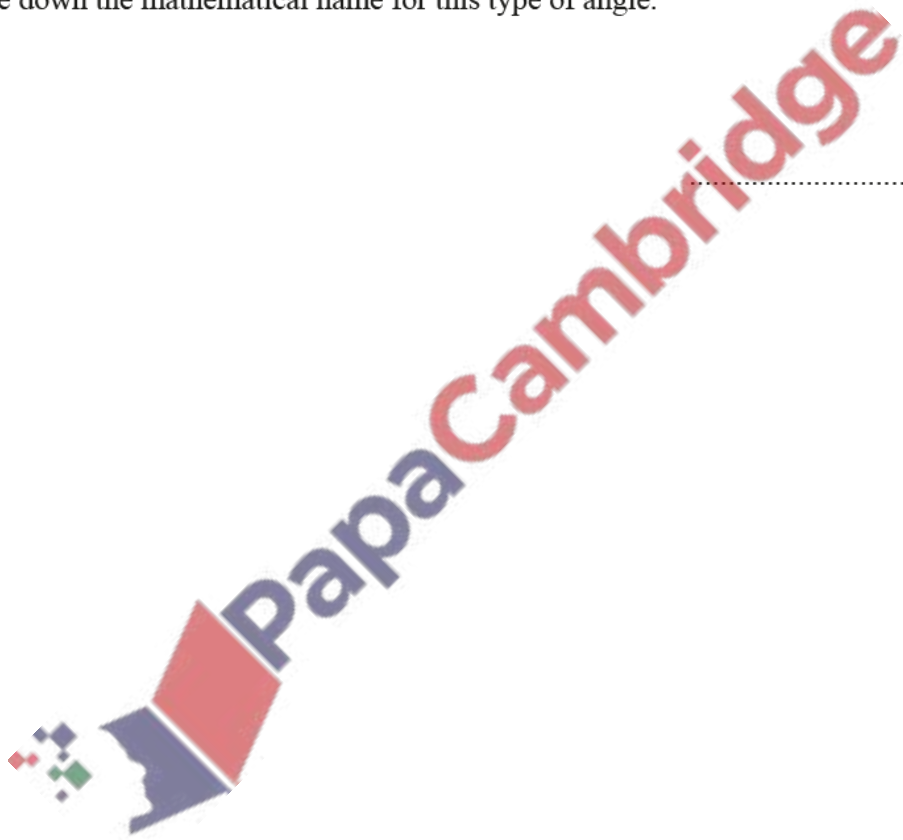The diagram shows a quadrilateral.

Work out the value of x.

$x =$ .... [4]

(a) Measure angle a.

.... [1]

(b) Write down the mathematical name for this type of angle.

.... [1]

56
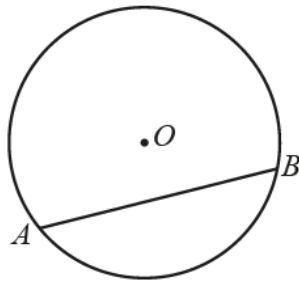
NOT TO SCALE

Points A and B lie on a circle, centre O.

(a) Write down the mathematical name for line AB.

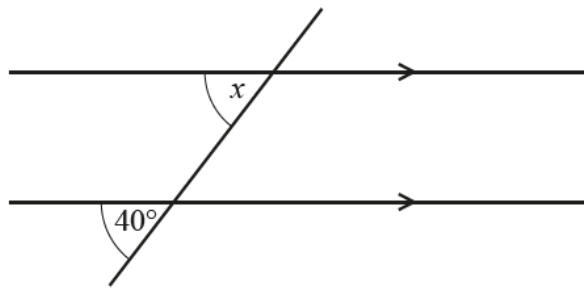.. [1]

(b) The circle has a diameter of 16.8 cm.

Write down the radius of the circle.
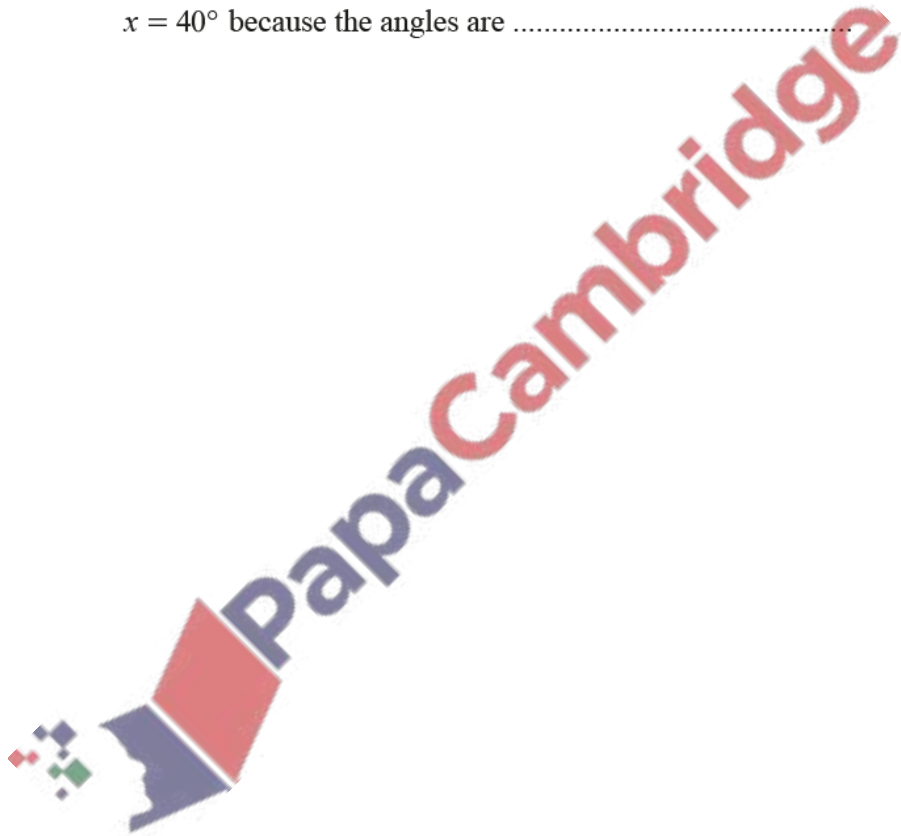
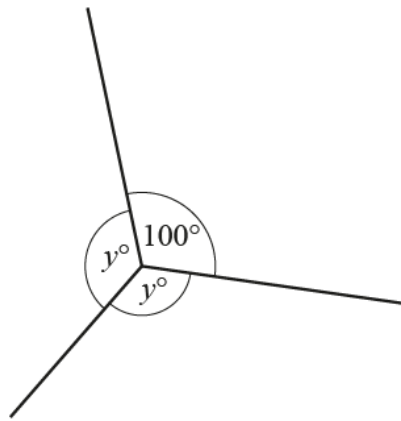... cm [1]
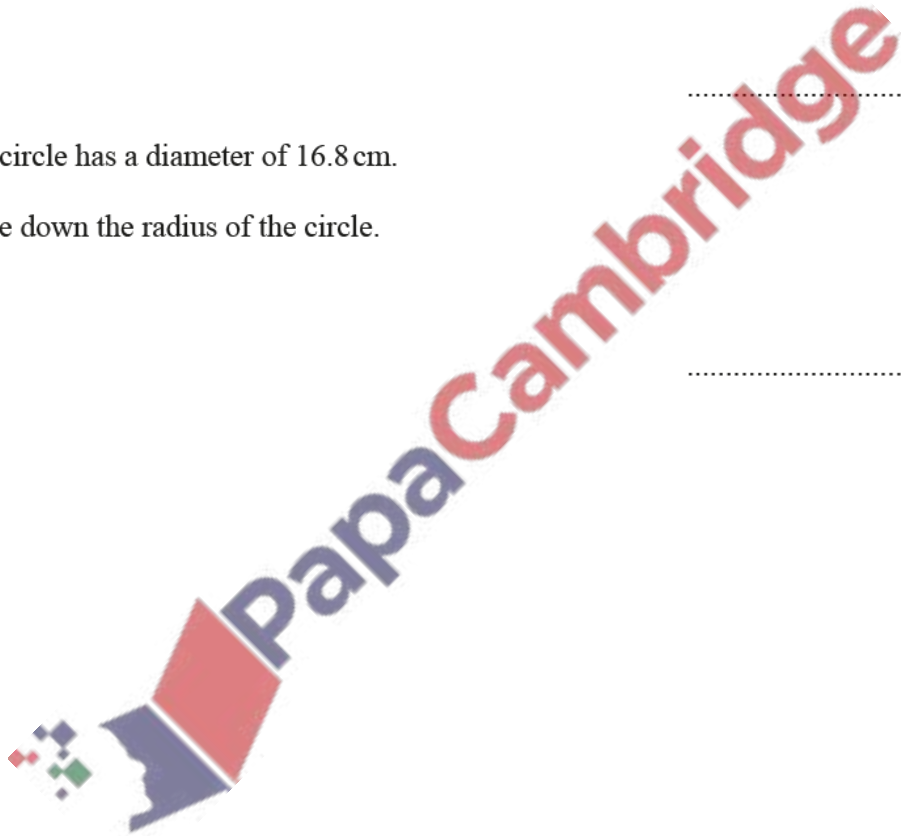
NOT TO SCALE

The diagram shows a pair of parallel lines and a straight line.

Complete the statement with the correct geometrical reason.

$x = 40°$ because the angles are .... [1]
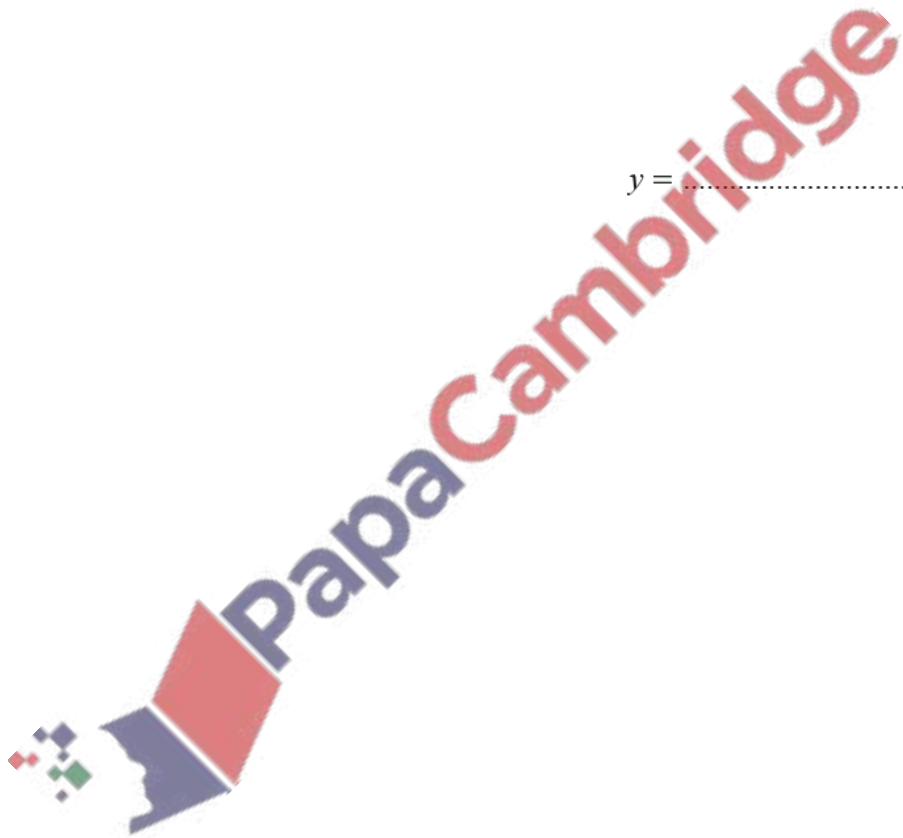
NOT TO
SCALE

Find the value of y.

$y =$ .... [2]

49.

The exterior angle of a regular polygon is 36°.

Find how many sides this polygon has.

.... [1]
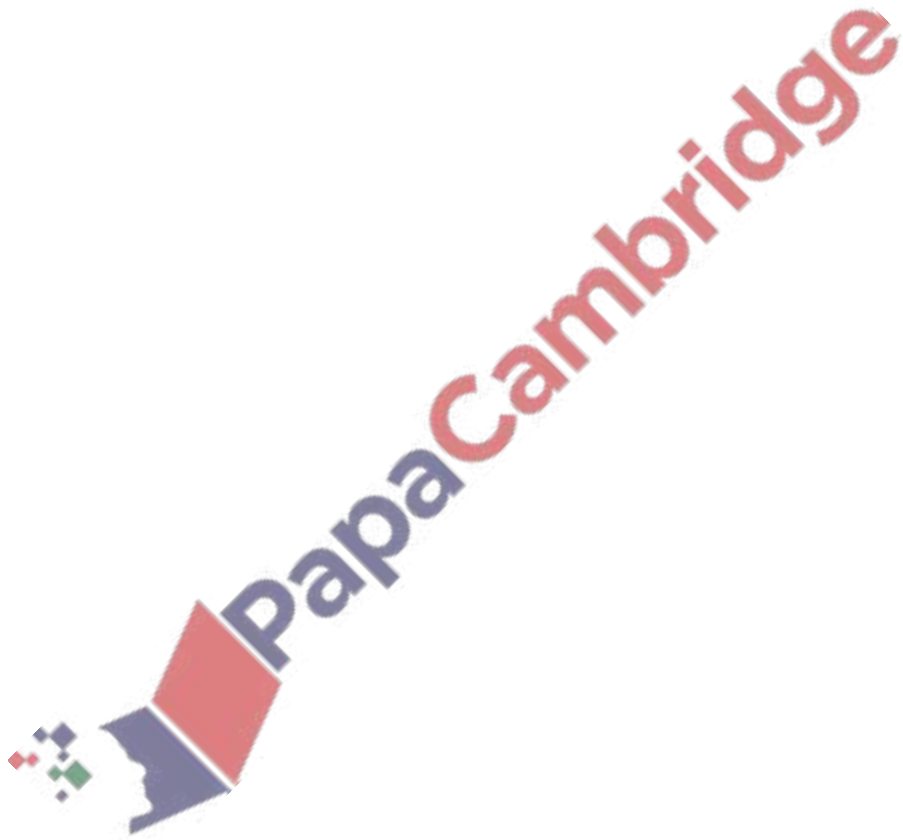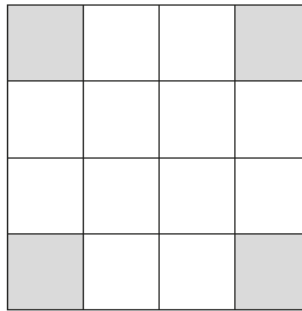
(a) Write down the order of rotational symmetry of this diagram.

.... [1]

(b) On the diagram, draw all the lines of symmetry. [2]
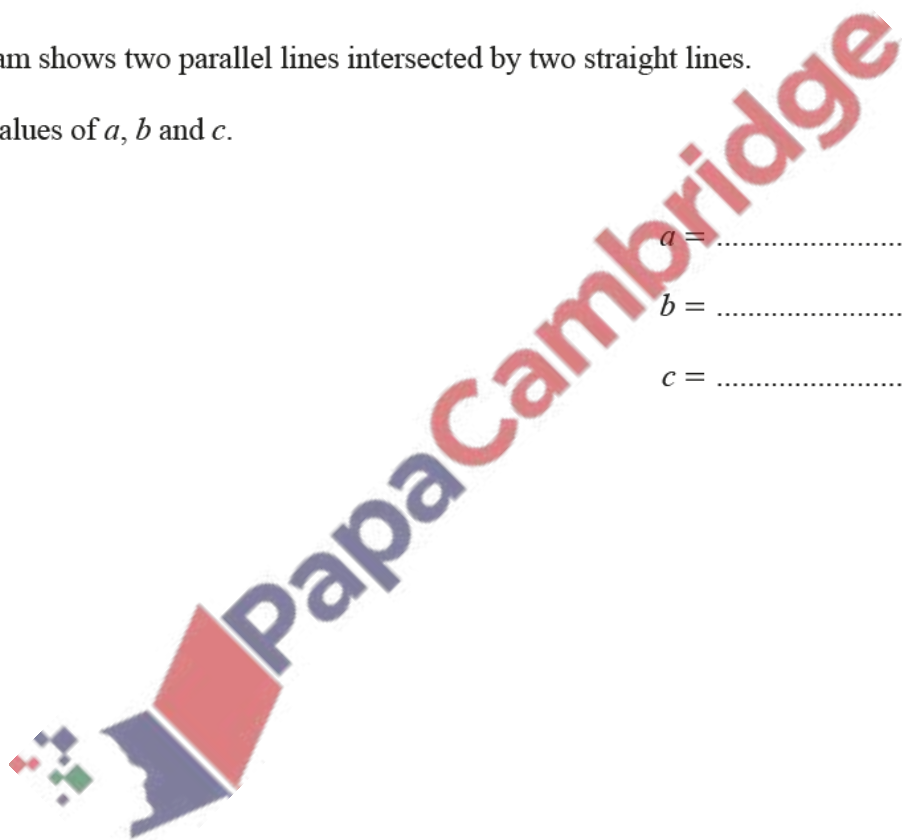
The diagram shows two parallel lines intersected by two straight lines.

Find the values of a, b and c.

$a = $ ....

$b = $ ....

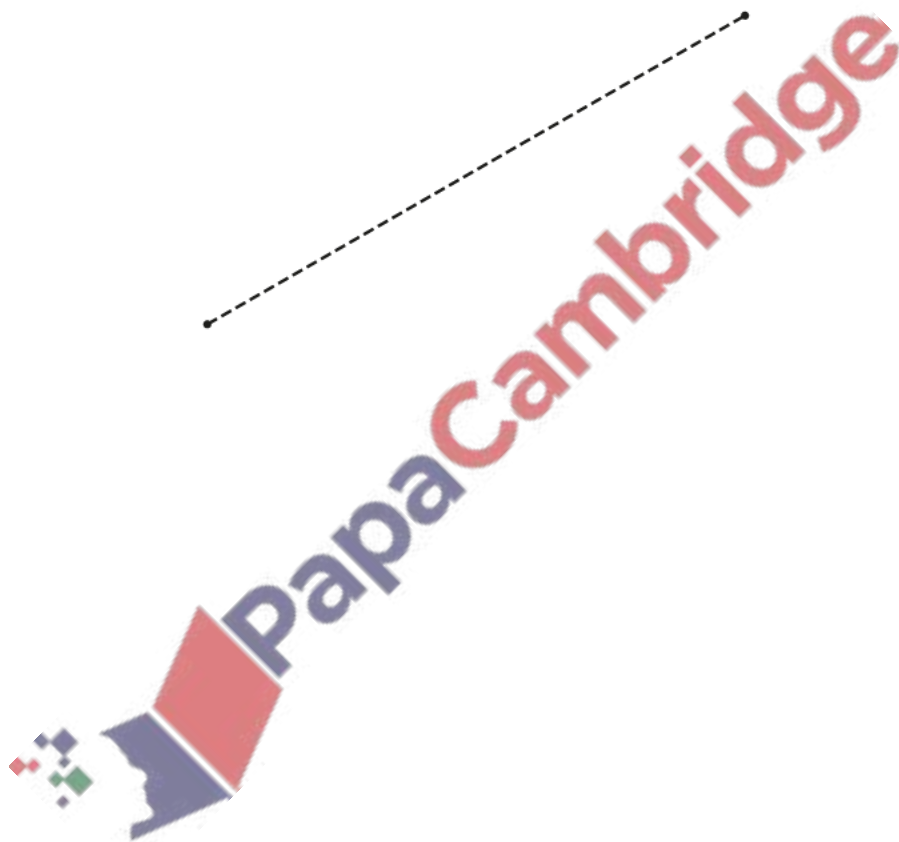$c = $ .... [3]
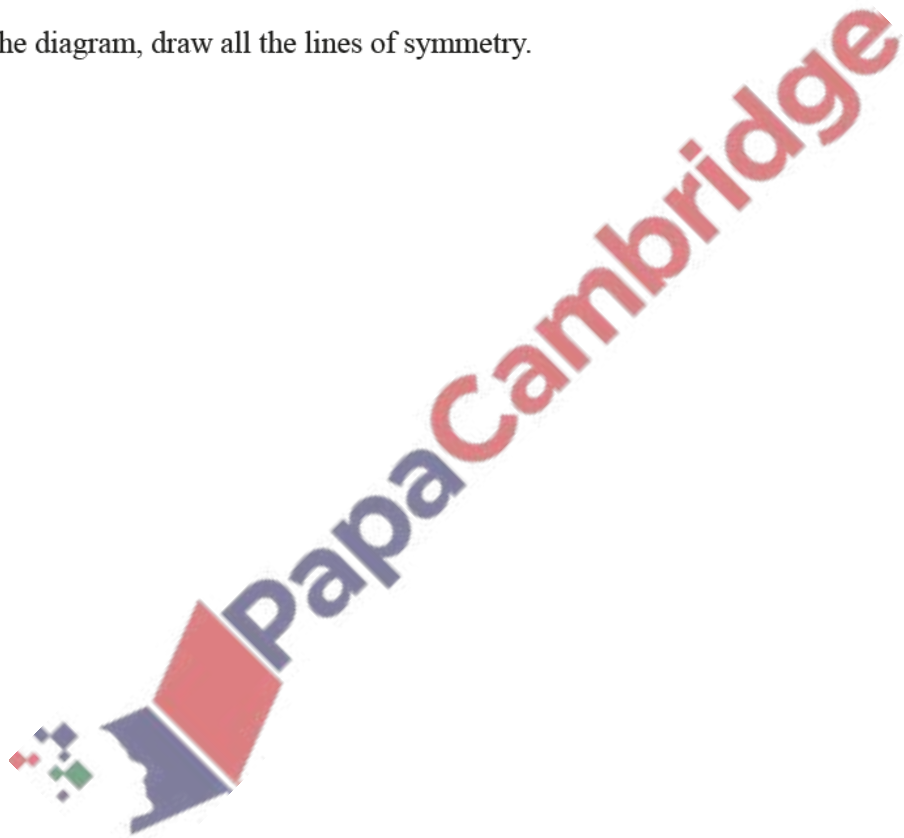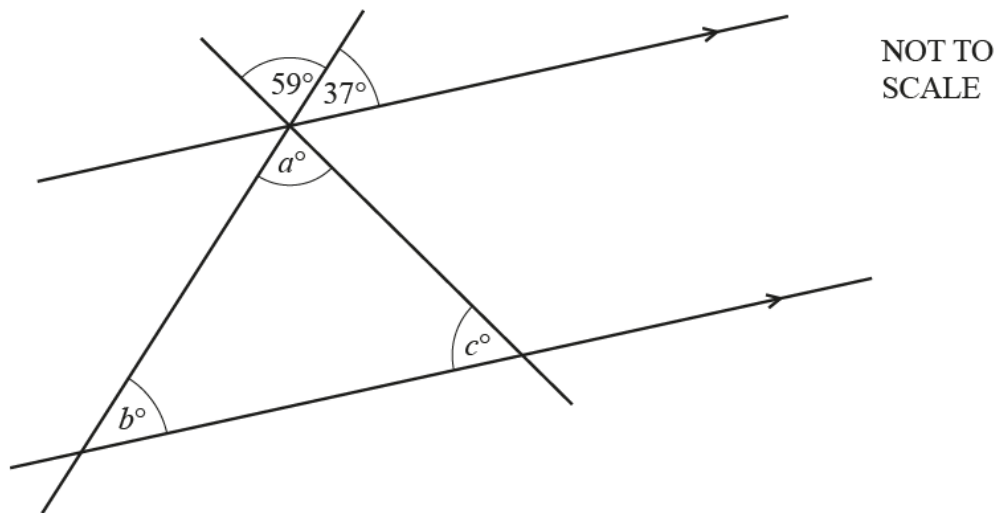
A rhombus has side length 6.5 cm.
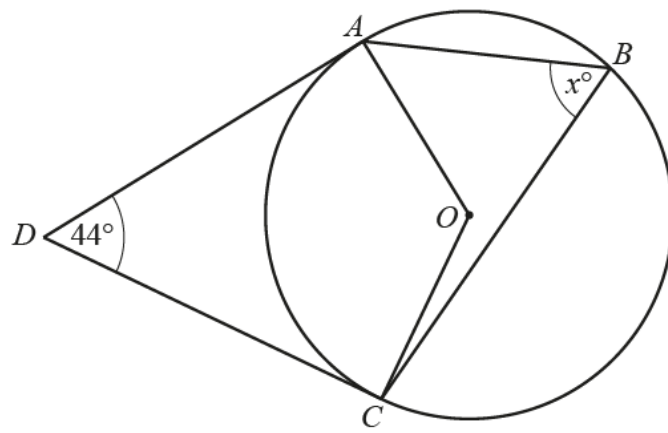The rhombus can be constructed by drawing two triangles.

Using a ruler and compasses only, construct the rhombus.
Leave in your construction arcs.
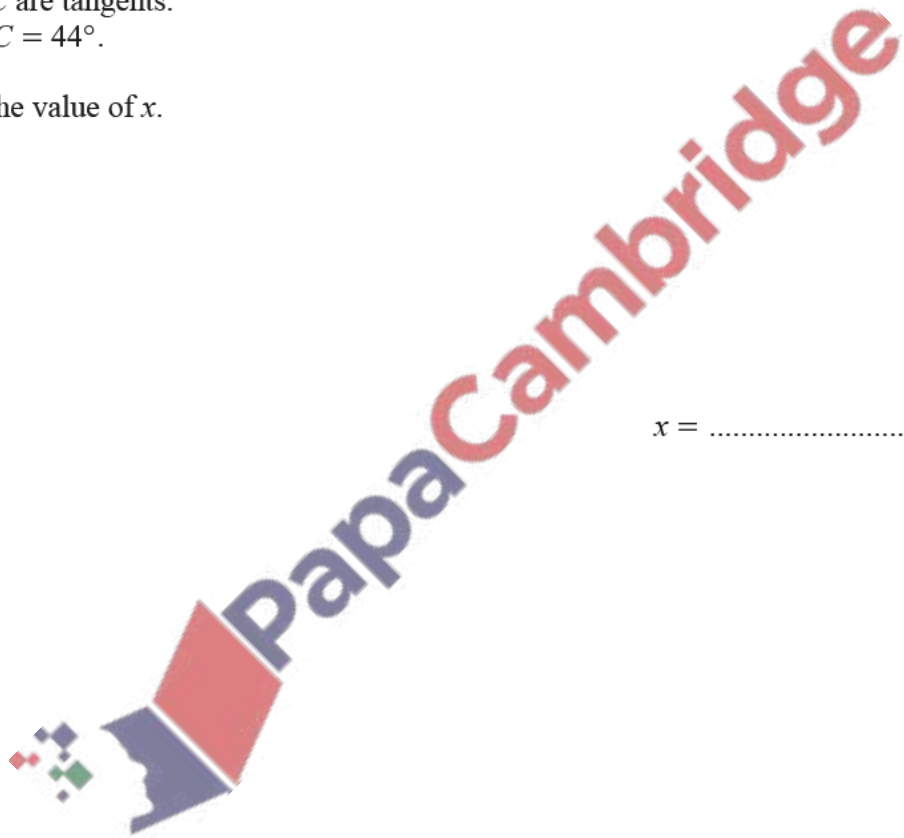One diagonal of the rhombus has been drawn for you.

[2]

NOT TO SCALE

A, B and C are points on a circle, centre O.
DA and DC are tangents.
Angle $ADC = 44°$.

Work out the value of x.

$x =$ .... [3]
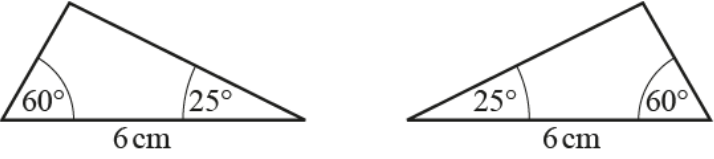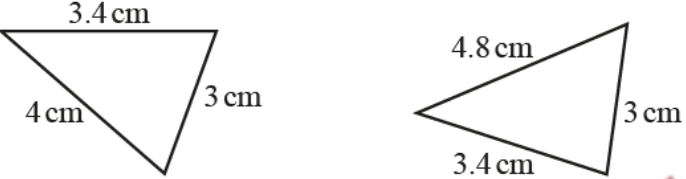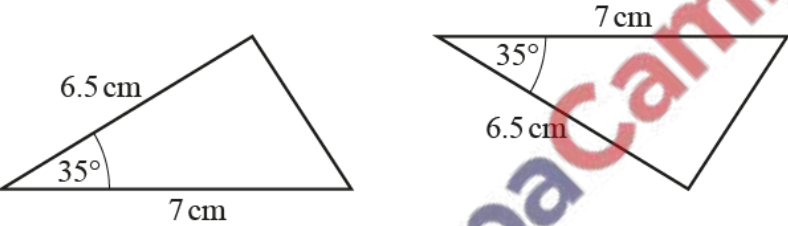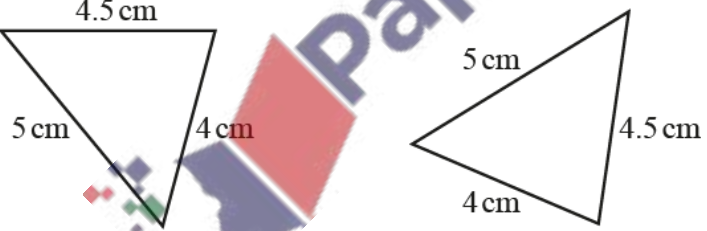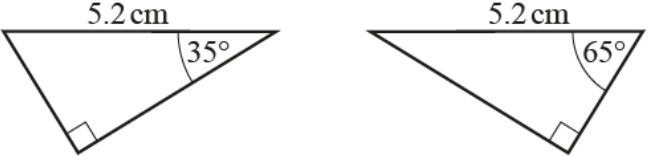
Complete the table showing information about the congruence of pairs of triangles.
The first two rows have been completed for you.
All diagrams are not to scale.

Pair of triangles		Congruent or not congruent	Congruence criterion
		Congruent	ASA
		Not congruent	None

[3]
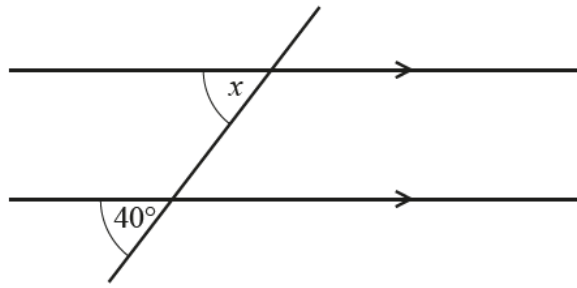
NOT TO
SCALE

The diagram shows a pair of parallel lines and a straight line.

Complete the statement with the correct geometrical reason.

$x = 40°$ because the angles are .... [1]

NOT TO
SCALE

Find the value of y.

$y = $ .... [2]
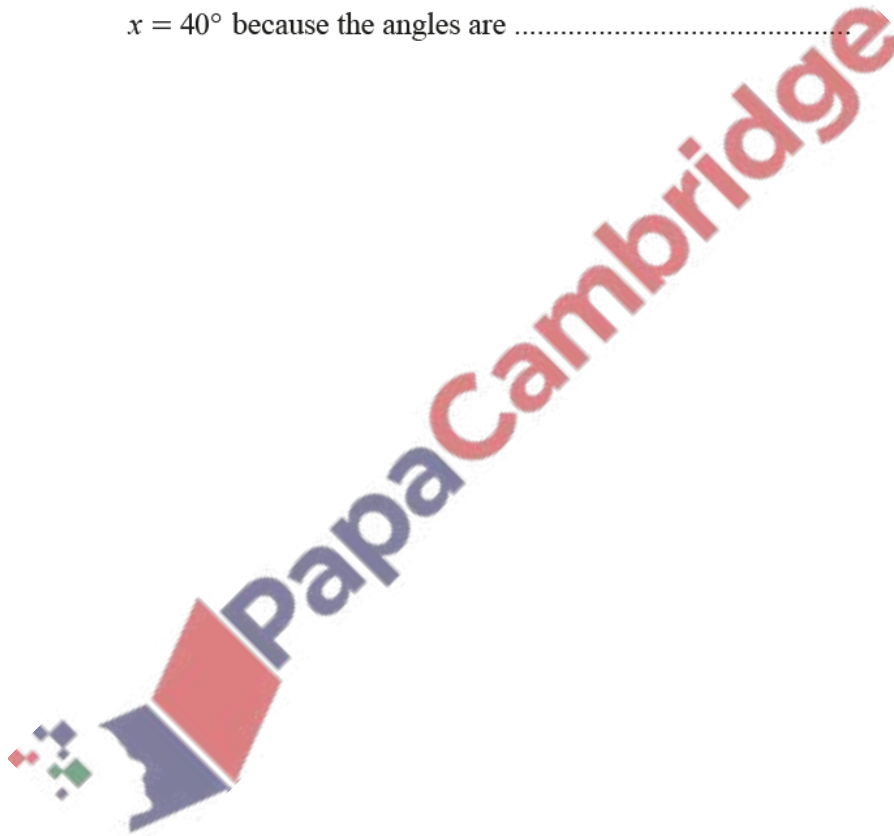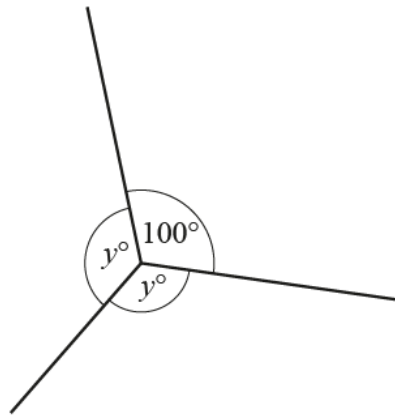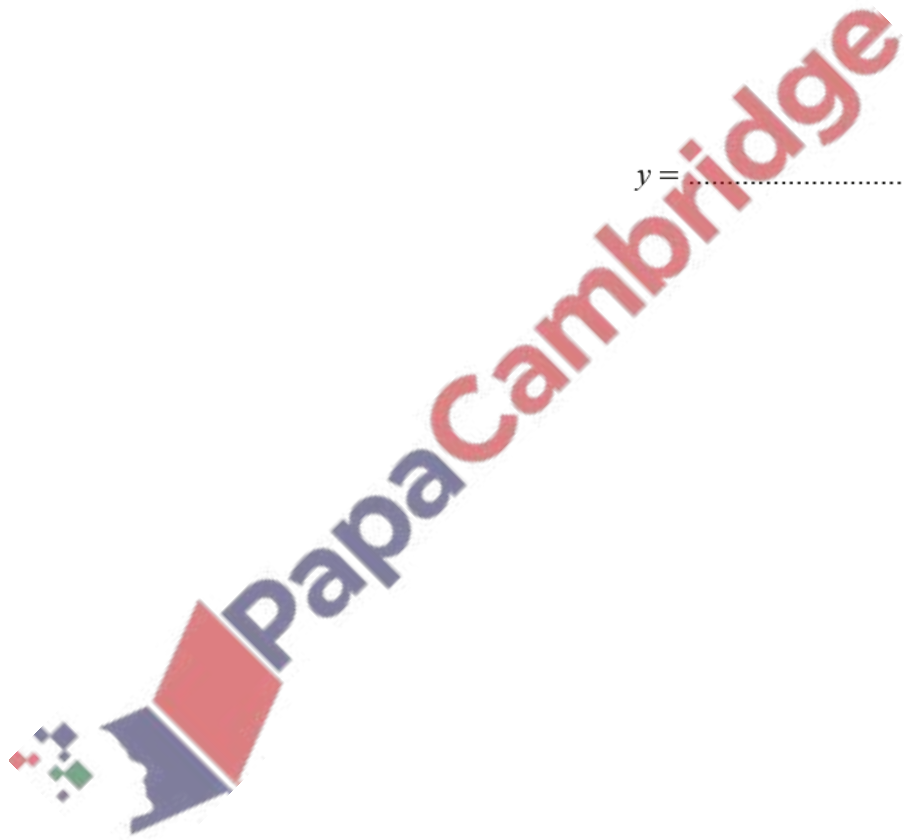
The sides of a regular hexagon are 80 mm, correct to the nearest millimetre.

Calculate the lower bound of the perimeter of the hexagon.

.... mm [2]

58.

The interior angle of a regular polygon is 175°.

Calculate the number of sides.

.... [2]

(a)
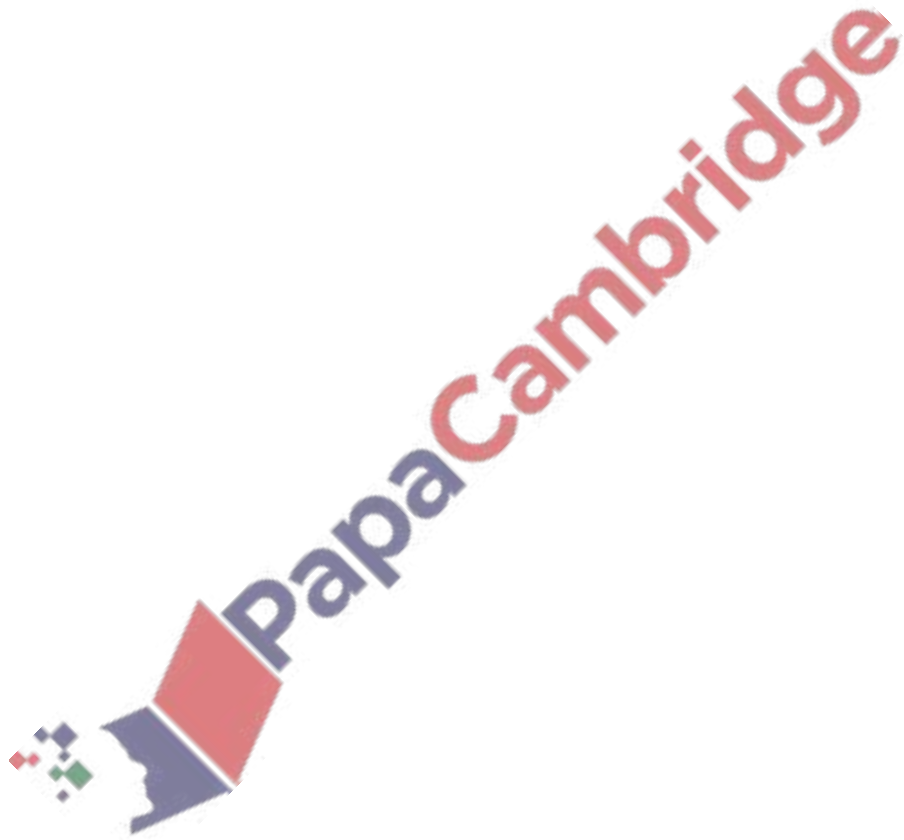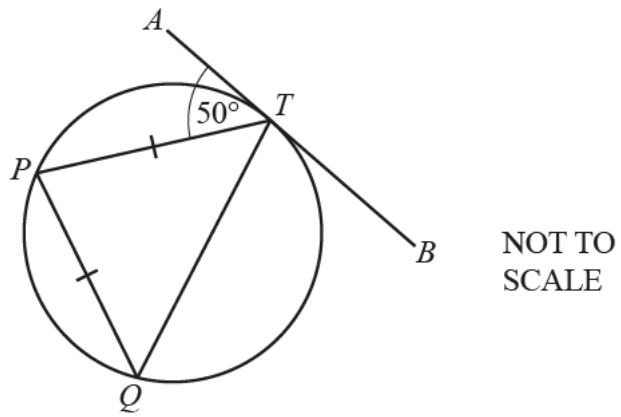
NOT TO SCALE

P, Q and T are points on a circle.
ATB is a tangent to the circle at T and $PT = PQ$.

Find angle TPQ.

Angle TPQ = ... [2]

(b)
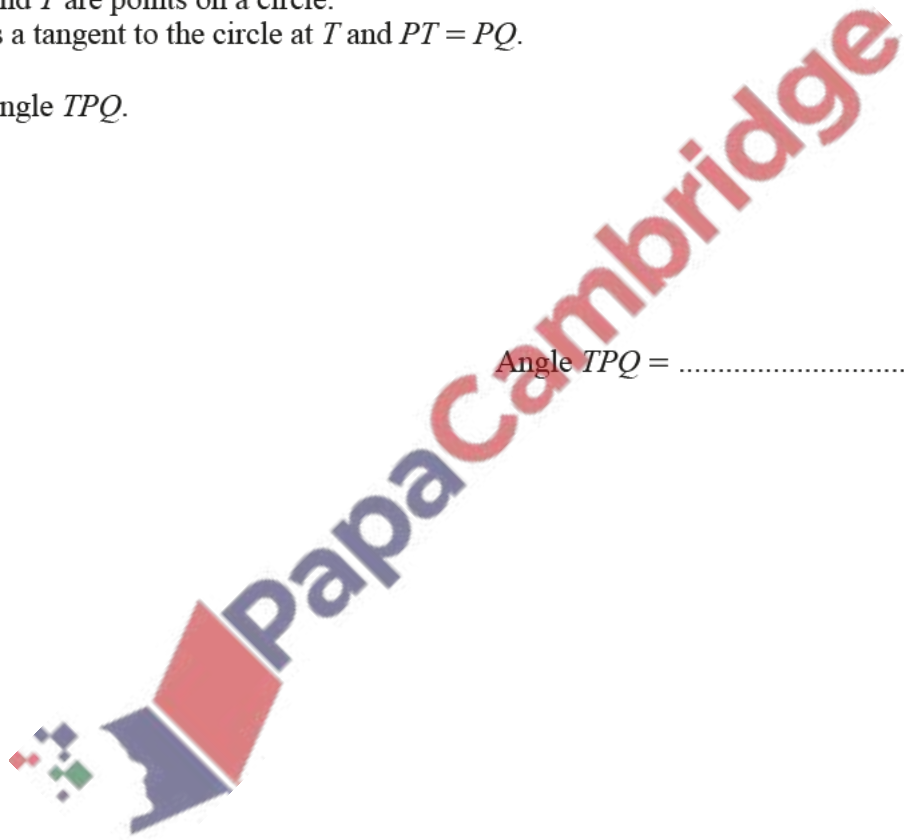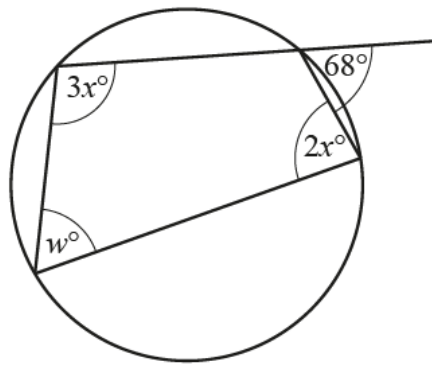
NOT TO
SCALE

The diagram shows a cyclic quadrilateral with an exterior angle of 68°.

Find the value of w and the value of x.

$w =$ ....

$x =$ .... [3]
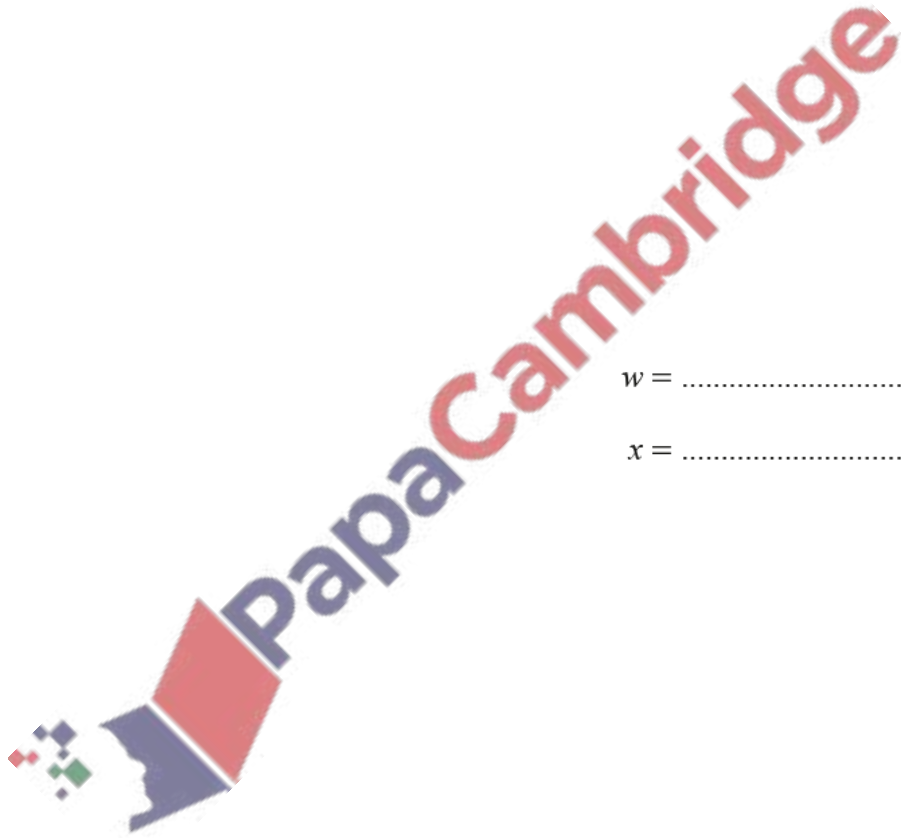
The scale drawing shows the position of town R on a map.
The scale is 1 centimetre represents 5 kilometres.

North

R
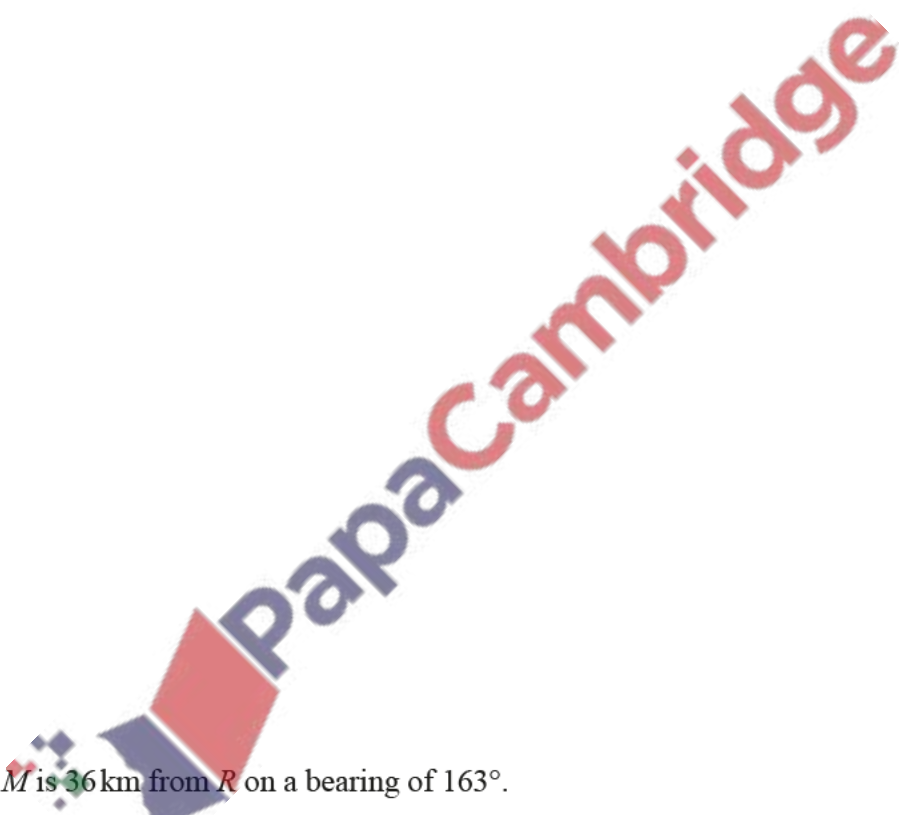
Scale : 1 cm to 5 km

(a) Town M is 36 km from R on a bearing of 163°.

Mark the position of M on the map.

[2]

(b) A railway track, 36 km long, is to be built in a straight line from R to M.

   (i) The track costs $1070 per metre to build.

      Work out the cost of building the track.

$ .... [2]

   (ii) 15 people can build 60 metres of track per day.

      Work out how many days it will take 45 people to build the whole track.

.... days [3]

(c) Trains will travel the 36 km at an average speed of 75 km/h.

   Work out the journey time.
   Give your answer in minutes.

.... min [2]

(d) Town K is on a bearing of $312°$ from R.

   Work out the bearing of R from K.

.... [2]

(a) The scale drawing shows the positions of house A and house B.
The scale is 1 centimetre represents 12 metres.

North

North

B

A
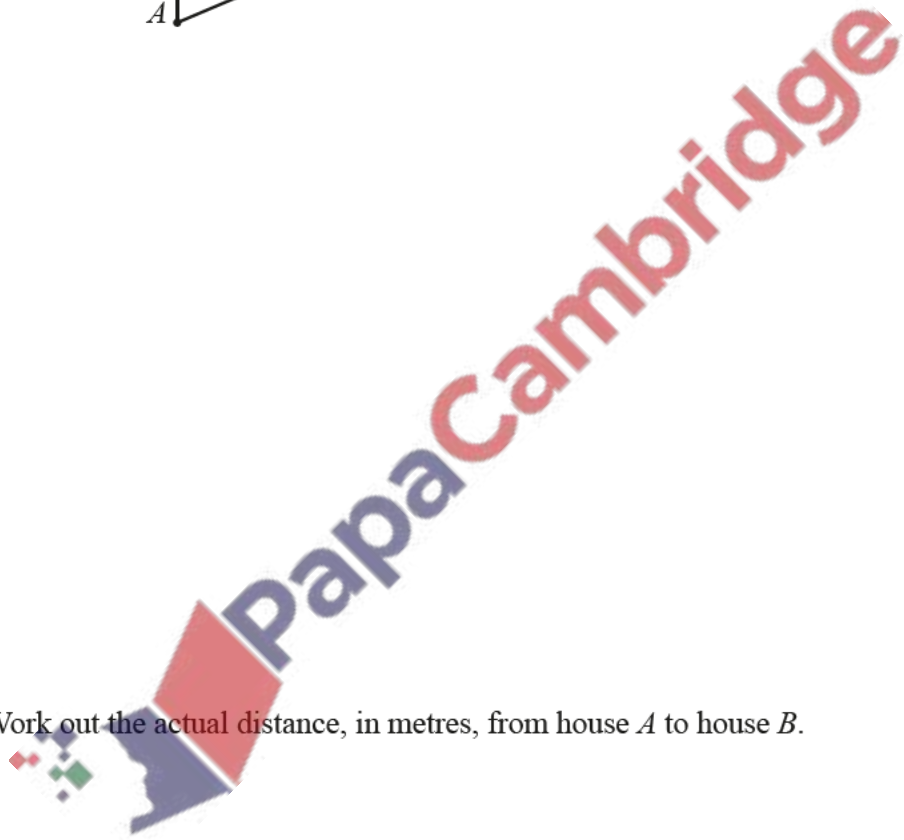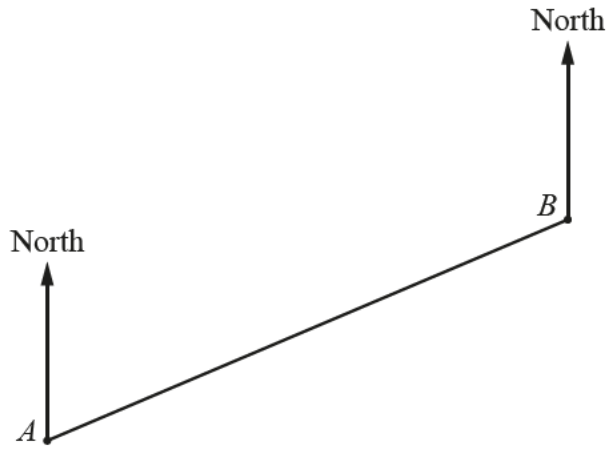
Scale: 1 cm to 12 m

(i) Work out the actual distance, in metres, from house A to house B.

.... m [2]

(ii) Measure the bearing of house A from house B.

.... [1]

74

(iii) Another house, C, is 102 metres from house B on a bearing of 157°.

On the scale drawing, mark the position of house C.

[3]

(b)

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]

(a)
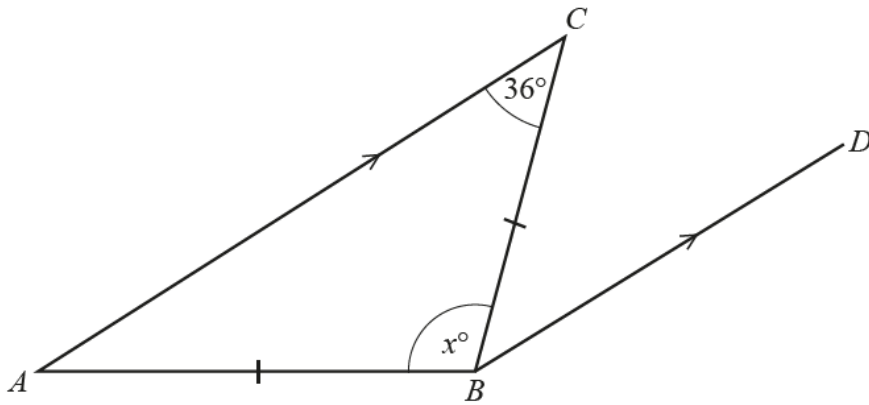
The diagram shows a triangle ABC and a line BD.
$AB = BC$ and AC is parallel to BD.

(i) Angle $ACB = 36°$.
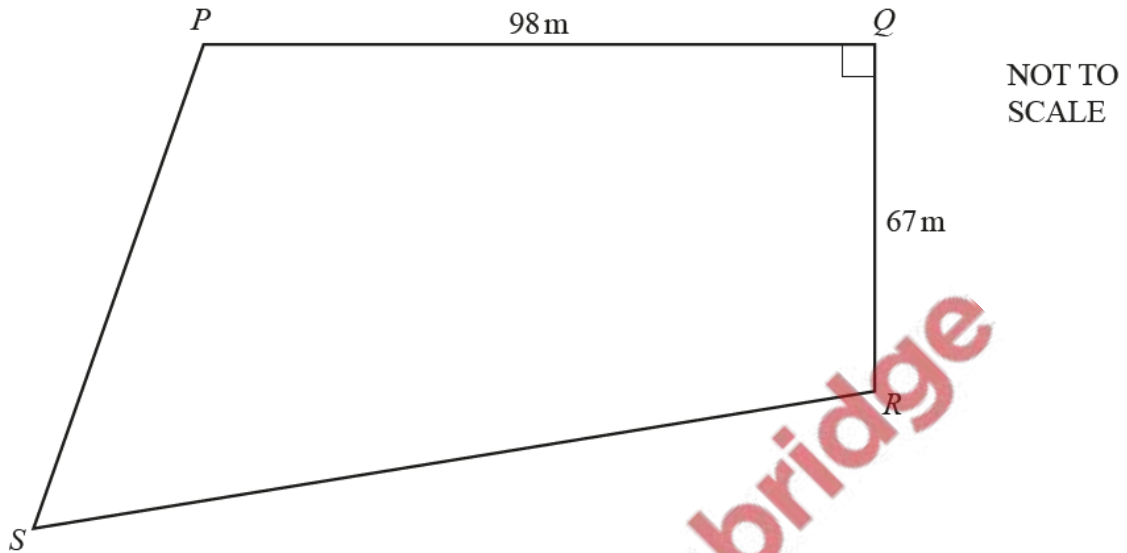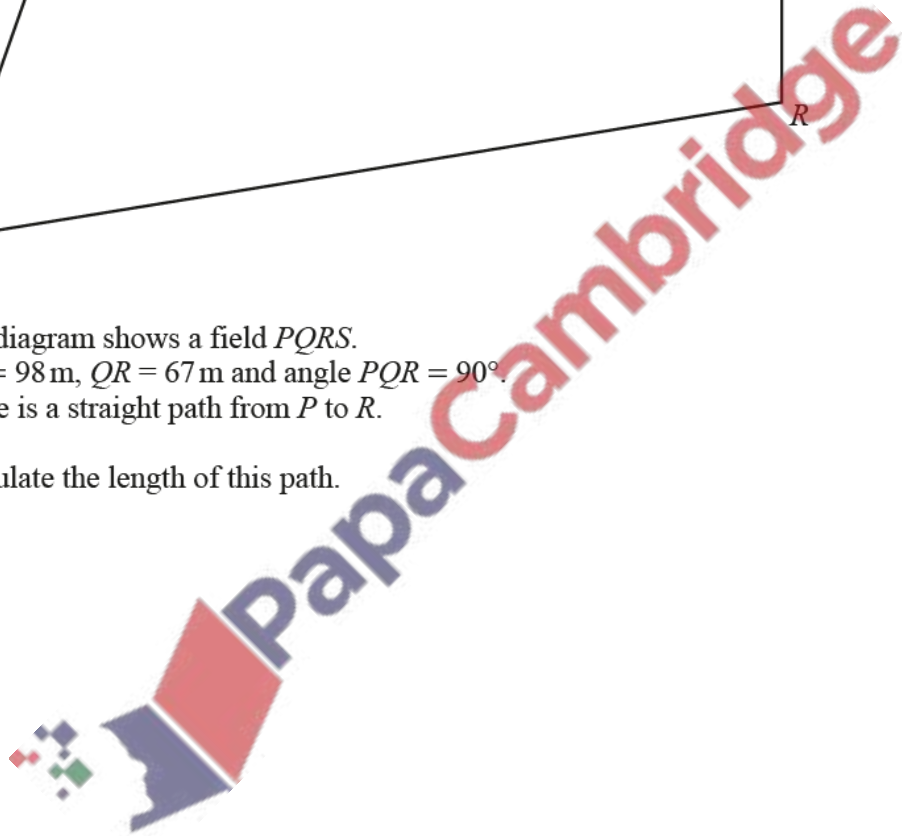
Write down the mathematical name for this type of angle.

.... [1]

(ii) Write down the mathematical name for triangle ABC.

.... [1]

(iii) Work out the value of x.

$x = $ .... [2]

(iv) Find angle CBD.
Give a geometrical reason for your answer.

Angle $CBD = $ .... because ....

.... [2]

(b)
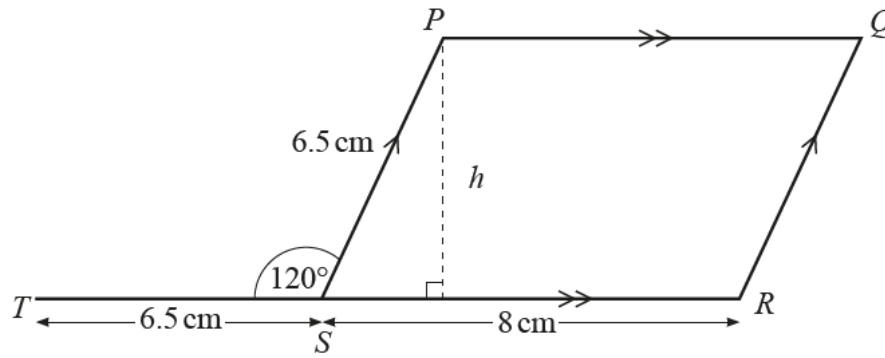
The diagram shows a quadrilateral, *PQRS*.
PQ is parallel to *SR* and *SP* is parallel to *RQ*.
TSR is a straight line.
SR = 8 cm, *PS* = *ST* = 6.5 cm and angle *PST* = 120°.

(i) Write down the mathematical name of quadrilateral *PQRS*.

.... [1]

(ii) Work out the perimeter of quadrilateral *PQRS*.

.... cm [1]

(iii) Find angle *PSR*.
Give a reason for your answer.

Angle *PSR* = ... because ....

.... [2]

(iv) *PS* and *ST* are two sides of a regular polygon.

Work out the number of sides of this regular polygon.

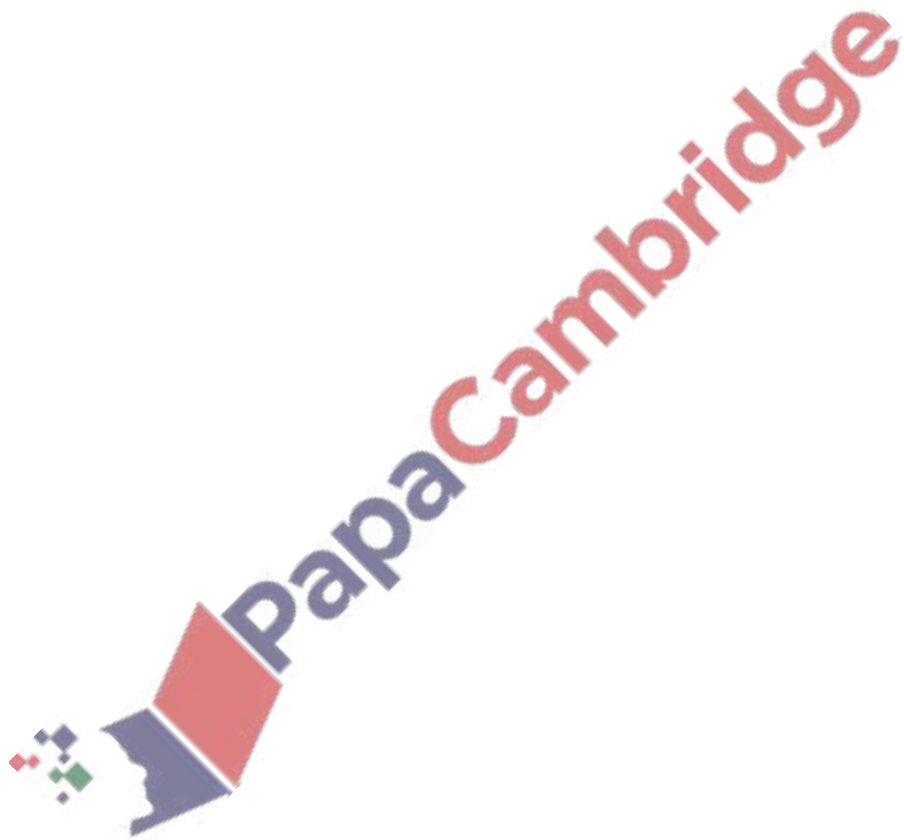.. [1]

(v) Show that the height, *h*, of the quadrilateral *PQRS* is 5.63 cm, correct to 2 decimal places.

[2]

(vi) Work out the area of quadrilateral *PQRS*.

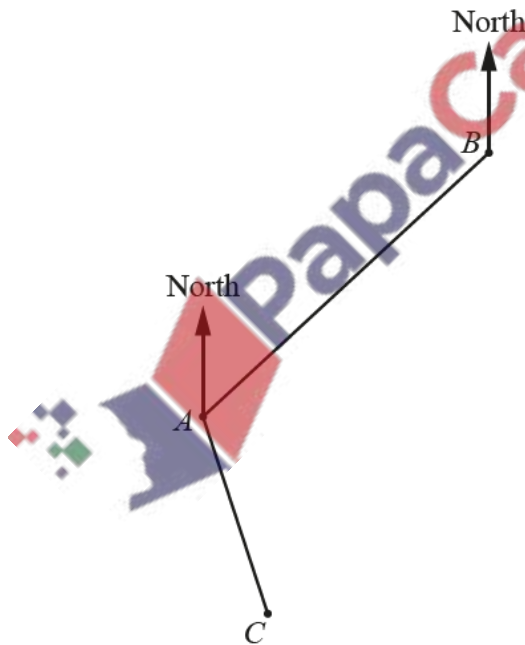.. cm^2 [2]

(a)
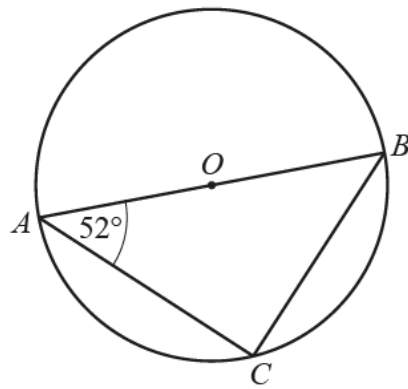
NOT TO SCALE

AB is the diameter of a circle, centre *O*.
C is a point on the circle and angle *BAC* = 52°.

Find angle *ABC*.

Angle *ABC* = ... [2]

(b) The diagram shows the positions of town *A*, town *B* and town *C*.

NOT TO SCALE

The bearing of town *B* from town *A* is 042°.
The bearing of town *C* from town *A* is 146°.

(i) Find angle *BAC*.

Angle *BAC* = ... [2]

(ii) Find the bearing of town A from town B.

.... [2]

(c)
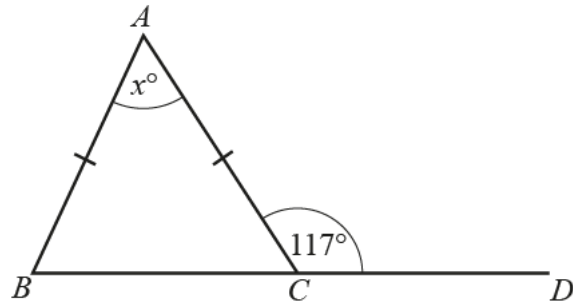
NOT TO
SCALE

Triangle ABC is isosceles with $AB = AC$.
BCD is a straight line and angle $ACD = 117°$.

Find the value of x.

$x = $ .... [3]