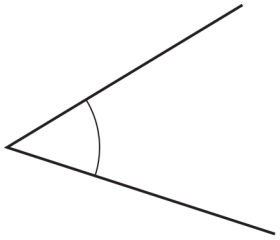
Topical Worksheets for Cambridge O LEVEL Mathematics D (4024)

Geometry

1st edition, for examination until 2025

1

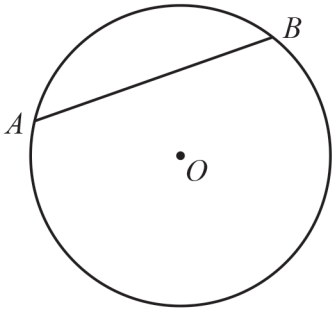


Write down the mathematical name for this type of angle.

..... [1]

[Total: 1]

2



NOT TO SCALE

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

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

..... [1]

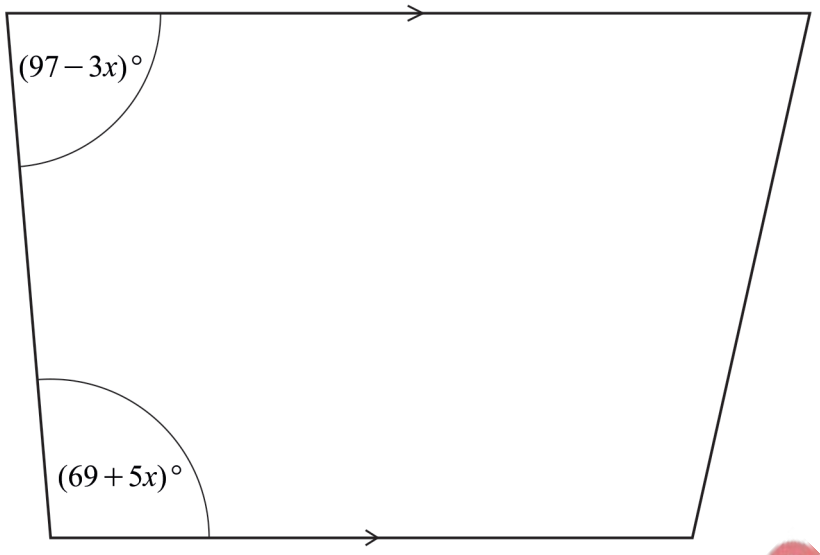
(b) *OA* = 8 cm

Write down the length of the diameter of this circle.

..... cm [1]

[Total: 2]

3 The diagram shows a trapezium.



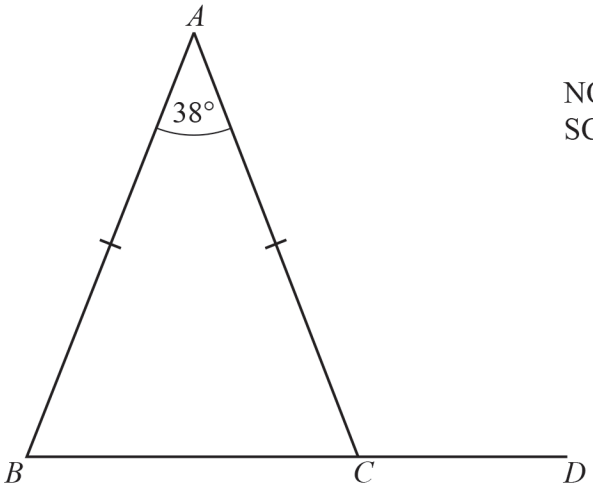
NOT TO SCALE

Work out the value of x.

x = ... [3]

[Total: 3]

4



NOT TO SCALE

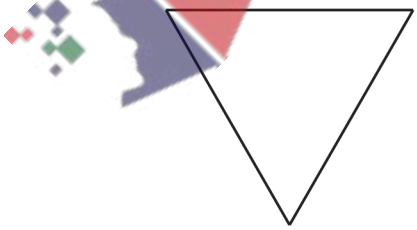
In the triangle ABC, $AB = AC$ and angle $BAC = 38°$.
BCD is a straight line.

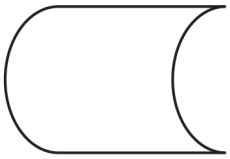
Work out angle ACD.

Angle ACD = ... [3]

[Total: 3]

5

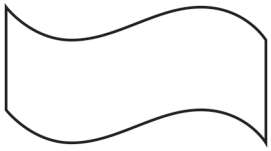




On each shape draw all the lines of symmetry. [3]

[Total: 3]

6

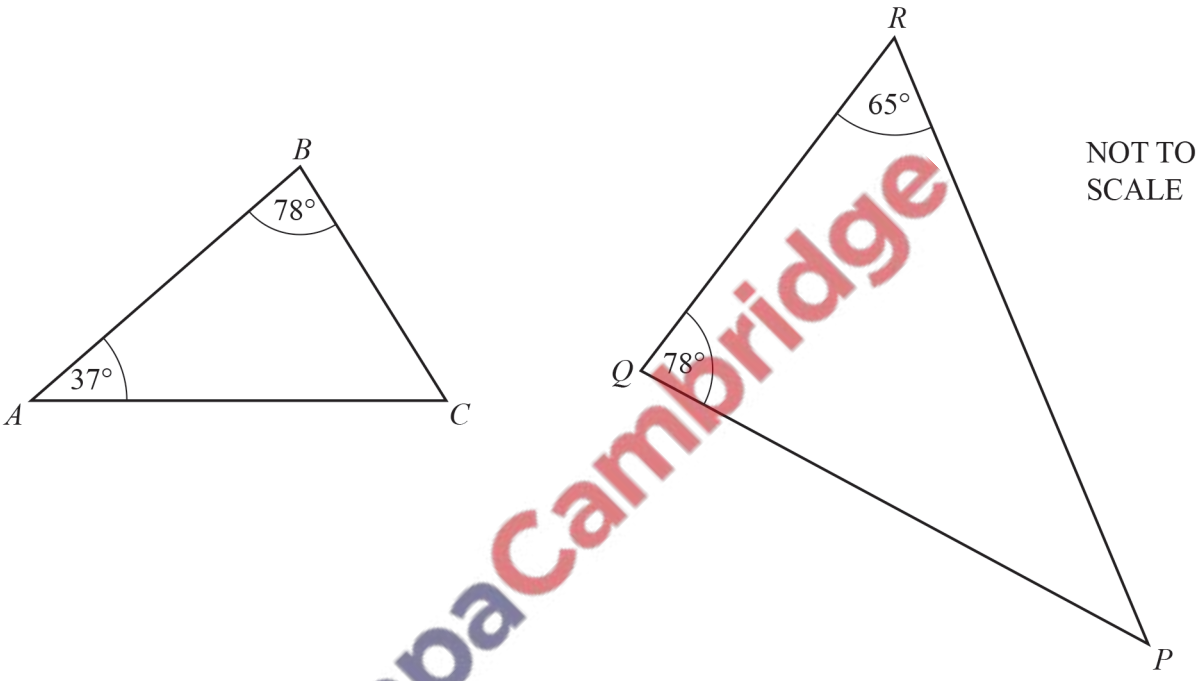


Write down the order of rotational symmetry of this shape.

..... [1]

[Total: 1]

7



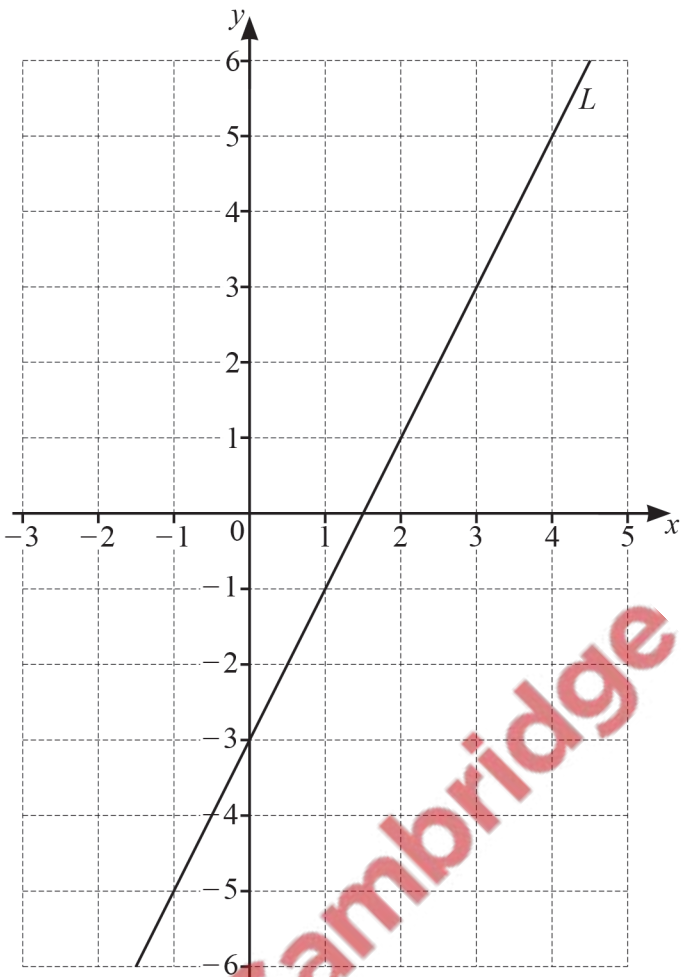
Explain why triangle *ABC* is similar to triangle *PQR*.

.....

..... [2]

[Total: 2]

8



(a) Find the equation of line L in the form $y = mx + c$.

$y =$ ..... [2]

(b) On the grid, draw a line that is perpendicular to line L. [1]

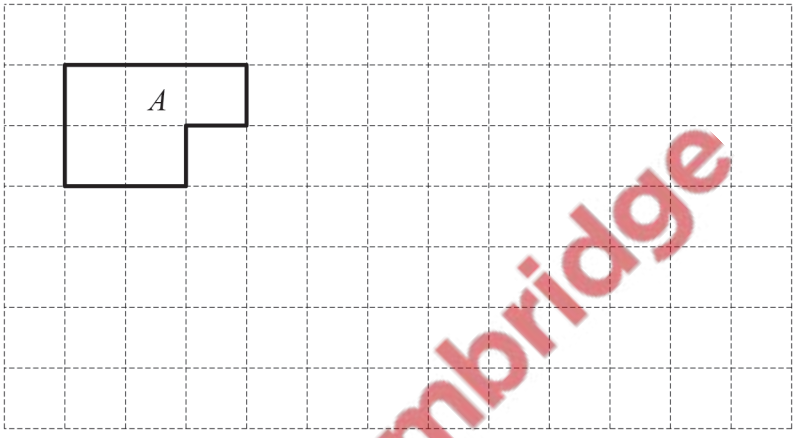
[Total: 3]

9 Work out the size of one interior angle of a regular 9-sided polygon.

..... [2]

[Total: 2]

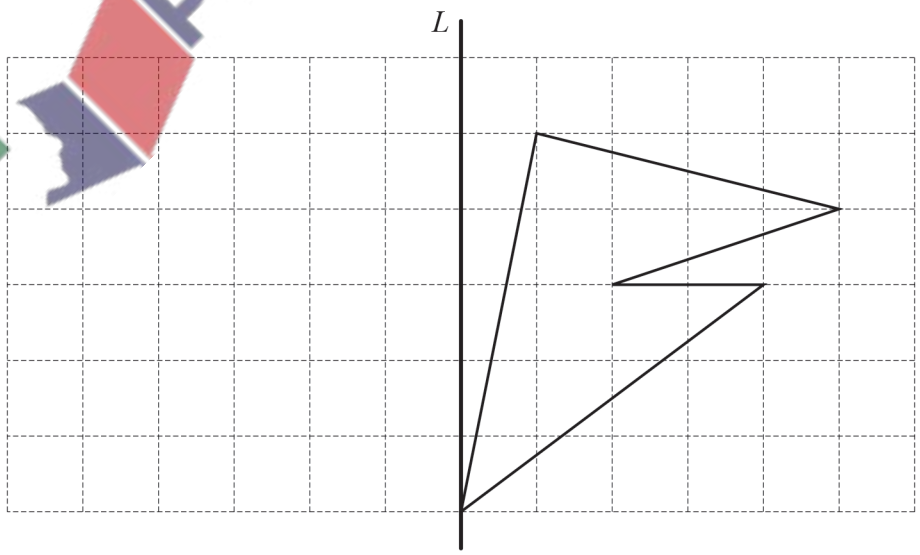
10



On the grid, draw a shape that is congruent to shape *A*. [1]

[Total: 1]

11 Reflect the shape in line *L*.



[2]

[Total: 2]

12 Write down the mathematical name of a quadrilateral that has

- rotational symmetry of order 1

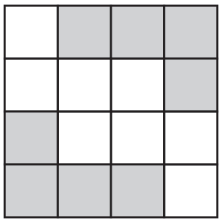
and

- only one line of symmetry.

..... [1]

[Total: 1]

13



Write down the order of rotational symmetry of the diagram.

..... [1]

[Total: 1]

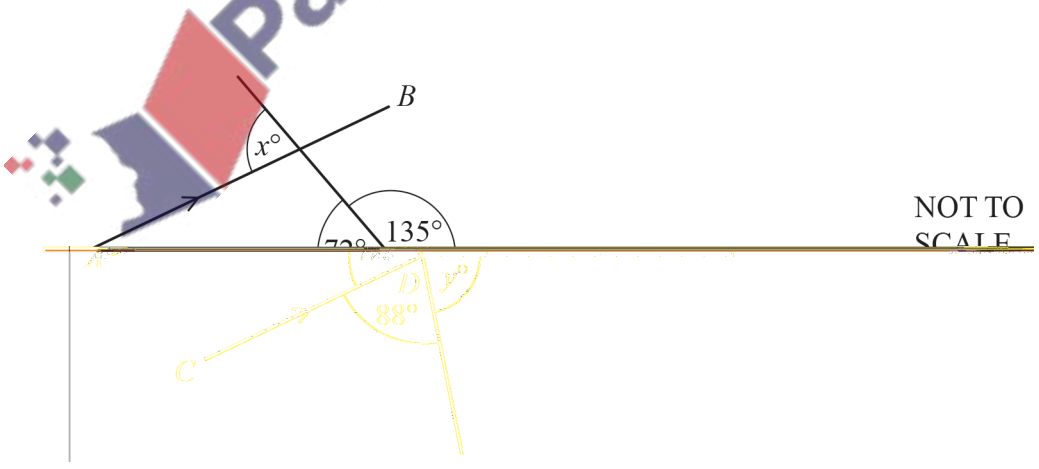
14 A circular garden has diameter 11.4 m.

Draw the garden accurately, using a scale of 1 cm represents 1.5 m.

Scale: 1 cm to 1.5 m
[2]

[Total: 2]

15



In the diagram, *AB* is parallel to *CD*.

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

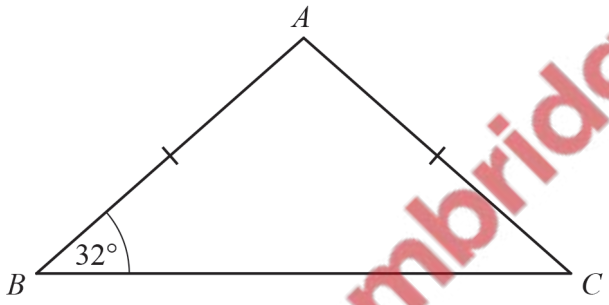
x = ... because ..... [2]

(b) Work out the value of y.
Give a geometrical reason for your answer.

y = ... because ..... [2]

[Total: 4]

16



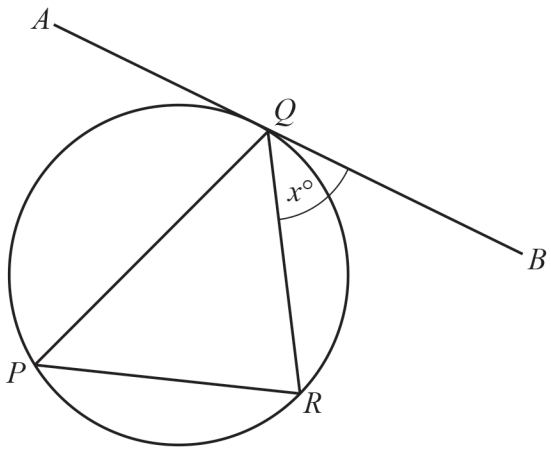
Triangle ABC is isosceles.
Angle $ABC = 32°$ and $AB = AC$.

Find angle BAC.

Angle BAC = ... [2]

[Total: 2]

17



NOT TO SCALE

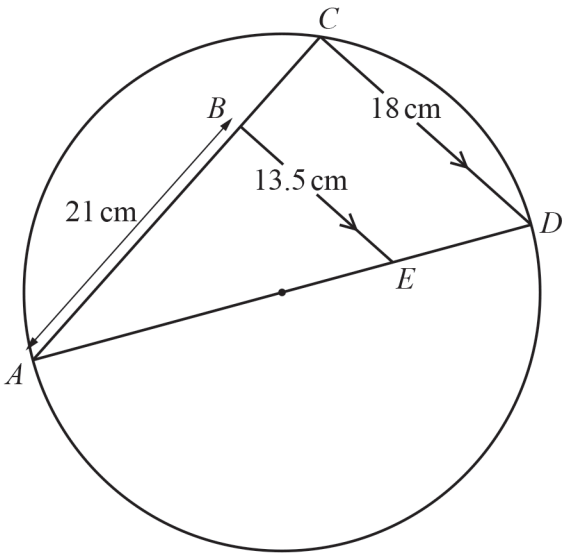
P, R and Q are points on the circle.
AB is a tangent to the circle at Q.
QR bisects angle PQB.
Angle $BQR = x°$ and $x < 60$.

Use this information to show that triangle PQR is an isosceles triangle.
Give a geometrical reason for each step of your work.

[3]

[Total: 3]

18



NOT TO SCALE

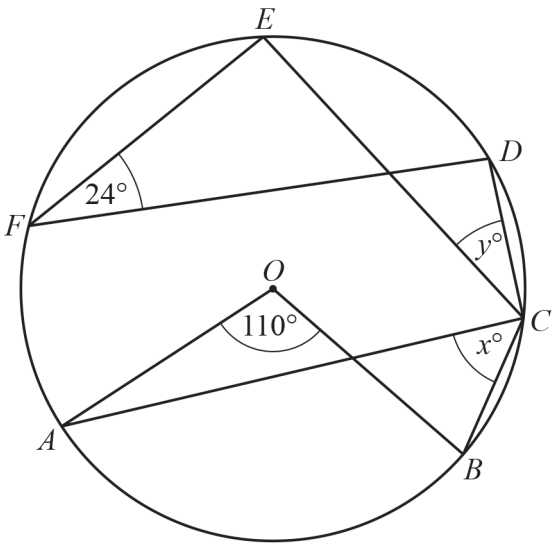
C lies on a circle with diameter *AD*.
B lies on *AC* and *E* lies on *AD* such that *BE* is parallel to *CD*.
AB = 21 cm, *CD* = 18 cm and *BE* = 13.5 cm.

Work out the radius of the circle.

..... cm [5]

[Total: 5]

19



NOT TO SCALE

Points A, B, C, D, E and F lie on the circle, centre O.

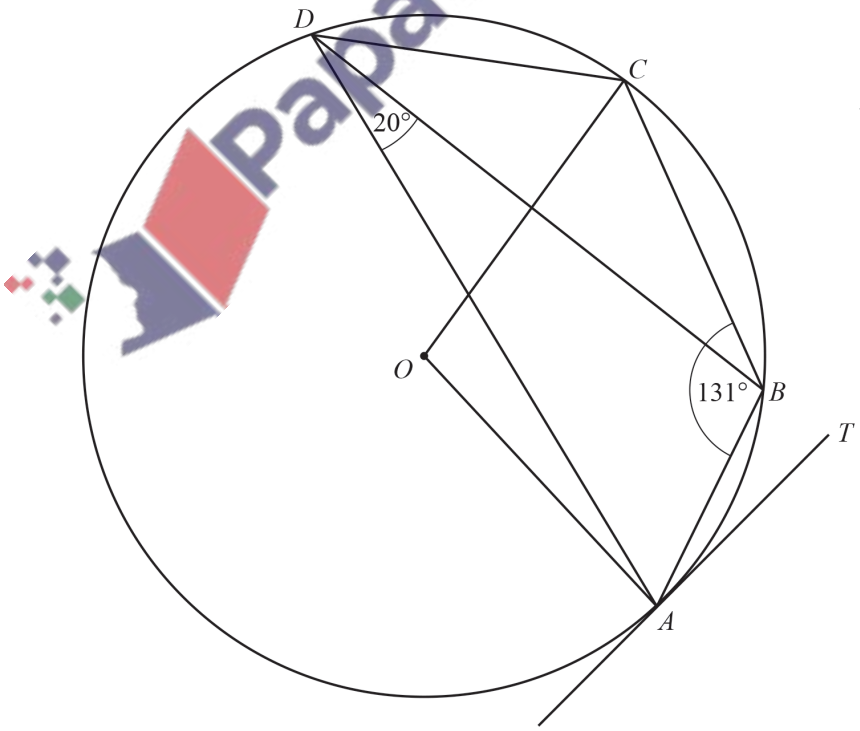
Find the value of x and the value of y.

x = ...

y = ... [2]

[Total: 2]

20



NOT TO SCALE

A, B, C and D lie on the circle, centre O.
TA is a tangent to the circle at A.
Angle $ABC = 131°$ and angle $ADB = 20°$.

Find

(a) angle ADC,

Angle ADC = ... [1]

(b) angle AOC,

Angle AOC = ... [1]

(c) angle BAT,

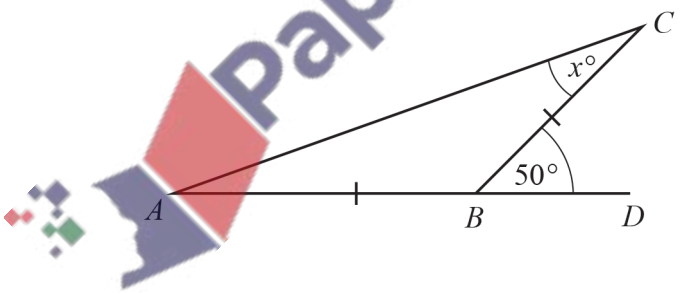
Angle BAT = ... [1]

(d) angle OAB.

Angle OAB = ... [1]

[Total: 4]

21



NOT TO SCALE

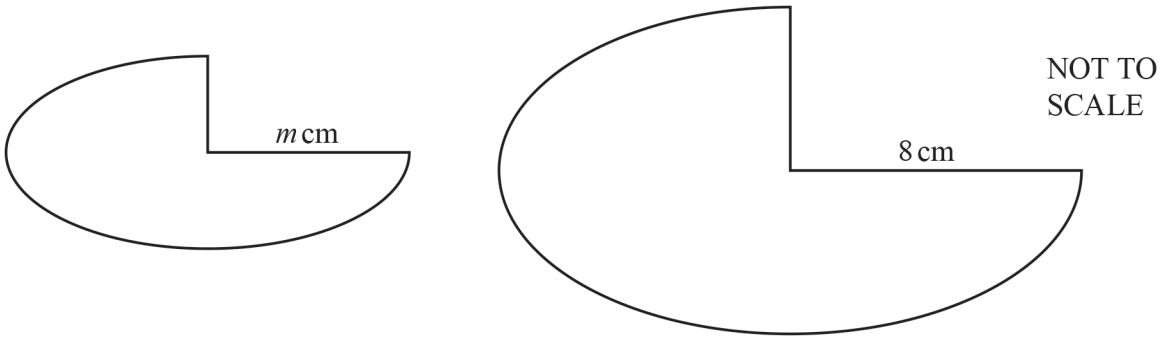
$AB = BC$ and ABD is a straight line.

Find the value of x.

x = ... [2]

[Total: 2]

22



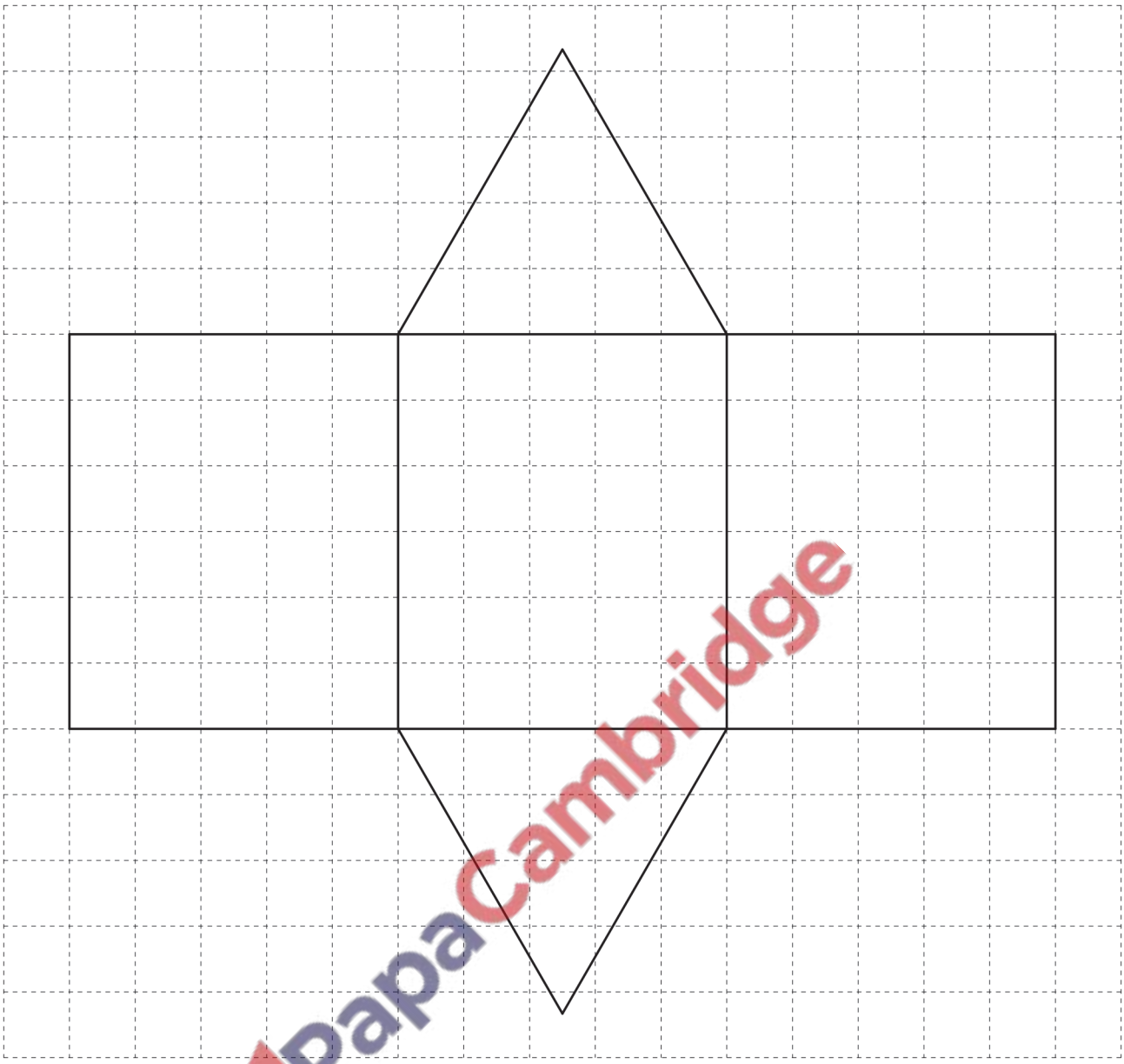
The diagram shows two shapes that are mathematically similar.
The smaller shape has area 52.5 cm^2 and the larger shape has area 134.4 cm^2.

Calculate the value of m.

m = ... [3]

[Total: 3]

23 The diagram shows the net of a triangular prism on a 1 cm^2 grid.



(a) Write down the mathematical name for the type of triangle shown on the grid.

..... [1]

(b) **(i)** Measure the perpendicular height of the triangle.

..... cm [1]

(ii) Calculate the area of the triangle.

..... cm^2 [2]

(iii) Calculate the volume of the triangular prism.

..... cm^3 [2]

[Total: 6]

24 Point B is 36 km from point A on a bearing of 140°.

(a) Using a scale of 1 centimetre to represent 4 kilometres, mark the position of B.

Scale: 1 cm to 4 km [2]

(b) **(i)** Point C is 28 km from A and 20 km from B.
The bearing of C from A is less than 140°.

Using a ruler and compasses only, construct triangle ABC.
Show all your construction arcs.

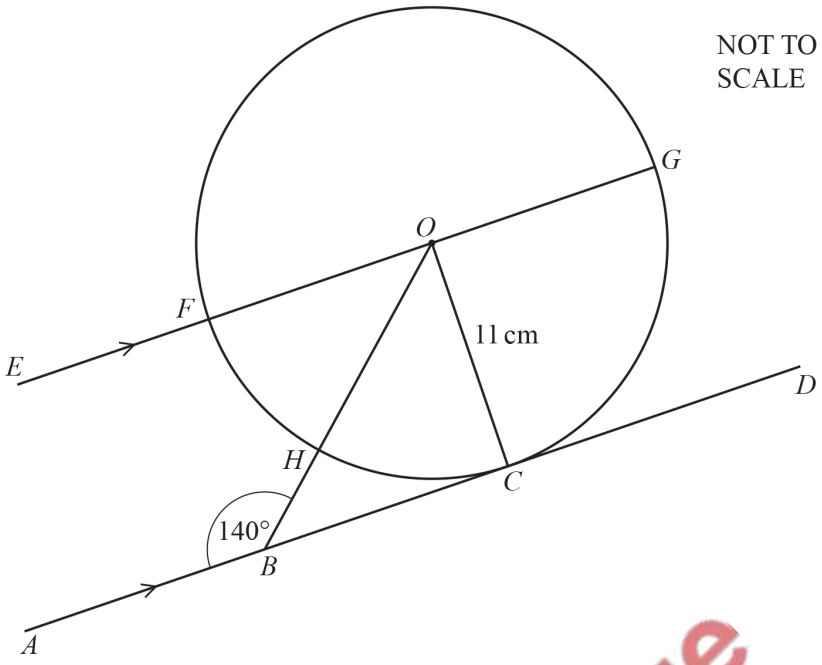
[3]

(ii) Measure angle ACB.

Angle ACB = ... [1]

[Total: 6]

25



The diagram shows a circle, centre O, radius 11 cm.
C, F, G and H are points on the circumference of the circle.
The line AD touches the circle at C and is parallel to the line EG.
B is a point on AD and angle $ABO = 140°$.

(a) Write down the mathematical name of the straight line AD.

..... [1]

(b) **(i)** Find, in terms of π, the circumference of the circle.

..... cm [2]

(ii) Work out angle FOH.

Angle FOH = ... [2]

(iii) Calculate the length of the minor arc FH.

..... cm [2]

(c) **(i)** Give a reason why angle BCO is 90°.

..... [1]

(ii) Show that $BC = 13.11$ cm, correct to 2 decimal places.

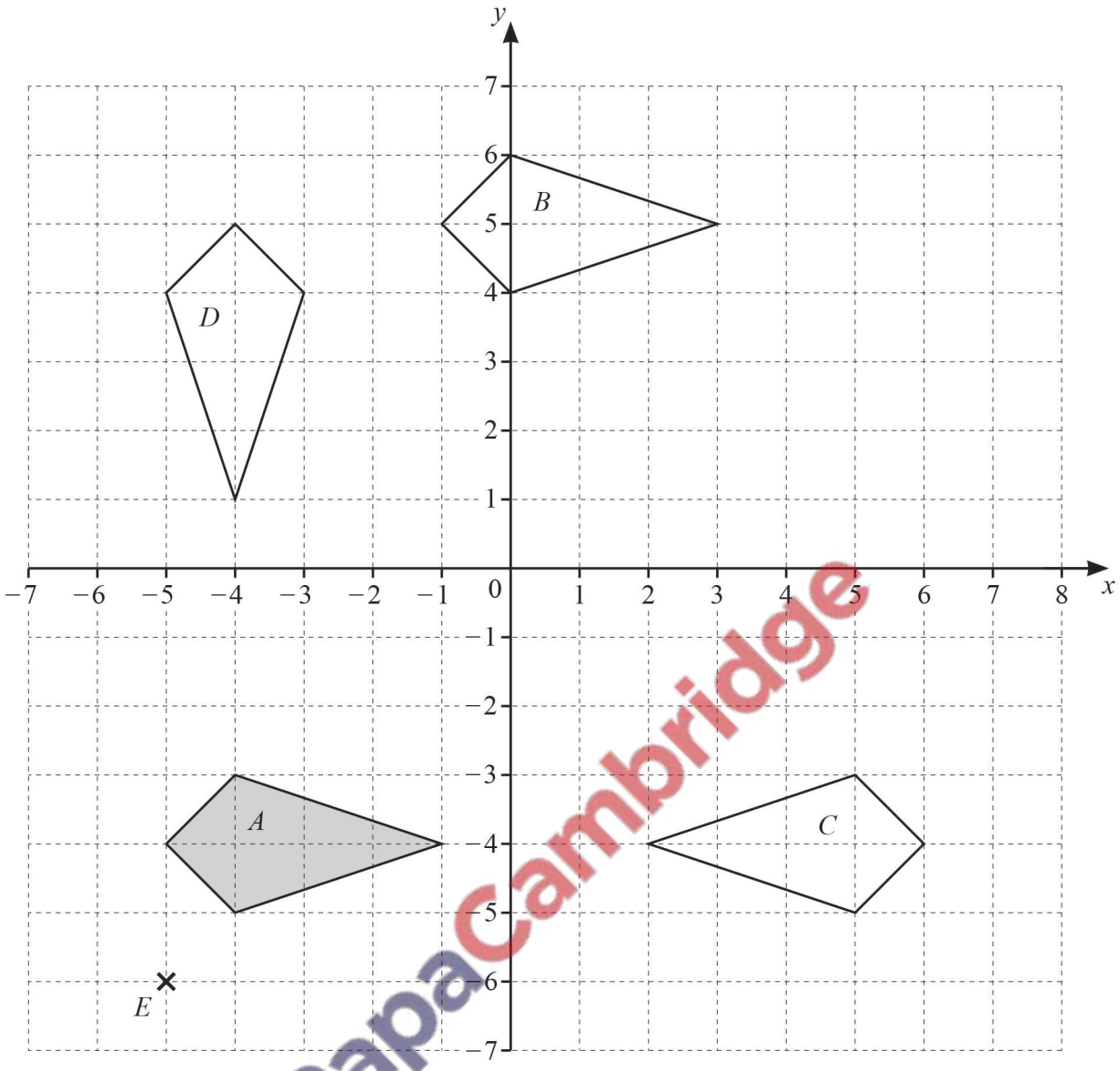
[3]

(iii) Calculate BH.

$BH =$ ..... cm [3]

[Total: 14]

26 The grid shows a point E and four quadrilaterals, A, B, C and D.



(a) Write down the mathematical name of shape A.

..... [1]

(b) Describe fully the **single** transformation that maps

(i) shape A onto shape B,

.....

..... [2]

(ii) shape A onto shape C,

.....

..... [2]

(iii) shape *A* onto shape *D*.

.....

..... [3]

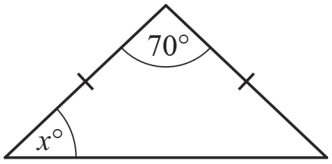
(c) **(i)** Write down the coordinates of the point *E*.

(..... , ...) [1]

(ii) On the grid, draw the image of shape *A* after an enlargement by scale factor 3, centre *E*. [2]

[Total: 11]

27



NOT TO SCALE

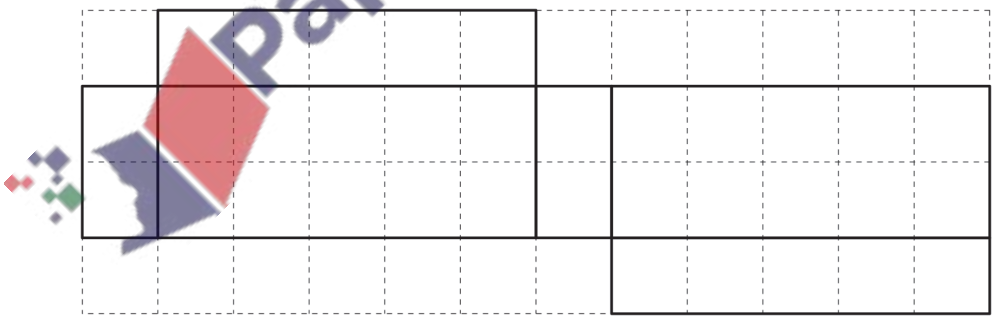
The diagram shows an isosceles triangle.

Find the value of *x*.

x = ... [2]

[Total: 2]

28 The diagram shows the net of a solid on a 1 cm^2 grid.



(a) Write down the mathematical name for the solid.

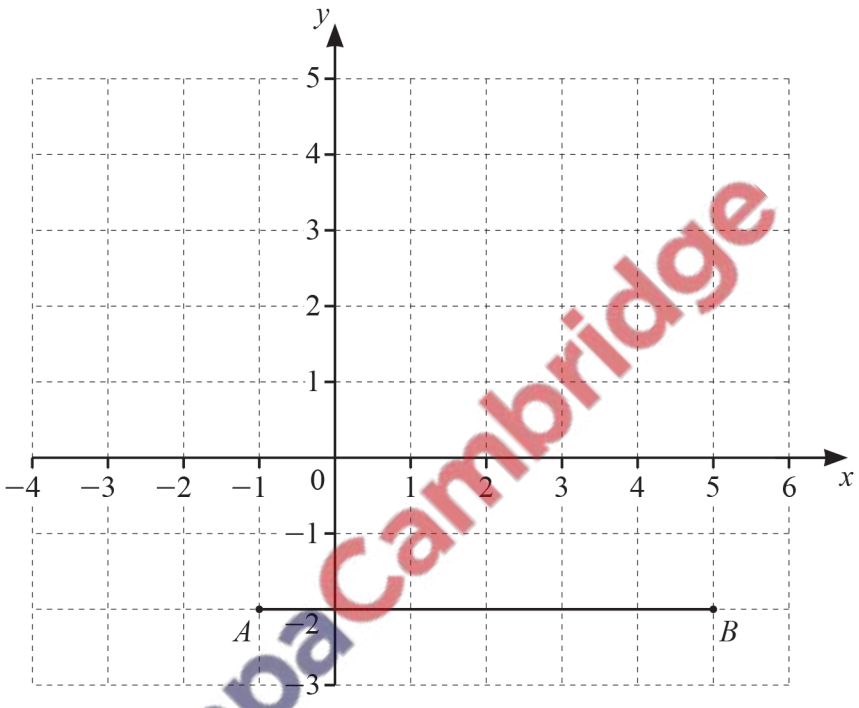
..... [1]

(b) Work out the volume of the solid.

..... cm^3 [2]

[Total: 3]

29 The diagram shows a line AB on a 1 cm^2 grid.



(a) Write down the coordinates of point A.

(..... , ...) [1]

(b) Write down the vector $\overrightarrow{AB}$.

$\begin{pmatrix} \quad \\ \quad \end{pmatrix}$ [1]

(c) $\overrightarrow{BC} = \begin{pmatrix} -2 \\ 5 \end{pmatrix}$

Mark point C on the grid. [1]

(d) **(i)** Work out $\overrightarrow{AB} + \overrightarrow{BC}$.

( ) [1]

(ii) Complete this statement.

$$\overrightarrow{AB} + \overrightarrow{BC} = \overrightarrow{\quad}$$

..... [1]

(e) A, B and C are three vertices of a parallelogram, $ABCD$.

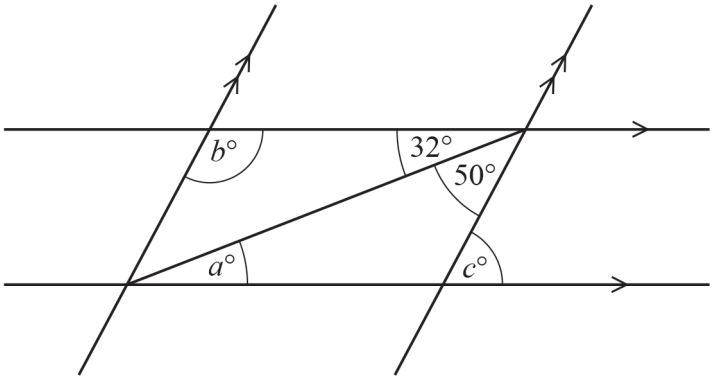
(i) Mark point D on the diagram and draw the parallelogram $ABCD$. [1]

(ii) Work out the area of the parallelogram.
Give the units of your answer.

.... [2]

[Total: 8]

30



NOT TO SCALE

The diagram shows two pairs of parallel lines.

Find the value of a, the value of b and the value of c.

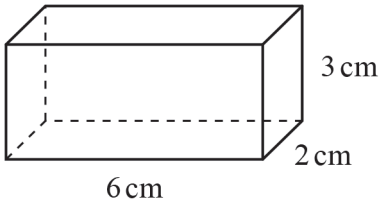
a = ...

b = ...

c = ... [3]

[Total: 3]

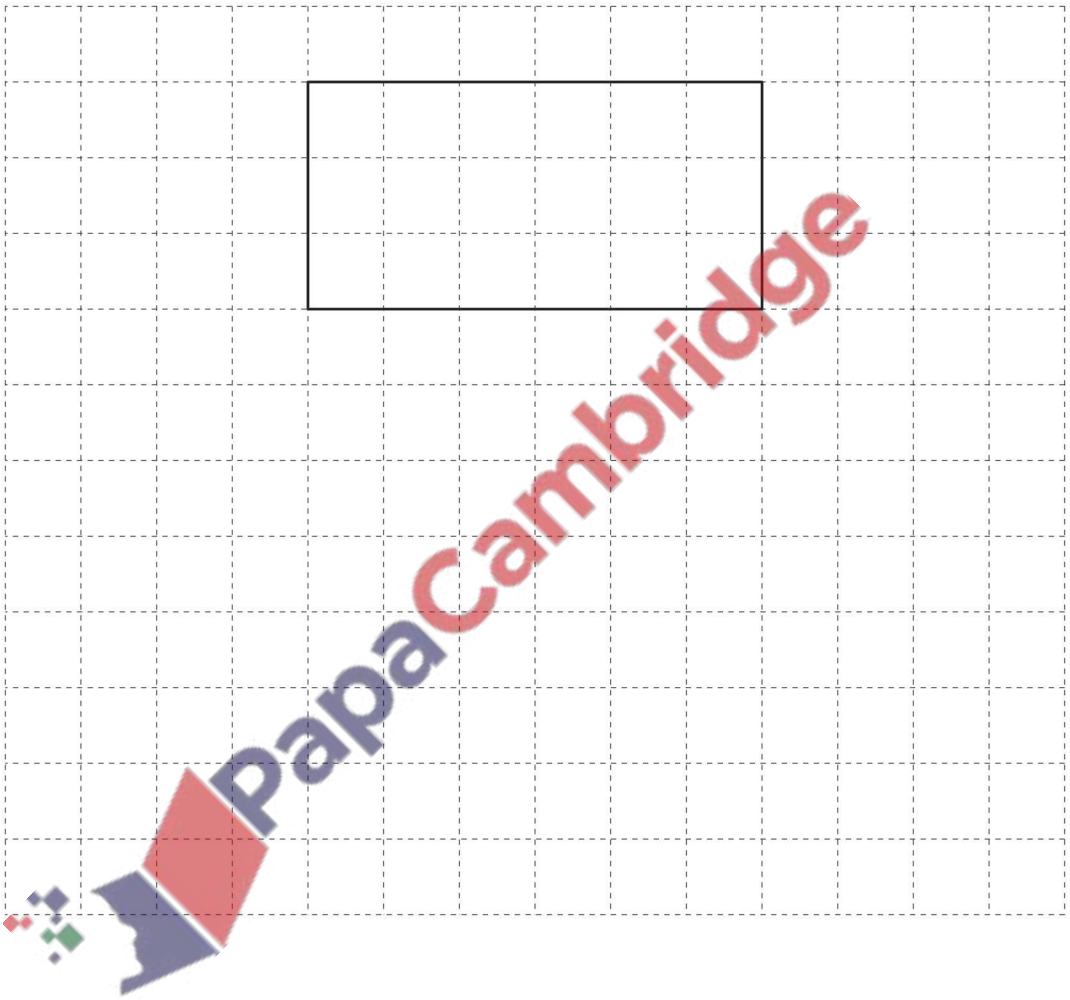
31



NOT TO SCALE

The diagram shows a cuboid.

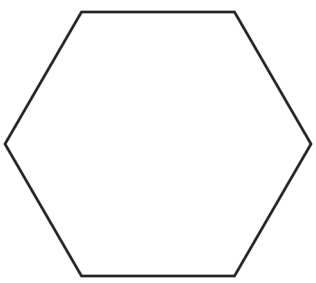
On the 1 cm^2 grid, complete the net of the cuboid.
One face has been drawn for you.



[3]

[Total: 3]

32 The diagram shows a regular polygon.



(a) Write down the mathematical name for this shape.

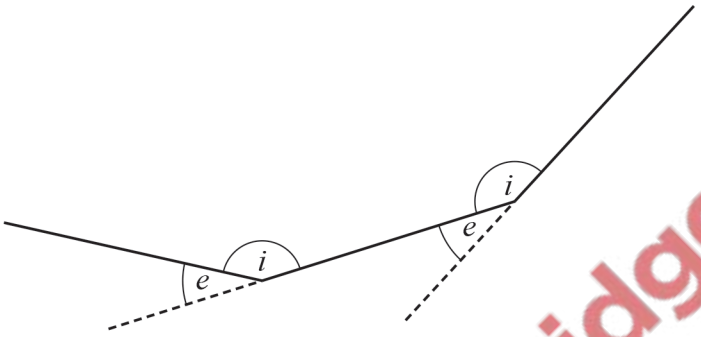
..... [1]

(b) Write down the order of rotational symmetry of this shape.

..... [1]

[Total: 2]

33 The diagram shows part of a regular polygon.



NOT TO SCALE

e is an exterior angle.
i is an interior angle.

The ratio $e : i = 2 : 13$.

(a) Work out angle *e*.

..... [3]

(b) Work out the number of sides of this regular polygon.

..... [1]

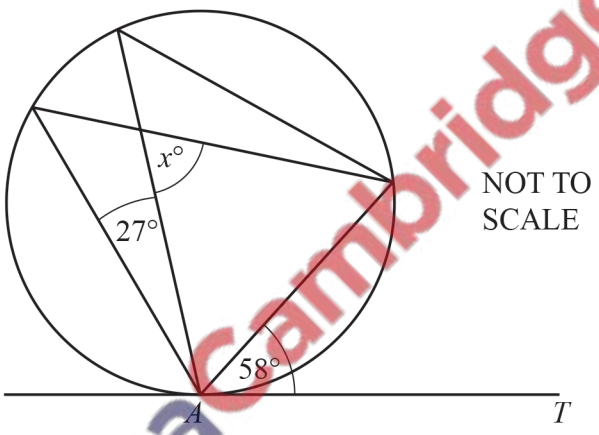
[Total: 4]

34 **Using a straight edge and compasses only,** construct the equilateral triangle ABC.
Side AB has been drawn for you.

[2]

[Total: 2]

35



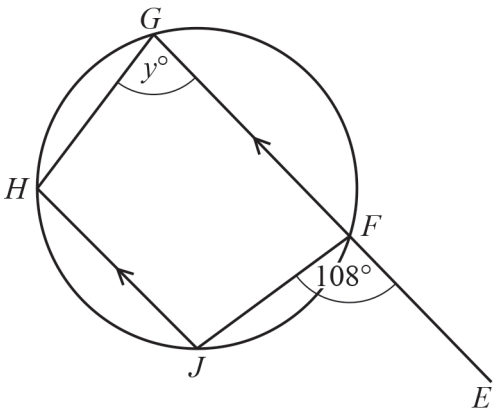
AT is a tangent to the circle at A.

Find the value of x.

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

[Total: 2]

36



NOT TO SCALE

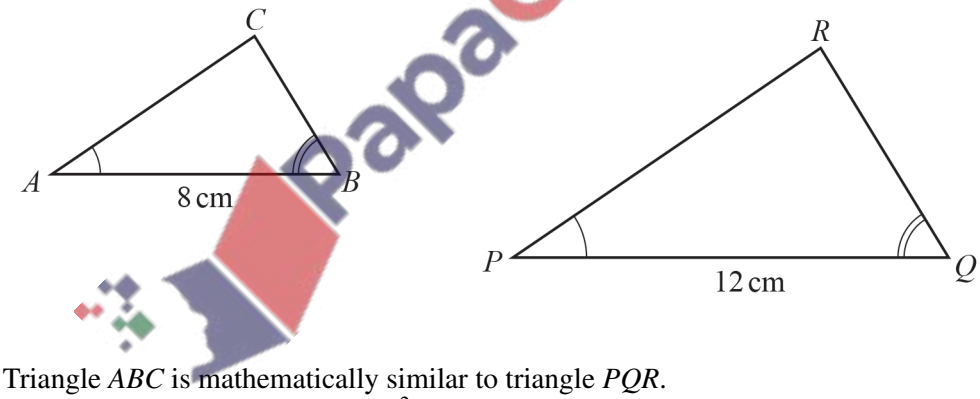
F, *G*, *H* and *J* are points on the circle.
EFG is a straight line parallel to *JH*.

Find the value of *y*.

y = ... [2]

[Total: 2]

37



NOT TO SCALE

Triangle *ABC* is mathematically similar to triangle *PQR*.
The area of triangle *ABC* is 16 cm^2.

(a) Calculate the area of triangle *PQR*.

..... cm^2 [2]

(b) The triangles are the cross-sections of prisms which are also mathematically similar.
The volume of the smaller prism is $320\,cm^3$.

Calculate the length of the larger prism.

..... cm [3]

[Total: 5]

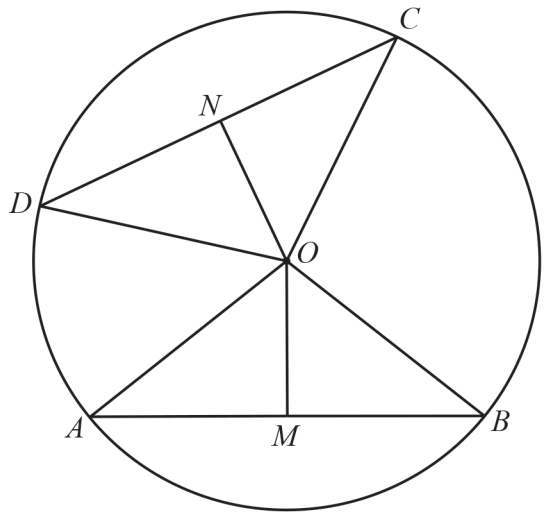
38 The interior angle of a regular polygon with n sides is 150°.

Calculate the value of n.

n = ... [2]

[Total: 2]

39



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*.

.....

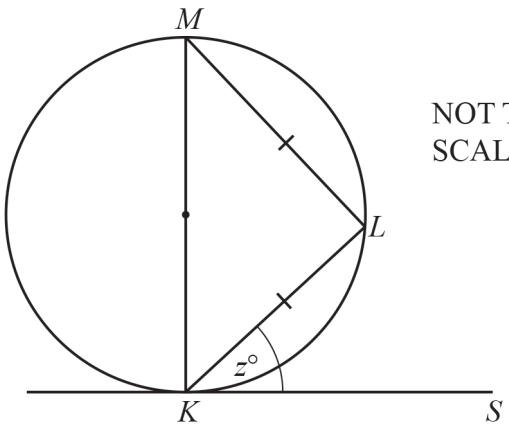
.....

.....

..... [3]

[Total: 3]

40



NOT TO SCALE

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 = ... [2]

[Total: 2]