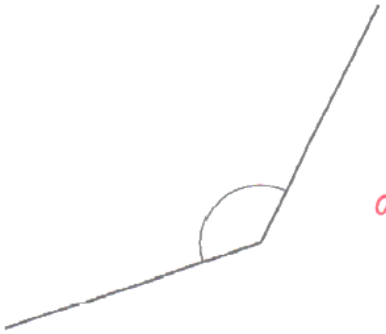
Geometry – 2022 Nov IGCSE 0580

1. Nov/2022/Paper_0580_11/No.2



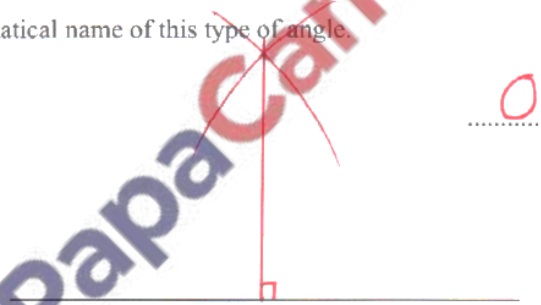
The angle given is greater than 90° but Less than 180°, So its an Obtuse angle.

Write down the mathematical name of this type of angle.

Obtuse angle ..... [1]

2. Nov/2022/Paper_0580_11/No.3

Write down the mathematical name of this type of angle.



Obtuse angle ..... [1]

(a) Measure the length of this line in millimetres.

Length in Centimetres = 7.7

1cm = 10 mm

7.7cm = 7.7 x 10 = 77 mm

77 ..... mm [1]

(b) Draw a line perpendicular to this line. [1]

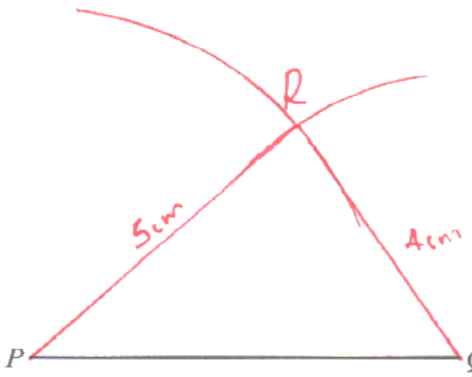
3. Nov/2022/Paper_0580_11/No.4

In triangle PQR, $PR = 5$ cm and $QR = 4$ cm.

Using a ruler and compasses only, construct triangle PQR.
Leave in your construction arcs.
The side PQ has been drawn for you.

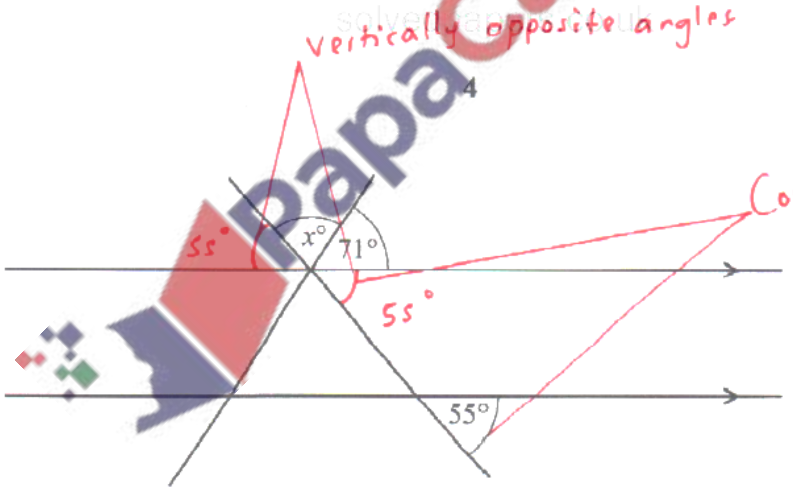
Using a ruler and a Compass measure 5cm, with the same distance make an arc from point P.

Measure 4 cm and make an arc from point Q intersecting the first arc from point P.



[2]

4. Nov/2022/Paper_0580_11/No.8



The diagram shows two straight lines intersecting two parallel lines.

Find the value of x.

Corresponding angles are equal
Vertically opposite angles are equal
Angles in a straight line add up to 180°

$55° + x° + 71° = 180°$

$x° + 126° = 180°$

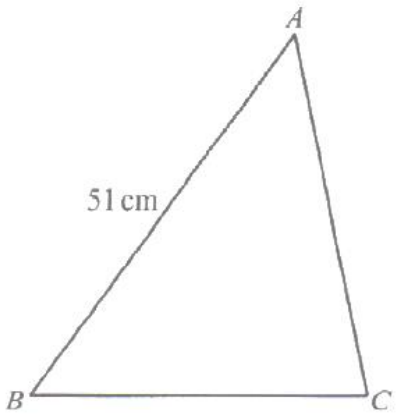
$\therefore x° = 180° - 126°$

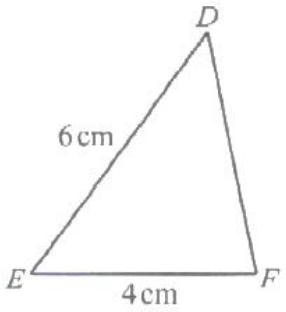
$= 54°$

$\therefore x = 54$

$x =$ 54 [2]

5. Nov/2022/Paper_0580_11/No.21





NOT TO SCALE

Triangle ABC is mathematically similar to triangle DEF.

Find BC.

$\frac{AB}{DE} = \frac{BC}{EF}$

$\frac{51}{6} = \frac{BC}{4}$

By cross-multiplication

$6 \times BC = 4 \times 51$

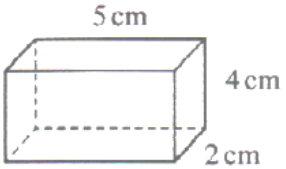
$\frac{6BC}{6} = \frac{204}{6}$

$BC = \frac{204}{6}$

$= 34$ cm

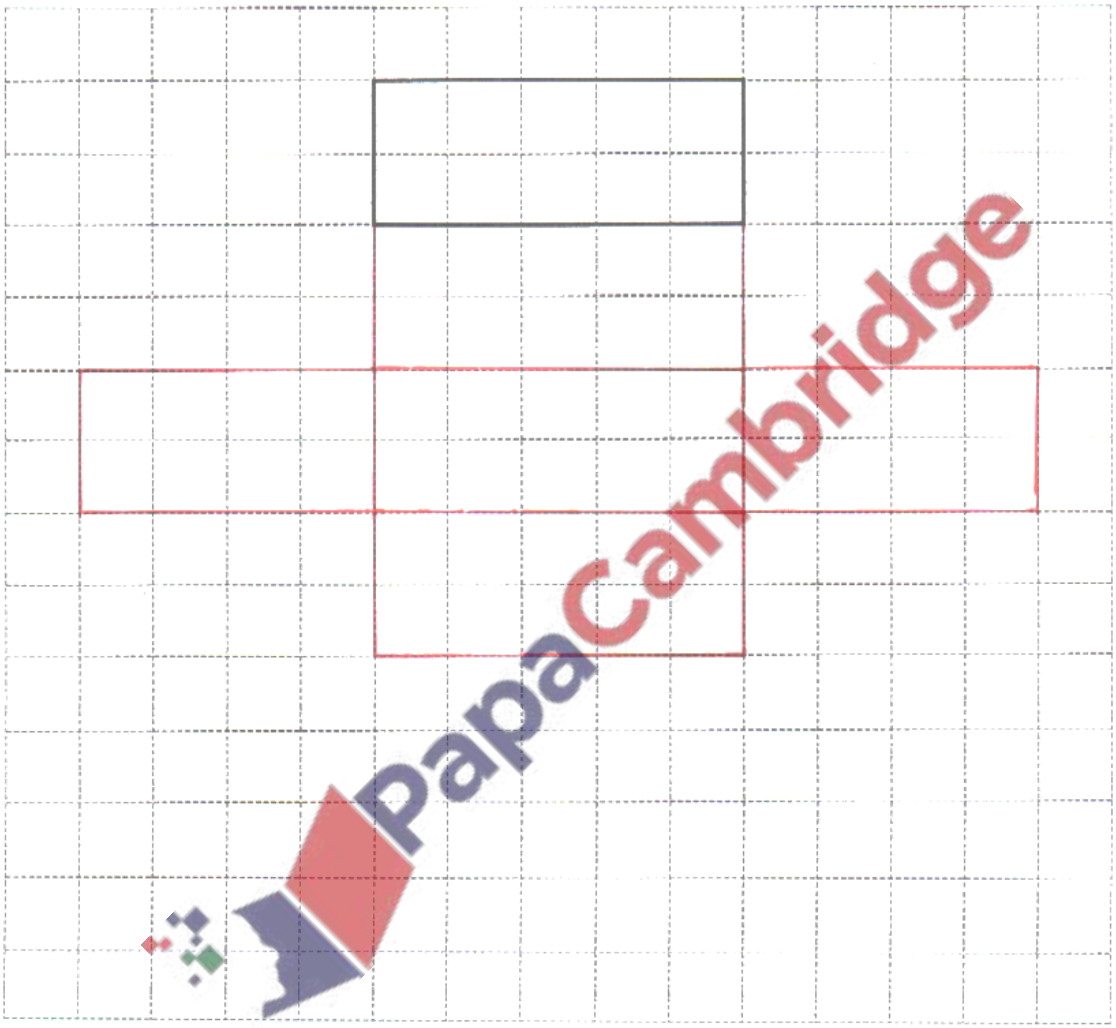
$BC =$ 34 cm [2]

6. Nov/2022/Paper_0580_12/No.4



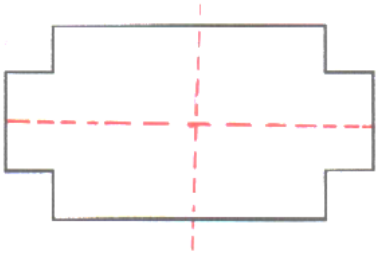
NOT TO SCALE

Complete the net of this cuboid on the 1 cm^2 grid.
One face has been drawn for you.



[3]

7. Nov/2022/Paper_0580_12/No.5

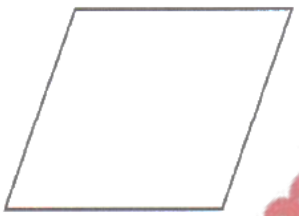


Draw all the lines of symmetry on this shape. [2]

A line of Symmetry divides a shape into two equal parts.

8. Nov/2022/Paper_0580_13/No.4

The diagram shows a shape with four sides of equal length.



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

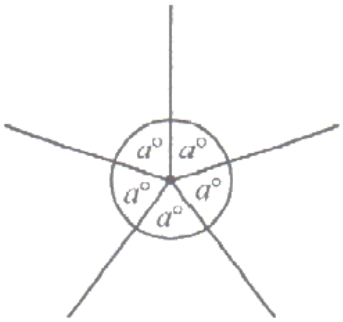
Rhombus ..... [1]

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

Rotational Symmetry refers to the number of times a shape looks the same as it is rotated 360° about its centre.

2 ..... [1]

9. Nov/2022/Paper_0580_13/No.10



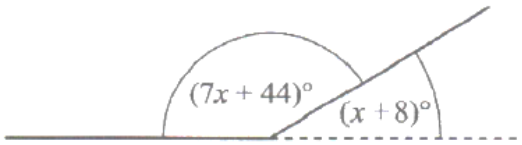
Give the geometrical reason why the value of a is 72.

Angles at a point add to 360°

∴ $a° = \frac{360°}{5} = 72°$ [1]

∴ $a = 72$

10. Nov/2022/Paper_0580_13/No.24



NOT TO SCALE

The diagram shows two sides of a regular polygon.
The interior angle of the polygon is $(7x+44)^\circ$ and the exterior angle is $(x+8)^\circ$.

Find the number of sides of this polygon.

Interior angle + exterior angle = 180°

$7x + 44 + x + 8 = 180$

$8x + 52 = 180$

$8x = 180 - 52$

$\frac{8x}{8} = \frac{128}{8}$

$x = 16$

Exterior angle $= (x + 8)^\circ$

$= (16 + 8)^\circ$

$= 24^\circ$

Exterior angle $= \frac{360^\circ}{n}$

$\Rightarrow 24^\circ = \frac{360^\circ}{n}$

$\Rightarrow 24n = 360$

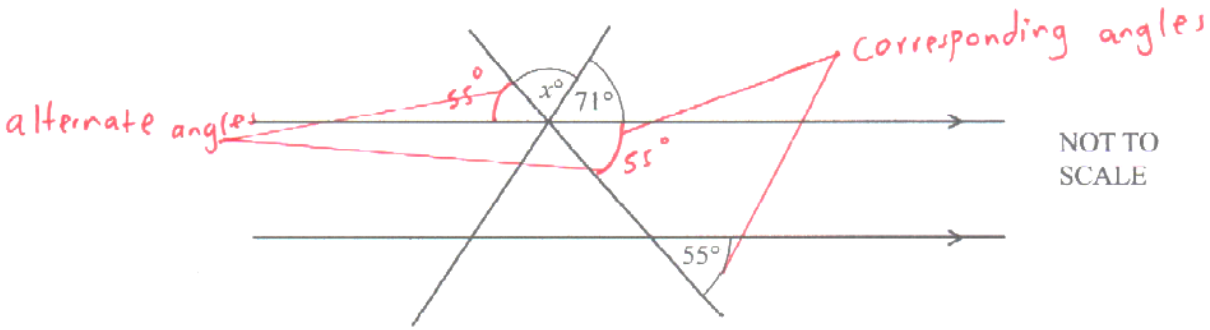
$\frac{24n}{24} = \frac{360}{24}$

$n = 15$

∴ Number of sides = 15

15 [4]

11. Nov/2022/Paper_0580_21/No.5



The diagram shows two straight lines intersecting two parallel lines.

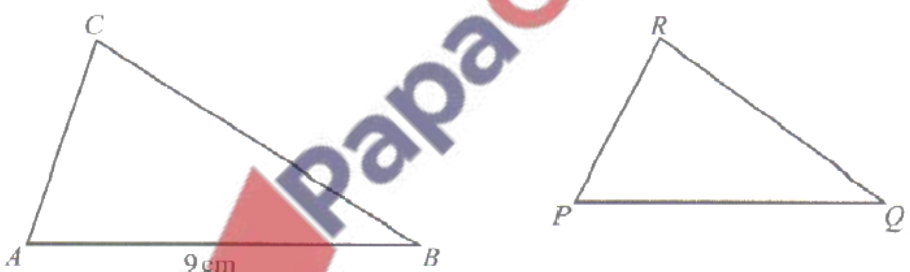
Find the value of x.

Corresponding angles are equal.
Alternate angles are equal.
Angles in a line add to 180°

$55° + x° + 71° = 180°$
$x° + 126° = 180°$
$x = 180° - 126°$
$= 54°$

$x =$ 54° [2]

12. Nov/2022/Paper_0580_21/No.12



Triangle PQR is similar to triangle ABC with $\frac{PR}{AC} = \frac{2}{3}$.

$AB = 9$ cm and the area of triangle ABC is 18 cm^2.

(a) Find the length of PQ.

$\frac{PR}{AC} = \frac{PQ}{AB}$
$\frac{2}{3} = \frac{PQ}{9}$

$3 \times PQ = 2 \times 9$
$\frac{3PQ}{3} = \frac{18}{3}$
$PQ = 6$ cm

6 cm [1]

(b) Find the area of triangle PQR.

$ASF = (LSF)^2$
$= \left(\frac{2}{3}\right)^2 = \frac{4}{9}$

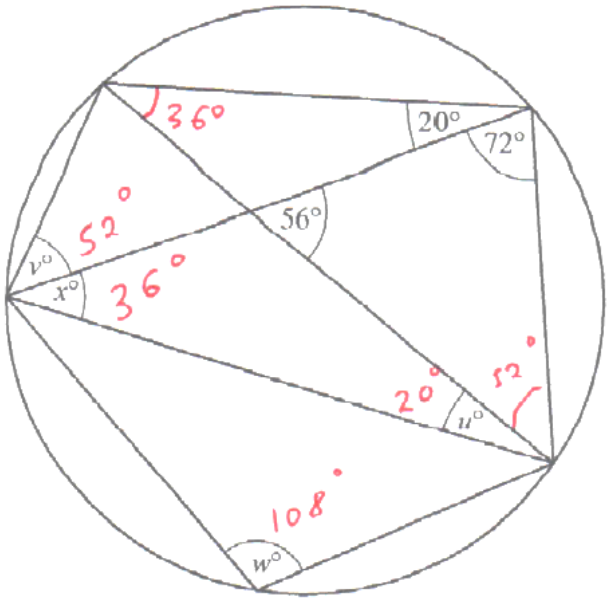
$\frac{\text{Area of } PQR}{\text{Area of } ABC} = \frac{4}{9}$

$\frac{\text{Area of } PQR}{18} = \frac{4}{9}$

$\Rightarrow$ Area of $PQR = \frac{4}{9} \times 18^2$
$= 4 \times 2$
$= 8$ cm^2

8 cm^2 [2]

13. Nov/2022/Paper_0580_21/No.16



NOT TO SCALE

The diagram shows a circle and eight chords.

Calculate the values of u, v, w and x.

Opposite angles in a cyclic quadrilateral add up to 180°

$w° = 180° - 72° = 108°$

Angles in the same segment are equal

$v° = 180° - (72° + 56°)$

$= 180° - 128° = 52°$

$x° = 180° - (20° + 72° + 52°)$

$= 180° - 144°$

$= 36°$

$u° = 20°$

$u =$ 20

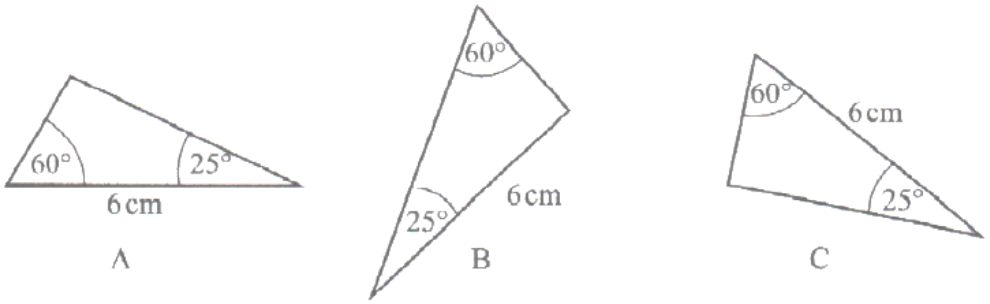
$v =$ 52

$w =$ 108

$x =$ 36 [4]

14. Nov/2022/Paper_0580_22/No.9

The diagram shows three triangles A, B and C.



NOT TO SCALE

(a) Which two of the triangles A, B and C are congruent with each other?

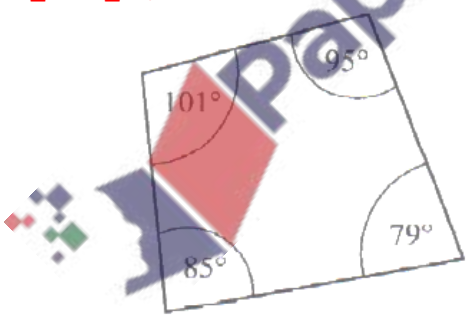
Two triangles are Congruent if they have the same shape and are of the same size. A and C ..... [1]

(b) Draw a ring around the congruence criterion that can be used to support your answer to **part (a)**.

SSS ASA SAS RHS

[1]

15. Nov/2022/Paper_0580_22/No.15



NOT TO SCALE

$101° + 79° = 180°$

$95° + 85° = 180°$

The diagram shows a quadrilateral.

Give a geometrical reason why this is a cyclic quadrilateral.

Opposite angles in a cyclic quadrilateral add up to 180°. ..... [1]

16. Nov/2022/Paper_0580_22/No.22

The volumes of two mathematically similar objects are $56\,cm^3$ and $875\,cm^3$.
The height of the smaller object is 18 cm.

Find the height of the larger object.

$VSF = \frac{56}{875} \div 7 = \frac{8}{125}$

$VSF = (LSF)^3$

$\therefore LSF = \sqrt[3]{VSF}$

$= \sqrt[3]{\frac{8}{125}} = \frac{2}{5}$

$\frac{\text{height of the smaller object}}{\text{height of the larger object}} = \frac{2}{5}$

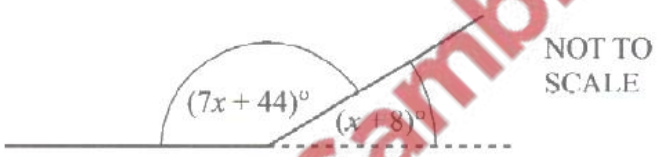
$\Rightarrow \frac{18}{h} = \frac{2}{5}$

$h = \frac{18 \times 5}{2}$

$= 45\,cm$

45 cm [3]

17. Nov/2022/Paper_0580_23/No.11



The diagram shows two sides of a regular polygon.
The interior angle of the polygon is $(7x + 44)°$ and the exterior angle is $(x + 8)°$.

Find the number of sides of this polygon.

Interior angle + exterior angle = 180°

$7x + 44 + x + 8 = 180$

$8x + 52 = 180$

$8x = 180 - 52$

$\frac{8x}{8} = \frac{128}{8}$

$x = 16$

Exterior angle $= (x + 8)°$

$= (16 + 8)°$

$= 24°$

Exterior angle $= \frac{360°}{n}$

$\Rightarrow \frac{360°}{n} = 24°$

$\therefore n = \frac{360°}{24°}$

$= 15$

$\therefore$ number of sides = 15

15 [4]

18. Nov/2022/Paper_0580_23/No.14

A map has a scale of 1 : 200 000.

Find the area, in square kilometres, of a lake that has an area of 12.4 cm^2 on the map.

1 km = 100,000 cm

1 : 200 000

1 : $\frac{200\,000}{100\,000}$

1 cm rep 2 km

1 cm^2 rep $(2\,km)^2$

1 cm^2 rep 4 km^2

12.4 cm^2 ?

= 12.4 × 4

= 49.6 km^2

..... 49.6 ..... km^2 [2]

19. Nov/2022/Paper_0580_23/No.18

Two bottles are mathematically similar.
The small bottle has a capacity of 324 ml and a height of 12 cm.
The large bottle has a capacity of 768 ml.

Calculate the height of the large bottle.

VSF = $\frac{768 \div 12}{324 \div 12} = \frac{64}{27}$

$(LSF)^3$ = VSF

LSF = $\sqrt[3]{VSF} = \sqrt[3]{\frac{64}{27}}$

= $\frac{4}{3}$

∴ Height of the large bottle = LSF × 12 cm

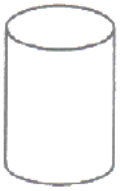
= $\frac{4}{3} \times 12$

= 4 × 4 = 16 cm

..... 16 ..... cm [3]

20. Nov/2022/Paper_0580_31/No.6

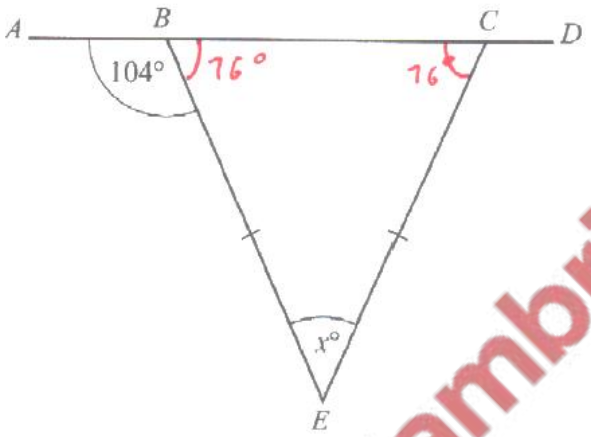
(a)



Write down the mathematical name of this solid.

Cylinder ..... [1]

(b)



The diagram shows triangle BCE and a straight line $ABCD$.
$BE = CE$ and angle $ABE = 104°$.

Find the value of x.

Angles in a straight line add up to 180°
$\angle CBE = 180° - 104° = 76°$
$\angle CBE = \angle BCE$ since triangle CBE is isosceles.

Angles in a triangle add up to 180°
$76° + 76° + x° = 180°$
$152° + x° = 180°$
$x° = 180° - 152° = 28°$

$x =$ 28 ..... [2]

(c) Work out the size of one interior angle of a regular polygon with 15 sides.

Sum of interior angles $= (n-2) \times 180°$

One interior angle $= \dfrac{(n-2) \times 180°}{n}$

(n – number of sides)

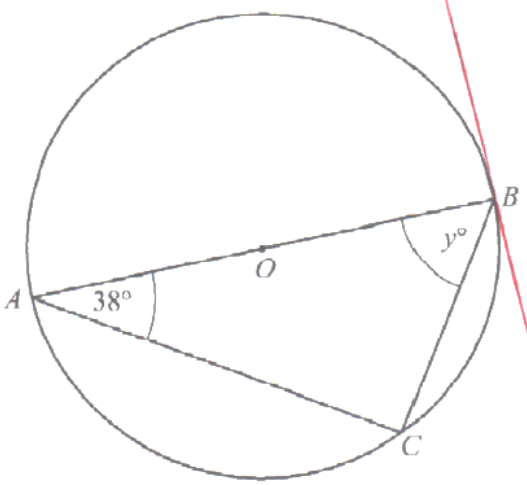
$= \dfrac{(15-2) \times 180°}{15}$

$= \dfrac{13 \times 180°}{15}$

$= 156°$

156° ..... [2]

(d)



NOT TO SCALE

A, B and C are points on a circle, centre O.

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

Chord ..... [1]

(ii) Draw a tangent to the circle at point B. [1]

(iii) The area of the circle is 245.5 cm^2.

Calculate AB.

AB is the diameter of the circle.

Area $= \pi r^2$

$\frac{245.5}{\pi} = \frac{\pi r^2}{\pi}$

$r^2 = \frac{245.5}{\pi}$

$r = \sqrt{\frac{245.5}{\pi}} = 8.84$ cm

$AB = 8.84 \times 2$

$= 17.68$ cm

$= 17.7$ cm (3sf)

$AB =$ 17.7 cm [3]

(iv) Find the value of y.

Angles in a Semi-Circle are equal to 90°.

$\angle ACB = 90°$

Angles in a triangle add up to 180°

$38° + 90° + y° = 180°$

$128° + y° = 180°$

$y° = 180° - 128°$

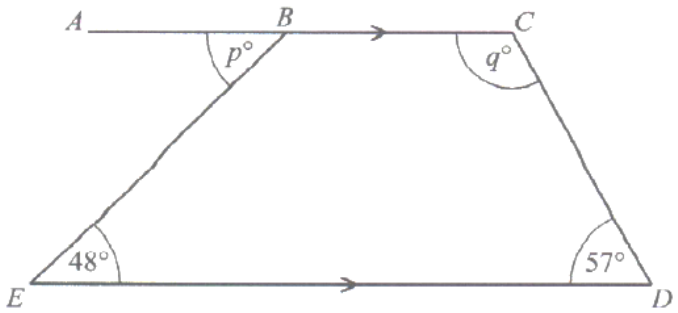
$y° = 52°$

$\therefore y = 52$

$y =$ 52 [2]

21. Nov/2022/Paper_0580_33/No.6

(a)



NOT TO SCALE

In the diagram, ABC is parallel to ED.

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

$p =$ 48° because angle BED and angle ABE are alternate angles. [2]

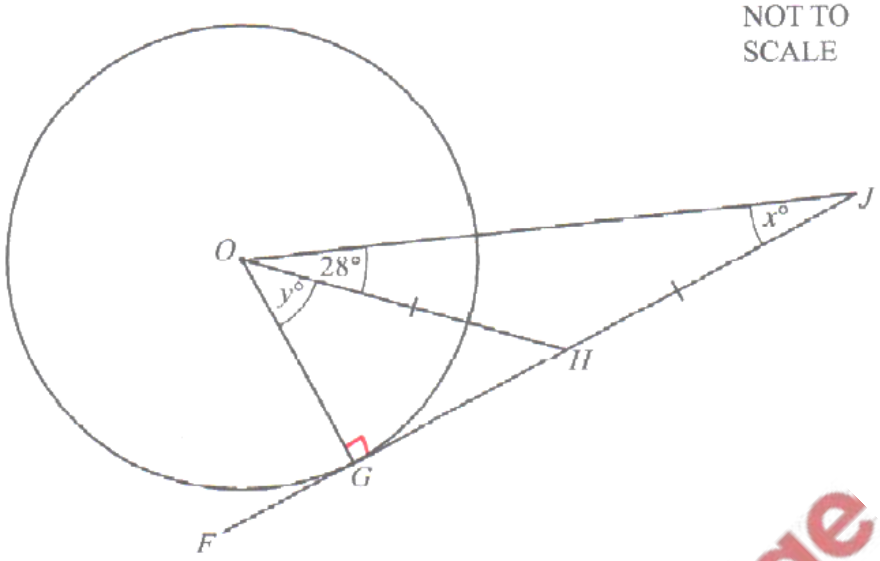
(ii) Find the value of q.
Give a geometrical reason for your answer.

$q =$ 123° because angle CDE and angle BCD are co-interior angles. [2]

$Q = 180° - 57° = 123°$ (co-interior angles add up to 180°)

(b)

NOT TO SCALE



G is a point on the circle, centre O.
FHJ is a tangent to the circle at G and $OH = HJ$.

(i) Write down the mathematical name for triangle OHJ.

Isosceles ..... [1]

(ii) Find the value of x.

$OH = HJ$
$\Rightarrow \angle HOJ = \angle HJO$

$x =$ 28° ..... [1]

(iii) Find the value of y.

The tangent and the radius meet at right angles.
$\Rightarrow \angle OGH = 90°$
Angles in a triangle add up to 180°
$y° + 28° + 90° + 28° = 180°$
$y° + 146° = 180°$
$y° = 180° - 146°$
$y° = 34°$
$\therefore y = 34$

$y =$ 34 ..... [3]