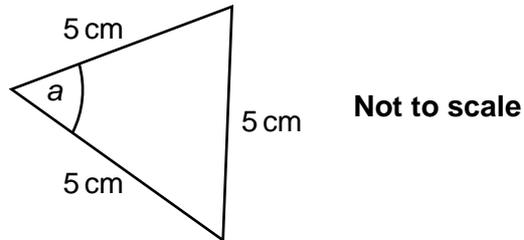# GCSE (9–1) MATHEMATICS

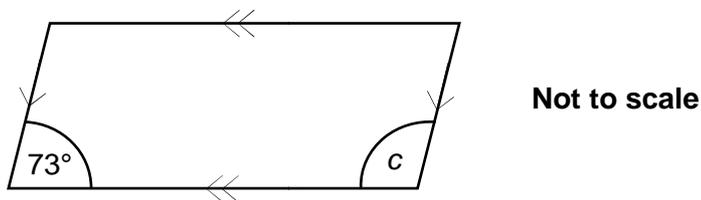## Foundation Check In - 8.04 Properties of polygons

1. Find the size of angle *a* in the triangle below.

    5 cm

    a

    5 cm

    5 cm

    Not to scale

2. Find the size of length *b* in the triangle below.

    56°

    15 cm

    19 cm

    68°

    b

    Not to scale
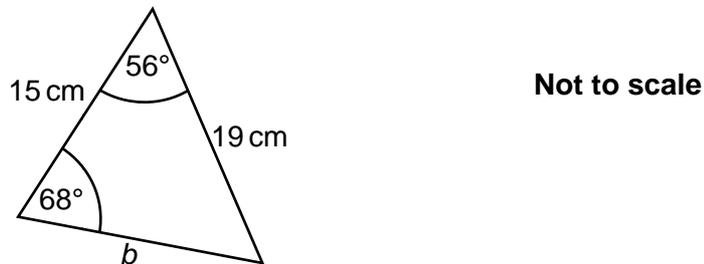
3. Find the size of angle *c* in the quadrilateral below.

    73°

    c

    Not to scale

4. Name a quadrilateral that has 2 lines of symmetry and rotational symmetry of order 2 about its centre.

5. Work out the size of each angle in the triangle below.

    $3x°$
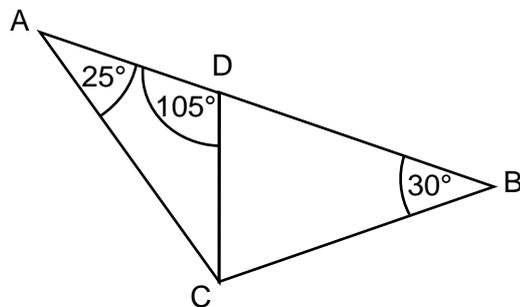
    $x°$

    Not to scale
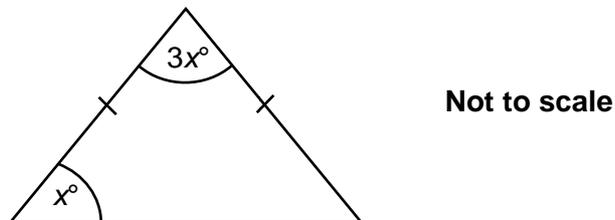
6. Mary says that she can draw a triangle with 2 obtuse angles. Explain why this is not possible.

7. Decide whether the following statement is correct and give a reason for your decision.
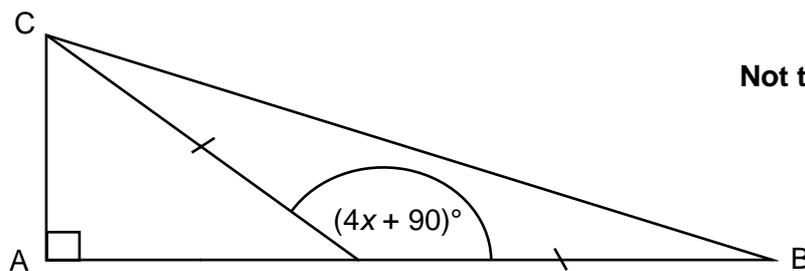
   The only quadrilateral with equal length diagonals is a square.
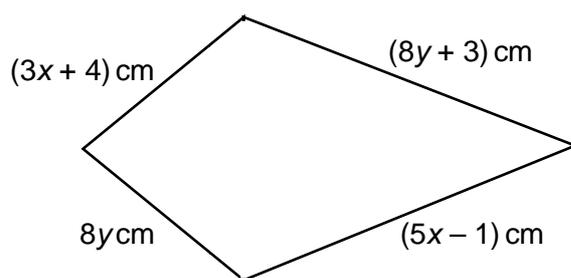
8. Prove that triangle BCD is isosceles.

Not to scale

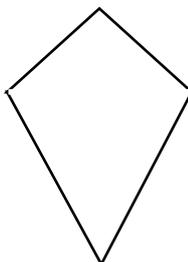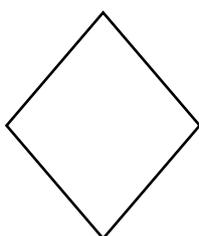9. If $\angle ACB = 11x$, calculate the size of $\angle CBA$ in the triangle below.

Not to scale

10. Find the lengths of each side of the kite below.

Not to scale

Extension
For the 3 quadrilaterals (rhombus, kite and parallelogram) explain why each could be the odd one out.

Answers

1. 60°

2. 15 cm

3. 107°

4. Rectangle or rhombus

5. 36°, 36°, 108°

6. An obtuse angle is greater than 90° so the sum of two obtuse angles would be greater than 180° and as the sum of angles in a triangle is 180° this is not possible.

7. The statement is incorrect because a rectangle has equal length diagonals. (Also accept isosceles trapezium.)

8. $\angle CDB = 180 - 105 = 75^\circ$ (Sum of angles at a point on a line is 180°)
   $\angle BCD = 180 - 30 - 75 = 75^\circ$ (Sum of angles in a triangle is 180°)
   $\angle CDB = \angle BCD \therefore$ triangle BCD is isosceles.

9. $\angle CBA = 35^\circ$

10. 16 cm and 19 cm

Extension

The rhombus could be the odd one out as it is the only one with all equal sides.
The parallelogram could be the odd one out as the diagonals do not cross at 90°.
The kite could be the odd one out as it has one line of symmetry and no rotational symmetry.

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Assessment Objective	Qu.	Topic	R	A	G
AO1	1	Know the properties of an equilateral triangle			
AO1	2	Use the properties of an isosceles triangle to find a length			
AO1	3	Use the properties of a parallelogram to find an angle			
AO1	4	Identify reflection and rotation symmetries of quadrilaterals			
AO1	5	Use the properties of an isosceles triangle to find an angle			
AO2	6	Know the angle properties of a triangle and give geometrical reasons to justify these properties			
AO2	7	Know the angle properties of quadrilaterals and give geometrical reasons to justify these properties			
AO2	8	Use the properties of triangles in a simple proof			
AO3	9	Solve a problem using the properties of triangles			
AO3	10	Solve a problem using the properties of quadrilaterals			