Angles and Symmetry Essential information

- An object has ***rotational symmetry*** if it can be rotated about a point so that it fits on top of itself without completing a full turn. The shapes below have rotational symmetry.

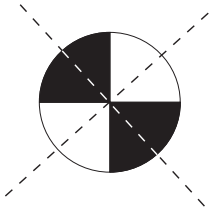
In a complete turn this shape fits on top of itself two times.

It has rotational symmetry of order 2.

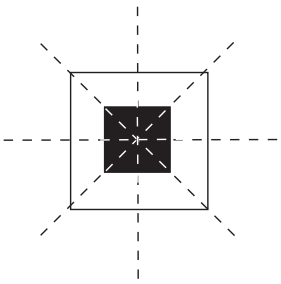
In a complete turn this shape fits on top of itself four times.

It has rotational symmetry of order 4.

- Shapes have ***line symmetry*** if a mirror could be placed so that one side is an exact reflection of the other. These imaginary 'mirror lines' are shown by dotted lines in the diagrams below.



This shape has 2 lines of symmetry.

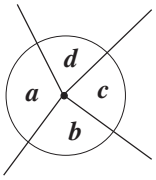


This shape has 4 lines of symmetry.

- ***Angles at a point***

  The angles at a point will always add up to 360°.

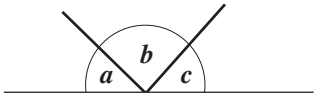
  It does not matter how many angles are formed at the point – their total will always be 360°.



$a + b + c + d = 360°$

- ***Angles on a line***

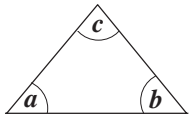
  Adjacent angles that form a straight line add up to 180°.



$a + b + c = 180°$

- ***Angles in a triangle***

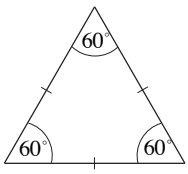
  The angles in any triangle add up to 180°.



$a + b + c = 180°$

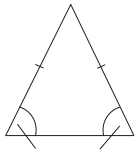
- ***Angles in an equilateral triangle***

  In an equilateral triangle all the angles are 60° and all the sides are the same length.



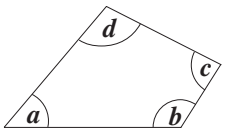
Angles and Symmetry Essential information

- ***Angles in an isosceles triangle***
  In an isosceles triangle two sides are the same length and the two base angles are the same size.



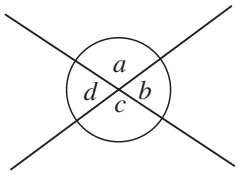
equal angles

- ***Angles in a quadrilateral***
  The angles in any quadrilateral add up to 360°.



$a + b + c + d = 360°$

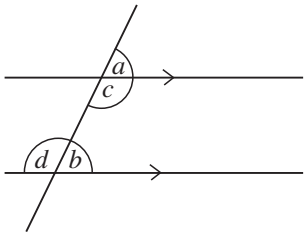
- ***Opposite angles***
  When any two lines intersect, two pairs of equal opposite angles are formed.
  The two angles marked *a* and *c* are a pair of *opposite* equal angles, so angle *a* is equal to angle *c*.
  The angles marked *b* and *d* are also a pair of opposite equal angles, so angle *b* is equal to angle *d*.



- ***Corresponding angles***

  When a line intersects a pair of parallel lines, angle *a* is equal to angle *b*.

  The angles *a* and *b* are called *corresponding* angles.



- ***Alternate angles***
  The angles *c* and *d* are equal.