

4.1.1 Plane Shapes

Name: _____ Class: _____ Date: _____

KEY WORDS line of symmetry

<!-- Session 2 native-skill companion -->

Objective

Practise plane shapes within the labelled native lessons. Public original tasks; locally authored answer guidance.

1 Key knowledge and worked examples

■ Shape vocabulary, properties and symmetry · Foundation

A point marks a position; a line extends in both directions and a segment has two end-points. A plane is a flat two-dimensional surface. A vertex is a corner; an edge is a boundary segment where solid faces meet. A polygon is a closed plane shape made of straight sides; regular means all sides and all interior angles are equal. Points label vertices; AB names a side and angle ABC has vertex B. Parallel lines have the same direction; perpendicular lines meet at 90°. Reflection symmetry uses a mirror line; rotational symmetry counts matches during one full turn, including 360°.

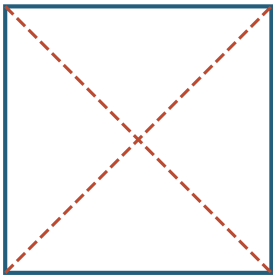
$$\text{order} = \frac{360^\circ}{\text{smallest matching rotation}}$$

A square has four equal sides, four right angles, four reflection axes and rotational order 4. A non-square rectangle has opposite sides equal, four right angles, two axes and order 2. A non-square rhombus has four equal sides, opposite angles equal, two diagonal axes and order 2. A parallelogram has two parallel side pairs and opposite angles equal; a general one has no reflection axis. A kite has two pairs of adjacent equal sides; a trapezium has a pair of parallel sides. An equilateral triangle has three equal sides/angles and three reflection axes; an isosceles triangle has two equal sides and equal base angles; scalene means no equal sides. Acute, right and obtuse classify triangles by their largest angle. Pentagons, hexagons, octagons and decagons have 5,6,8,10 sides. A rectangle has equal diagonals that bisect each other. A rhombus has perpendicular bisecting diagonals; a square has both properties. For a parallelogram, a diagonal splits it into triangles: alternate angles on the two parallel side pairs agree and the diagonal is shared, so ASA establishes congruence and opposite sides are equal. Opposite-angle equality also follows from parallel-line angle facts.

Equal-looking lengths need stated equal-length marks or a deduction. Regular does not mean equal sides alone. An axis of symmetry is a full line, not just an internal diagonal.

AQA G1/G4 requires conventional names, notation and derived shape properties. State the property that justifies a classification and allow overlapping classes, such as square and rectangle.

Square diagonals are symmetry axes



Square



Rectangle

Original native-lesson illustration; labels belong to its worked example.

2 Practice

2.1 (Foundation) Find the rotational symmetry order of a square.

2.2 (Foundation) Find the number of reflection axes of an equilateral triangle.

2.3 (Foundation) How many sides does a decagon have?

3 Exam-style questions

3.1 Decide whether this claim is true. Justify with a concrete calculation or counterexample: Every rectangle has four equal sides.

Solutions

2.1 It matches every 90° : four matches in 360° .

2.2 Each vertex-to-opposite-midpoint line is an axis.

2.3 The prefix deca names ten sides.

3.1 False. A 3 by 4 rectangle has four right angles but side lengths 3,4,3,4. Four equal sides additionally make it a square.

Local review guidance: show the chosen method; give the checked result; explain the condition or failed shortcut. This is authored classroom guidance.