

**As outcomes, Year 8 pupils should, for example:**

**Know and use side, angle and symmetry properties of equilateral, isosceles and right-angled triangles.**

For example:

- Discuss whether it is possible to draw or construct on a 3 by 3 pinboard:
  - a. a triangle with a reflex angle;
  - b. an isosceles trapezium;
  - c. an equilateral triangle or a (non-square) rhombus.
 If not, explain why not.

**Classify quadrilaterals by their geometric properties**

(equal and/or parallel sides, equal angles, right angles, diagonals bisected and/or at right angles, reflection and rotation symmetry...).

Know properties such as:

- An **isosceles trapezium** is a trapezium in which the two opposite non-parallel sides are the same length. It has one line of symmetry and both diagonals are the same length.
- A **parallelogram** has its opposite sides equal and parallel. Its diagonals bisect each other. It has rotation symmetry of order 2.
- A **rhombus** is a parallelogram with four equal sides. Its diagonals bisect each other at right angles. Both diagonals are lines of symmetry. It has rotation symmetry of order 2.
- A **kite** is a quadrilateral that has two pairs of adjacent sides of equal length, and no interior angle larger than  $180^\circ$ . It has one line of symmetry and its diagonals cross at right angles.
- An **arrowhead** or **delta** has two pairs of adjacent edges of equal length and one interior angle larger than  $180^\circ$ . It has one line of symmetry. Its diagonals cross at right angles outside the shape.

Provide a convincing argument to explain, for example, that a rhombus is a parallelogram but a parallelogram is not necessarily a rhombus.

Devise questions for a tree classification diagram to sort a given set of quadrilaterals.

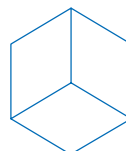
- Identify then classify the 16 distinct quadrilaterals that can be constructed on a 3 by 3 pinboard.

**Link to standard constructions (pages 220–3).**

**As outcomes, Year 9 pupils should, for example:**

**Know and use angle and symmetry properties of polygons, and angle properties of parallel and intersecting lines, to solve problems and explain reasoning.** For example:

- Deduce the angles of the rhombus in this arrangement of three identical tiles.



What can you deduce about the shape formed by the outline?

- Explain why:
  - Equilateral triangles, squares and regular hexagons will tessellate on their own but other regular polygons will not.
  - Squares and regular octagons will tessellate together.

**Know and use properties of triangles, including Pythagoras' theorem.**

Know that:

- In any triangle, the largest angle is opposite the longest side and the smallest angle is opposite the shortest side.
- In a right-angled triangle, the side opposite the right angle is the longest and is called the **hypotenuse**.

**Understand, recall and use Pythagoras' theorem.**

Explain special cases of Pythagoras' theorem in geometrical arrangements such as:

