

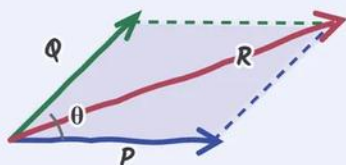


Quadrilaterals

four sides, the family tree they form, and the tests that name a shape from its properties

The starting facts *

- a quadrilateral is a closed figure with four sides, four vertices and four angles
- its four interior angles add to 360°
- the reason is simple: one diagonal cuts it into two triangles, and each triangle contributes 180°
- opposite sides are the pairs with no vertex in common, and adjacent sides share one
- the two diagonals join opposite vertices, and much of the chapter is about how they behave
- the sum of the exterior angles, one at each vertex, is 360° as it is for any polygon



a four sided figure with one diagonal drawn across it, splitting it into two triangles: each triangle holds 180° , and nothing is counted twice, so the four angles of the quadrilateral must total 360°

The parallelogram, and what follows from it

- a parallelogram is a quadrilateral whose opposite sides are parallel, and that one condition forces all the rest
- opposite sides are equal in length
- opposite angles are equal
- consecutive angles are supplementary, adding to 180° , since they are co-interior between the parallel sides
- the diagonals bisect each other, though they are not equal in general
- each diagonal splits it into two congruent triangles, which is how most of these properties are proved

Tests for a parallelogram

- any one of the following is enough to prove a quadrilateral is a parallelogram
- both pairs of opposite sides parallel, which is the definition itself
- both pairs of opposite sides equal
- both pairs of opposite angles equal
- the diagonals bisect each other
- one pair of opposite sides both equal and parallel, which is the most useful test of all and the one most often overlooked

