

Quadrilaterals

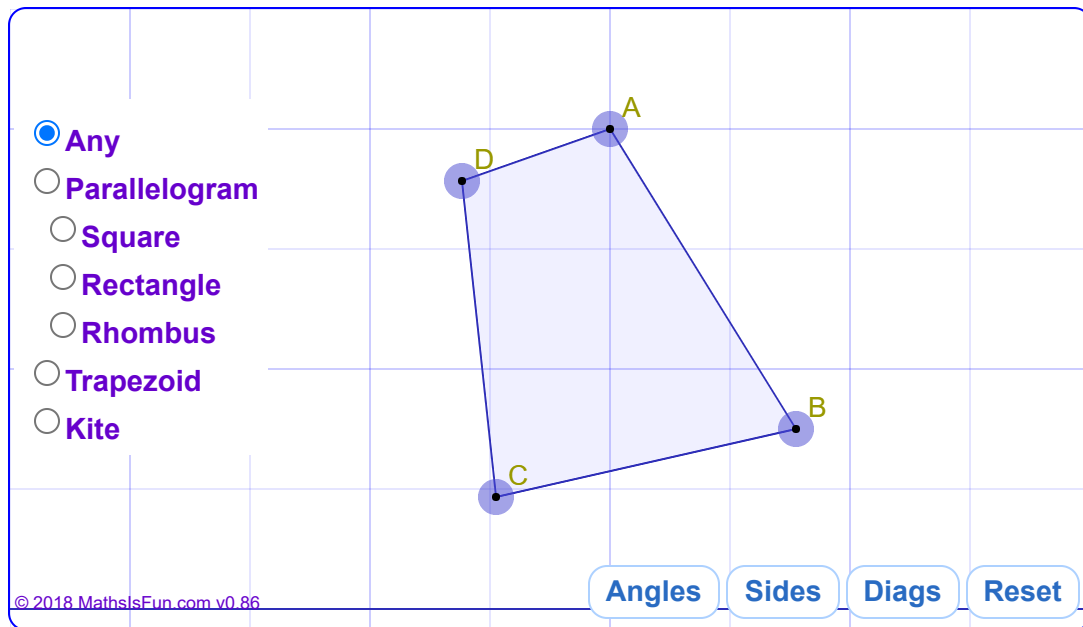
We may use [Cookies](#)

OK

Quadrilateral just means "four sides"
(*quad* means four, *lateral* means side).

A Quadrilateral has four-sides, it is **2-dimensional** (a flat shape), **closed** (the lines join up), and has **straight** sides.

Try it Yourself



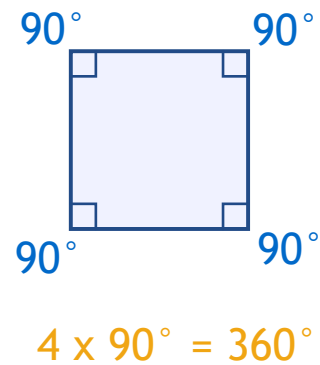
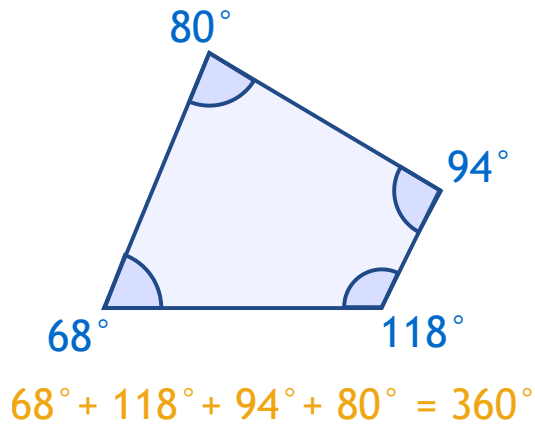
(Also see this on [Interactive Quadrilaterals](#))

Properties

A quadrilateral has:

- four sides (edges)
- four vertices (corners)

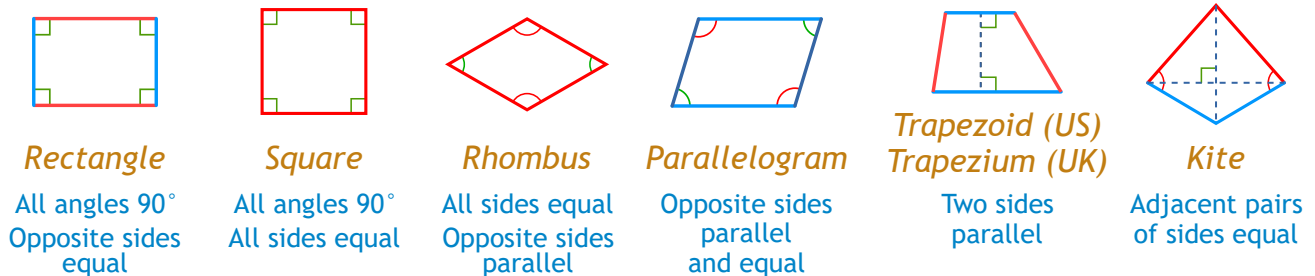
- interior angles that add to **360 degrees**:



Try drawing a quadrilateral, and measure the angles. They should add to **360°**

Types of Quadrilaterals

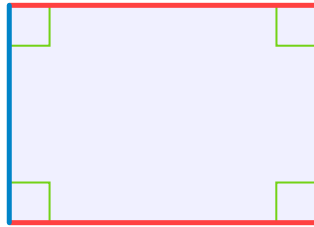
There are special types of quadrilateral:



Some types are also included in the definition of other types! For example a **square**, **rhombus** and **rectangle** are also **parallelograms**. [See below](#) for more details.

Let us look at each type in turn:

The Rectangle

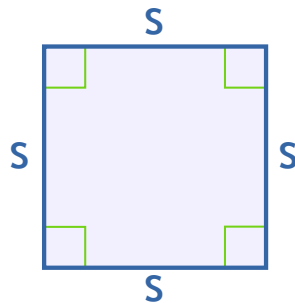


the little squares in each corner mean "right angle"

A rectangle is a four-sided shape where every angle is a right angle (90°).

Also **opposite sides** are parallel and of equal length.

The Square



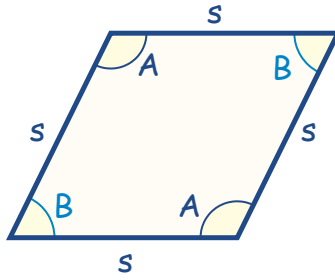
the little squares in each corner mean "right angle"

A square has equal sides (marked "s") and every angle is a right angle (90°)

Also opposite sides are parallel.

A square also fits the definition of a **rectangle** (all angles are 90°), and a **rhombus** (all sides are equal length).

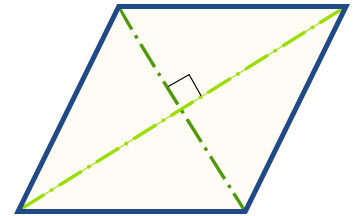
The Rhombus



A **rhombus** is a four-sided shape where all sides have equal length (marked "s").

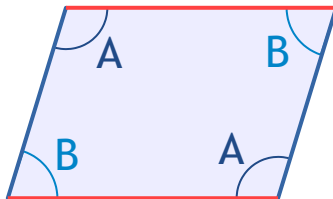
Also opposite sides are parallel *and* opposite angles are equal.

Another interesting thing is that the diagonals (dashed lines) meet in the middle at a right angle. In other words they "bisect" (cut in half) each other at right angles.



A rhombus is sometimes called a **rhomb** or a **diamond**.

The Parallelogram



A **parallelogram** has opposite sides parallel and equal in length. Also opposite angles are equal (angles "A" are the same, and angles "B" are the same).

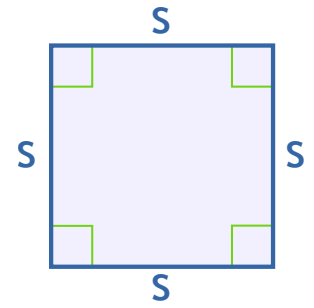
NOTE: Squares, Rectangles and Rhombuses are all Parallelograms!

Example:

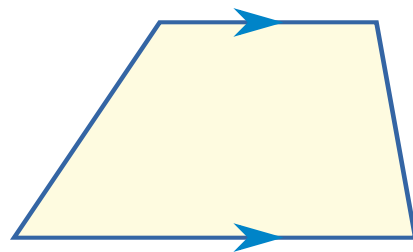
A **parallelogram** with:

- all sides equal and
- angles "A" and "B" as right angles

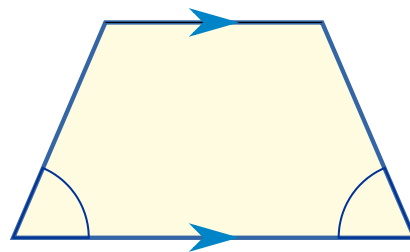
is a **square**!



The Trapezoid (UK: Trapezium)



Trapezoid



Isosceles Trapezoid

A trapezoid (called a *trapezium* in the UK) has a pair of opposite sides parallel.

And a **trapezium** (called a *trapezoid* in the UK) is a quadrilateral with NO parallel sides:

Trapezoid

Trapezium

In the US: a pair of parallel sides

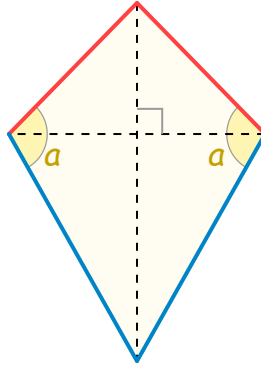
NO parallel sides

In the UK: NO parallel sides a pair of parallel sides

(the US and UK definitions are swapped over!)

An **Isosceles** trapezoid, as shown above, has left and right sides of equal length that join to the base at equal angles.

The Kite



Hey, it looks like a [kite](#) (usually).

It has **two pairs** of sides:

Each pair is made of two equal-length sides that join up.

Also:

- the angles where the two pairs meet are equal.
- the diagonals, shown as dashed lines above, meet at a right angle.
- one of the diagonals *bisects* (cuts equally in half) the other.

... and that's it for the special quadrilaterals.

Irregular Quadrilaterals

The only [regular](#) (all sides equal and all angles equal) quadrilateral is a square. So all other quadrilaterals are **irregular**.

The "Family Tree" Chart

Quadrilateral definitions are **inclusive**.

Example: a square is also a rectangle.

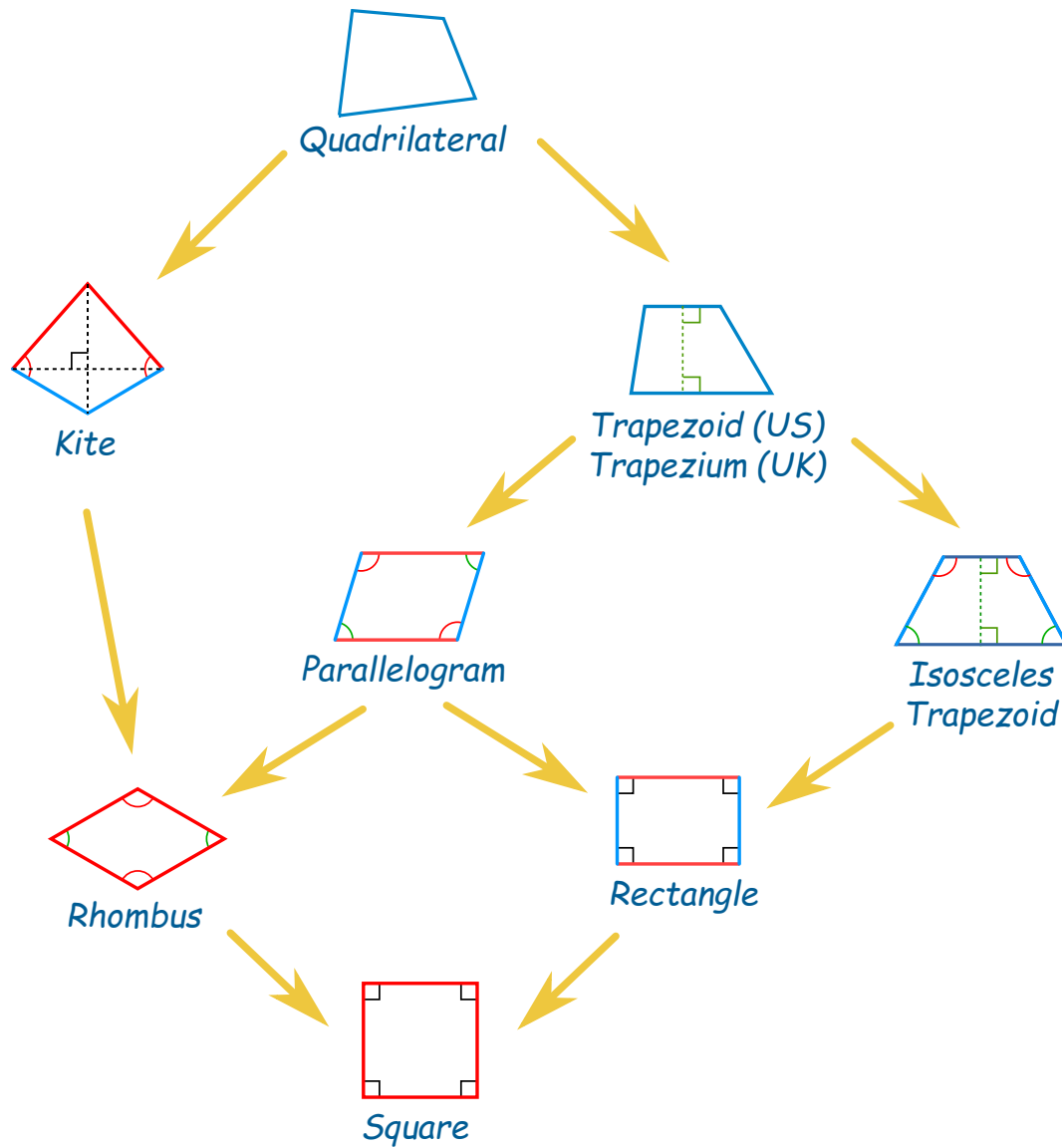
So we **include** a square in the definition of a rectangle.

*(We **don't** say "Having all 90° angles makes it a rectangle except when all sides are equal then it is a square.")*

This may seem odd, as in daily life we think of a square as **not** being a rectangle ... but in mathematics it **is**.

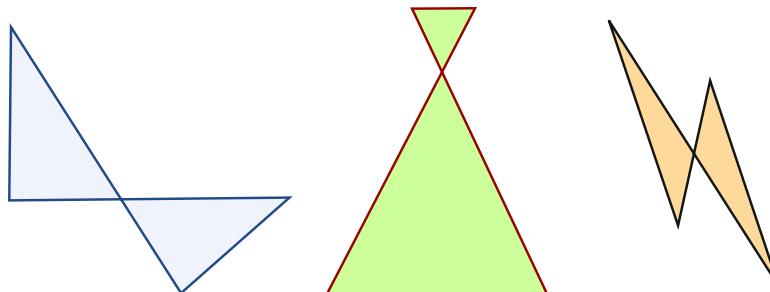
Using the chart below we can answer such questions as:

- Is a Square a type of Rectangle? (Yes)
- Is a Rectangle a type of Kite? (No)



Complex Quadrilaterals

Oh Yes! when two sides cross over, we call it a "Complex" or "Self-Intersecting" quadrilateral, like these:



They still have 4 sides, but two sides cross over.

Polygon

A quadrilateral is a [polygon](#). In fact it is a 4-sided polygon, just like a triangle is a 3-sided polygon, a pentagon is a 5-sided polygon, and so on.

Play with Them

Now that you know the different types, you can play with the

[Interactive Quadrilaterals](#).

Other Names

A quadrilateral can sometimes be called:

- a **Quadrangle** ("*four angles*"), so it sounds like "triangle"
- a **Tetragon** ("*four polygon*"), so it sounds like "pentagon", "hexagon", etc.

Mathopolis: [Q1](#) [Q2](#) [Q3](#) [Q4](#) [Q5](#) [Q6](#) [Q7](#) [Q8](#) [Q9](#) [Q10](#)

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