

Grade 5 - Classifying Two-Dimensional Figures - Lesson

Common Core 5.G.B.3, 5.G.B.4 · maths-pdf.fr/en/

Two-dimensional figures are sorted into categories by their properties. Every square is a rectangle, a rhombus, a parallelogram and a quadrilateral, because it has all of their properties. Triangles are named by sides (equilateral, isosceles, scalene) and by angles (acute, right, obtuse). Tree and Venn diagrams show these groups.

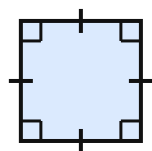
Grade 5 · Common Core State Standards: **5.G.B.3, 5.G.B.4**

Key facts

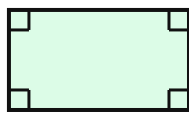
- A quadrilateral has 4 sides; a parallelogram has two pairs of parallel sides.
- A rectangle has 4 right angles; a rhombus has 4 equal sides; a square has both.
- Every square is a rectangle and a rhombus, but not every rectangle is a square.
- Triangles by sides: equilateral, isosceles, scalene.
- Triangles by angles: acute, right, obtuse.

What is a quadrilateral?

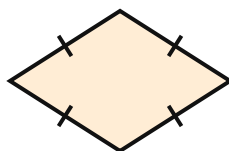
A **quadrilateral** is a closed shape with 4 straight sides and 4 angles. Special quadrilaterals have extra properties. A **parallelogram** has two pairs of parallel sides. A **rectangle** is a parallelogram with 4 right angles. A **rhombus** is a parallelogram with 4 equal sides. A **square** has 4 equal sides and 4 right angles. In this book, a **trapezoid** has at least one pair of parallel sides.



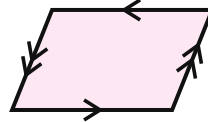
Square



Rectangle



Rhombus



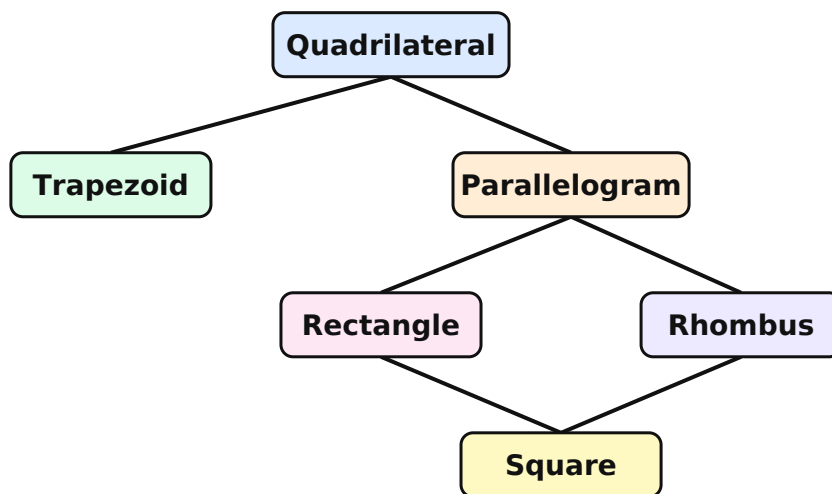
Parallelogram

Tick marks show equal sides, small squares show right angles and arrows show parallel sides.

How are the quadrilaterals related?

A shape that belongs to a group has every property of that group. Read the tree from the

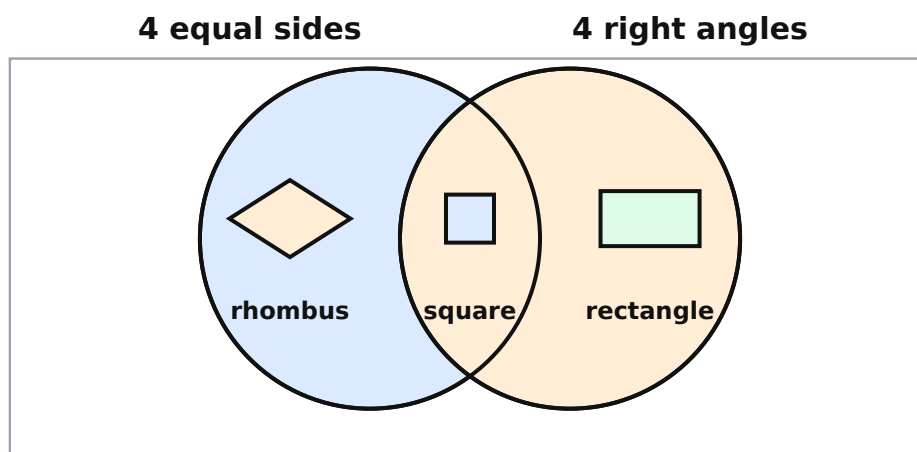
bottom up. A square is a rectangle and a rhombus, so it is also a parallelogram and a quadrilateral. The reverse is not true. A rectangle that is 6 cm by 3 cm is not a square, because its sides are not all equal. When you name a shape, the most specific name tells the most about it.



A tree diagram of the quadrilateral family.

How does a Venn diagram show the groups?

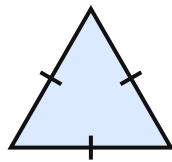
Each circle holds shapes with one property. The overlap holds shapes with both properties. Squares have 4 equal sides and 4 right angles, so they go in the overlap. A rhombus with slanted sides has only equal sides, so it goes in the left circle alone. A long rectangle has only right angles, so it goes in the right circle alone. A shape with neither property would go outside both circles.



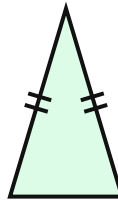
Rhombus (left only), square (both) and rectangle (right only).

How do you classify triangles?

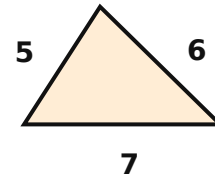
Name a triangle by its sides and by its angles. By sides: equilateral (3 equal sides), isosceles (at least 2 equal sides) or scalene (no equal sides). By angles: acute (all angles less than 90°), right (one 90° angle) or obtuse (one angle greater than 90°). A triangle always has two names, one for its sides and one for its angles. For example, a triangle with sides 3, 4 and 5 and a right angle is a scalene right triangle.



Equilateral
3 equal sides

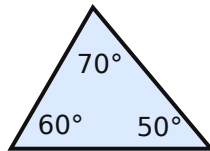


Isosceles
at least 2 equal sides

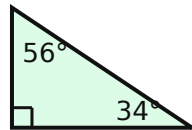


Scalene
no equal sides

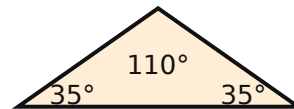
Triangles classified by their sides.



Acute
3 angles less than 90°



Right
one 90° angle



Obtuse
one angle over 90°

Triangles classified by their angles.

Steps

1. Count the sides and check which are equal or parallel.
2. Look for right angles.
3. Choose the most specific name.
4. Check that the shape has every property of its name.

Questions about classifying two-dimensional figures

Is every square a rectangle?

Yes. A rectangle has 4 right angles and opposite sides equal. A square has 4 right angles and all sides equal, so it has every property of a rectangle.

Is every rectangle a square?

No. A rectangle that is 6 cm by 3 cm has right angles, but its sides are not all equal. Only rectangles with 4 equal sides are squares.

What is the difference between a rhombus and a square?

A rhombus has 4 equal sides. A square has 4 equal sides and 4 right angles. So every square is a rhombus, but a rhombus with no right angles is not a square.

What is a trapezoid?

In this book, a trapezoid is a quadrilateral with at least one pair of parallel sides. The parallel sides are called the bases.

Can a triangle be both right and isosceles?

Yes. A triangle with a 90° angle and two equal sides is a right isosceles triangle. Sides and angles are two separate ways of naming the same triangle.