

Grade 3 · Quadrilaterals and Partitioning Shapes · Lesson

Common Core 3.G.A.1, 3.G.A.2 · mathovore.fr

A quadrilateral is a closed shape with 4 straight sides and 4 corners. Rectangles, squares, rhombuses, kites and trapezoids are quadrilaterals. They are sorted by attributes such as equal sides and right angles. A shape can also be partitioned into parts with equal areas, and each part is a unit fraction of the whole.

Grade 3 Common Core: 3.G.A.1 · 3.G.A.2

Key facts:

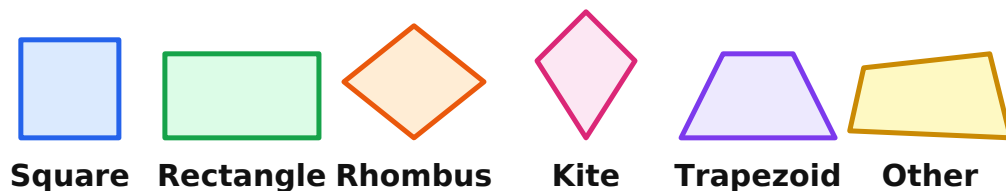
- A quadrilateral has exactly 4 sides and 4 vertices.
- A rectangle has 4 right angles; a rhombus has 4 equal sides.
- A square has 4 equal sides and 4 right angles, so it is both a rectangle and a rhombus.
- Cutting a shape into 4 equal-area parts makes each part $\frac{1}{4}$ of the whole.
- Equal parts can have different shapes if their areas are equal.

What is a quadrilateral?

Look around the classroom. Windows, book covers and floor tiles all have four straight sides. Math has a name for any closed shape like that.

Quadrilateral

A **quadrilateral** is a closed shape with exactly **4 straight sides** and **4 vertices** (corners).



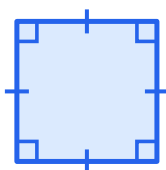
Six quadrilaterals. Each one has 4 sides and 4 corners.

A triangle has 3 sides and a pentagon has 5, so neither one is a quadrilateral. The six shapes

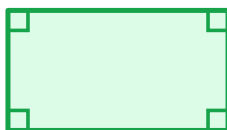
above all have 4 sides, even though they look very different.

How do you sort quadrilaterals by their attributes?

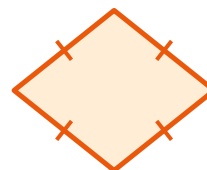
An **attribute** is something you can measure or count, such as the length of a side or the size of a corner. A corner that makes a perfect square corner is a **right angle**.



Square



Rectangle



Rhombus

Tick marks show equal sides. Small squares in the corners show right angles.

Shape	Key attribute
Rectangle	4 right angles
Rhombus	4 sides of equal length
Square	4 equal sides and 4 right angles

A square has both attributes, so a square is also a rectangle and also a rhombus. A kite or a trapezoid is a quadrilateral that is none of these three.

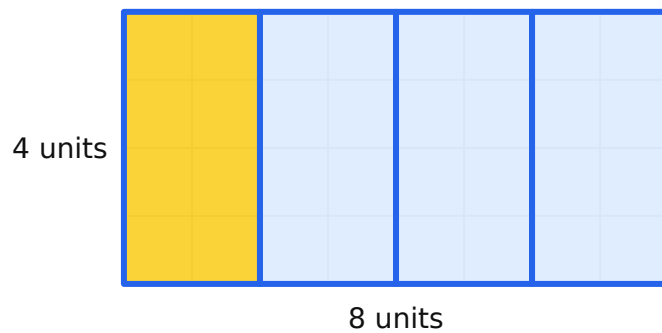
How do you decide what to call a shape?

1. Count the sides. If there are not 4, it is not a quadrilateral.
2. Check the sides. Are all 4 the same length?
3. Check the corners. Are all 4 right angles?
4. Use the answers to pick the name.

Example: A shape has 4 sides, each 6 inches long, and 4 right angles. Step 2 says the sides are equal. Step 3 says the corners are right angles. So the shape is a square, and it is also a rectangle and a rhombus.

What does it mean to partition a shape into equal parts?

To **partition** a shape means to cut it into parts that fill it with no gaps and no overlaps. The parts have equal areas when they cover the same amount of space.

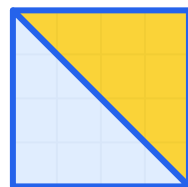


Four equal strips, each 2 by 4. Each strip has an area of 8 square units, which is $\frac{1}{4}$ of the whole.

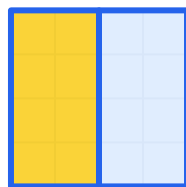
Unit fraction of area

If a shape is cut into **4** parts with equal areas, each part is $\frac{1}{4}$ of the whole shape. With **3** equal parts, each is $\frac{1}{3}$. With **8** equal parts, each is $\frac{1}{8}$.

Equal area does not mean equal shape. A square can be cut into two halves in many ways, and each half still covers the same space.



Diagonal



Vertical



Horizontal

Three different cuts, same result. Every half has an area of 8 square units.

Quadrilaterals and Partitioning Shapes: frequently asked questions

What is a quadrilateral in third grade math?

A quadrilateral is a closed shape with 4 straight sides and 4 vertices. Squares, rectangles, rhombuses, kites and trapezoids are all quadrilaterals.

Is a square a rectangle?

Yes. A rectangle is a quadrilateral with 4 right angles, and a square has 4 right angles. A square also has 4 equal sides, which makes it a special rectangle.

What is the difference between a rhombus and a square?

Both have 4 equal sides. A square must also have 4 right angles. A rhombus can lean over, so

its corners are not right angles.

Can a quadrilateral be none of the named kinds?

Yes. A kite, a trapezoid or a four-sided shape with uneven sides is a quadrilateral that is not a rhombus, a rectangle or a square.

How do you name the area of one equal part?

Count the equal parts in the whole. If a shape is cut into 6 equal-area parts, each part is $\frac{1}{6}$ of the shape's area.