

Build a Quadrilateral Definition

Use properties to explain each shape family

GRADE 4 • 4.MG.5.a

4.MG.5.a "Excerpt: Develop definitions for parallelograms, rectangles, squares, rhombi, and trapezoids through the exploration of properties and attributes."

NAME _____

DATE _____

Look Closely, Then Explain

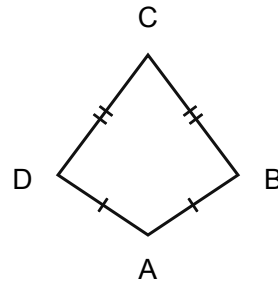
A quadrilateral has four straight sides. Parallel sides stay the same distance apart and never meet when extended. Matching tick marks show congruent (equal-length) sides; small corner squares mark right angles. Orientation and size do not change a shape family. On this worksheet, a trapezoid has exactly one pair of parallel sides.

Worked example

How can we tell that this kite is a quadrilateral?

Trace the closed boundary from A back to A. Count four straight sides; there are no curved sides. It is a quadrilateral because it is a closed shape with four straight sides.

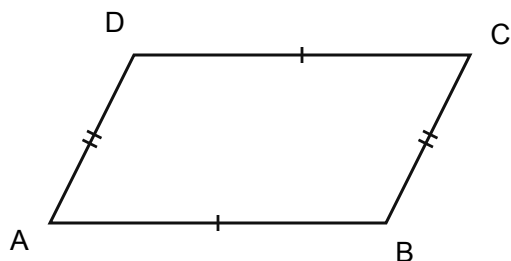
Example kite



Study the labelled examples and the stated properties. Write each definition in your own words. A shape may belong to more than one family.

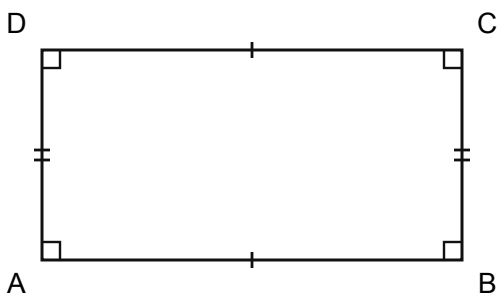
1. Explore parallelograms

AB is parallel to CD; BC is parallel to AD. Count the pairs. Write a definition of parallelogram using quadrilateral and parallel sides.

Parallelogram ABCD

2. Explore rectangles

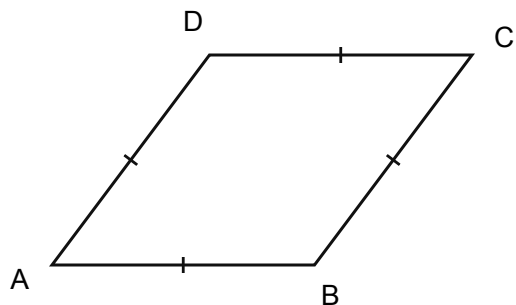
Find the right-angle marks. Opposite sides are parallel. Write a definition of rectangle using quadrilateral and angles.

Rectangle ABCD

3. Explore rhombi

Use the tick marks to compare all four side lengths. Opposite sides are parallel. Write a definition of rhombus using quadrilateral and side lengths.

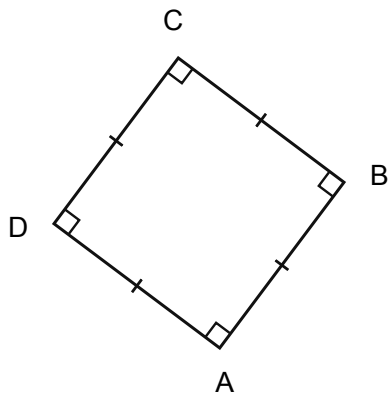
Rhombus ABCD



4. Explore squares

Use both kinds of marks. Write a definition of square that includes its side lengths and angles.

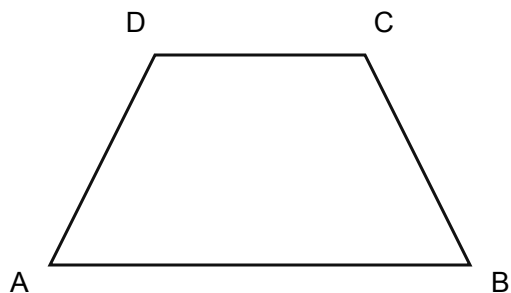
Square ABCD, turned



5. Explore trapezoids

AB is parallel to CD. AD and BC are not parallel. Write a definition of trapezoid that tells exactly how many pairs of parallel sides it has.

Trapezoid ABCD



6. Turned, but still a square

Use the turned square in Task 4. Use your definitions to explain why it is also a rectangle, a rhombus, and a parallelogram.

7. Find the missing property

Lee says a rectangle must have two long and two short sides. Nia says four congruent sides are enough to define a square. Use earlier figures to show why each definition needs fixing.

TEACHER NOTES

Accept equivalent necessary-and-sufficient definitions; students need not copy a sentence. Use the exactly-one-pair trapezoid convention stated on the student pages. Rectangles and rhombi include squares. Tick marks indicate equality, not parallelism; parallel relationships are supplied in the task text.

TASK 1

A parallelogram is a quadrilateral with two pairs of parallel opposite sides.

TASK 2

A rectangle is a quadrilateral with four right angles. It also has two pairs of parallel opposite sides.

TASK 3

A rhombus is a quadrilateral with four congruent sides. It also has two pairs of parallel opposite sides.

TASK 4

A square is a quadrilateral with four congruent sides and four right angles.

TASK 5

A trapezoid is a quadrilateral with exactly one pair of parallel sides, using this worksheet's definition. Require exactly one pair of parallel sides under the stated convention.

TASK 6

It has four right angles, so it is a rectangle; four congruent sides, so it is a rhombus; and two pairs of parallel opposite sides, so it is a parallelogram. Accept equivalent correct reasoning supported by the stated measurements or geometric properties.

TASK 7

Lee excludes squares, which are rectangles with all sides equal; a rectangle needs four right angles. Nia includes the non-square rhombus in Task 3; a square needs four congruent sides AND four right angles.