

Side-Pair Detectives

Parallel, intersecting, perpendicular, or congruent?

GRADE 4 • 4.MG.5.c

4.MG.5.c "Excerpt: Identify and describe parallel, intersecting, perpendicular, and congruent sides in quadrilaterals."

NAME _____

DATE _____

Look Closely, Then Explain

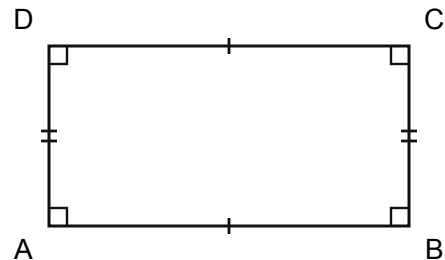
Parallel sides do not meet when extended in the same plane. Intersecting sides share a point. Perpendicular sides intersect at a right angle. Congruent sides have equal lengths. One pair may have more than one relationship. Matching ticks show equal lengths; corner squares show right angles.

Worked example

Describe AB and BC in this rectangle.

AB and BC share endpoint B, so they intersect. The right-angle mark at B also makes them perpendicular. AB and BC are intersecting and perpendicular. These adjacent sides are not congruent.

Example rectangle ABCD

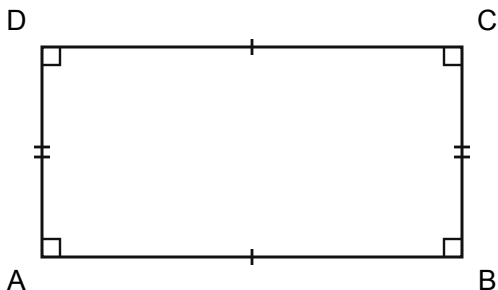


Name side pairs by endpoint letters, such as AB and CD. Give all applicable relationships and support each with a property, mark, or stated fact.

1. Opposite sides

ABCD is a rectangle. Describe AB and CD using every relationship from the title that applies. Explain using the rectangle's properties and marks.

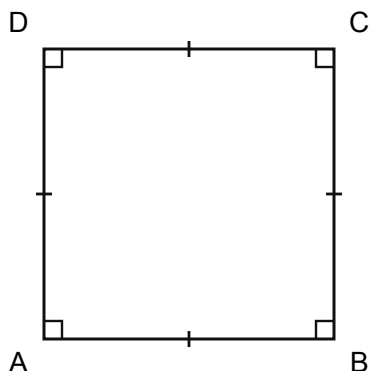
Rectangle ABCD



2. Adjacent square sides

ABCD is a square. Describe AB and BC using every relationship that applies. Name their shared point.

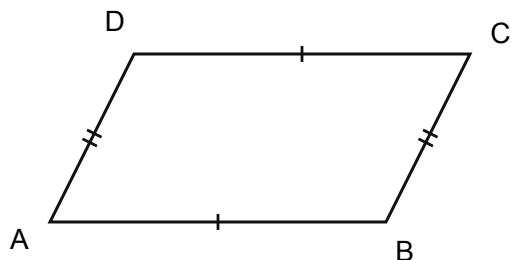
Square ABCD



3. A slanted parallelogram

ABCD is a parallelogram with no right angles. Describe AD and BC, then AB and BC. Explain why intersecting does not always mean perpendicular.

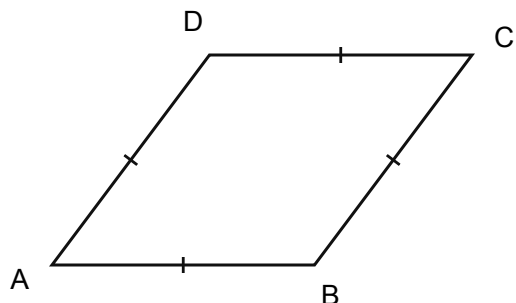
Parallelogram ABCD



4. Equal lengths, different directions

ABCD is a rhombus with no right angles. Describe AB and BC, then AB and CD. Does equal length always mean parallel? Explain.

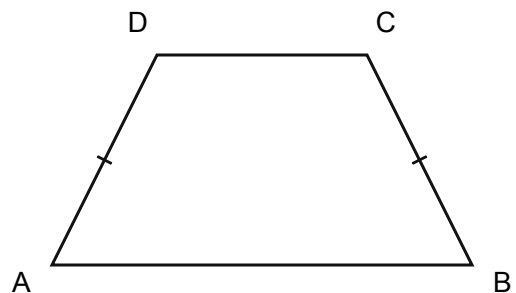
Rhombus ABCD



5. Frame edges

This trapezoid-shaped frame has AB parallel to CD. AD and BC are not parallel. Name the parallel pair and two intersecting pairs. Are either of your intersecting pairs perpendicular? Explain; none of the angles is a right angle.

Trapezoid frame ABCD



6. Two claims about a square

Use the square in Task 2. Ana says AB and BC cannot be perpendicular because they are congruent. Ben says AB and CD must intersect because they are congruent. Correct both claims.

7. Describe without a picture

A rectangle has side lengths 8 cm, 3 cm, 8 cm, 3 cm in order. Describe an opposite pair and an adjacent pair using all applicable relationships. Explain which pair is congruent.

TEACHER NOTES

Intersecting includes perpendicular. Congruence concerns length and can coexist with either parallelism or perpendicularity. Accept other correct adjacent or opposite pairs. Do not treat missing tick marks alone as proof of unequal length; the named shapes, exact diagrams, and stated facts support the answers.

TASK 1

AB and CD are parallel and congruent. They do not intersect and are not perpendicular.

TASK 2

AB and BC are intersecting, perpendicular, and congruent. They meet at B. They are not parallel.

TASK 3

AD and BC are parallel and congruent. AB and BC intersect at B but are not perpendicular or congruent. Intersecting only requires meeting, not a right angle.

TASK 4

AB and BC are congruent and intersecting but not parallel or perpendicular. AB and CD are congruent and parallel. Equal length does not always mean parallel.

TASK 5

Parallel: AB and CD. For example, AB and AD meet at A; AB and BC meet at B. Neither pair is perpendicular because those intersections are not right angles. Accept equivalent correct reasoning supported by the stated measurements or geometric properties.

TASK 6

Ana: a pair can be both congruent and perpendicular; length and angle describe different properties. Ben: AB and CD are congruent but parallel, so they do not intersect. Accept equivalent correct reasoning supported by the stated measurements or geometric properties.

TASK 7

Opposite sides are parallel and congruent (8 with 8, or 3 with 3). Adjacent sides intersect perpendicularly but are not congruent because 8 cm differs from 3 cm.