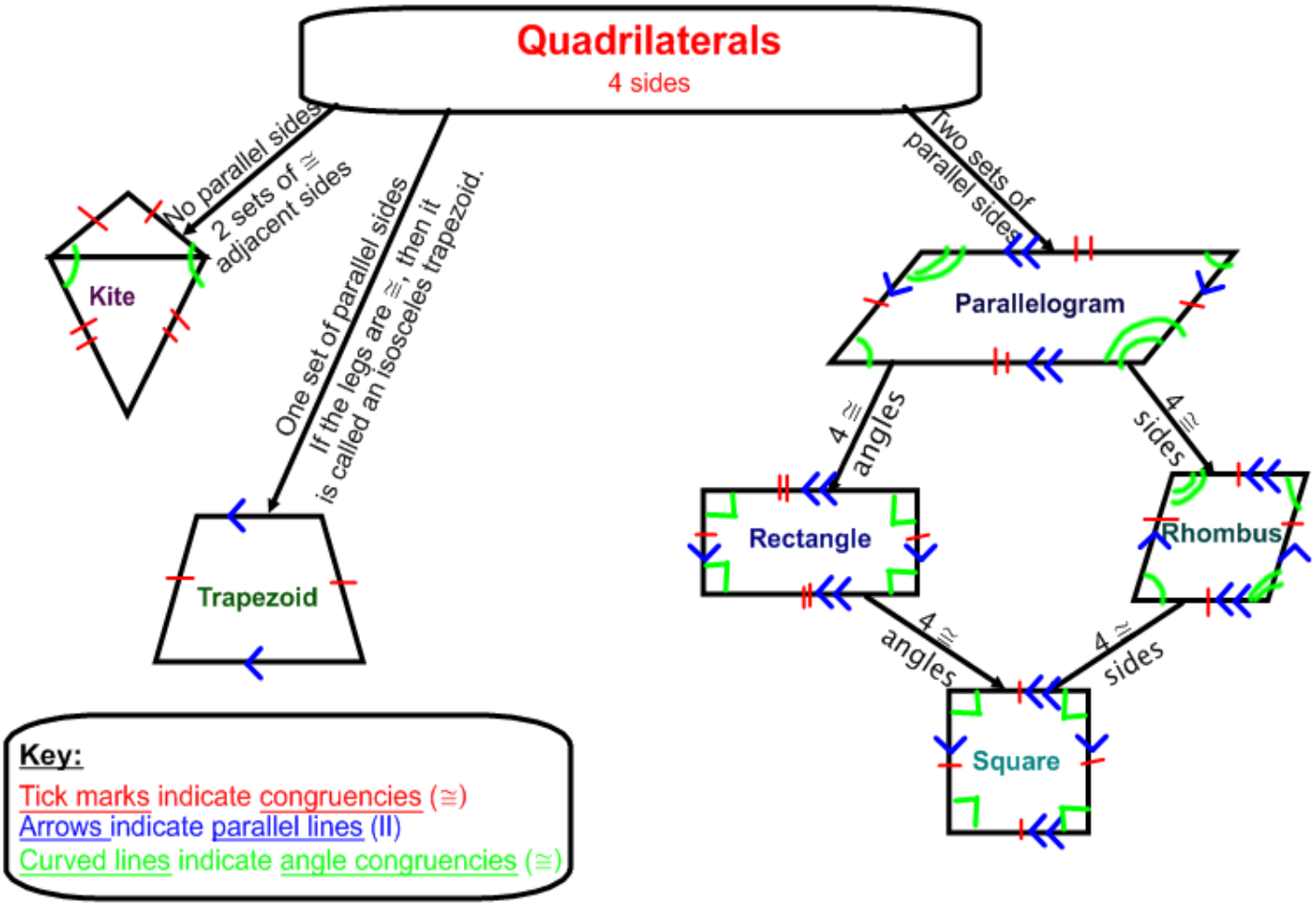
SOL 6.13 – Quadrilaterals

6.13 The student will describe and identify properties of quadrilaterals.

Understanding the Standard:

- A quadrilateral is a closed planar (two-dimensional) figure with four sides that are line segments.
- A parallelogram is a quadrilateral whose opposite sides are parallel and opposite angles are congruent.
- A rectangle is a parallelogram with four right angles.
- Rectangles have special characteristics (such as diagonals are bisectors) that are true for any rectangle.
- To bisect means to divide into two equal parts.
- A square is a rectangle with four congruent sides or a rhombus with four right angles.
- A rhombus is a parallelogram with four congruent sides.
- A trapezoid is a quadrilateral with exactly one pair of parallel sides. The parallel sides are called *bases,* and the nonparallel sides are called *legs*. If the legs have the same length, then the trapezoid is an isosceles trapezoid.
- A kite is a quadrilateral with two pairs of adjacent congruent sides. One pair of opposite angles is congruent.
- Quadrilaterals can be sorted according to common attributes, using a variety of materials.
- Quadrilaterals can be classified by the number of parallel sides: a parallelogram, rectangle, rhombus, and square each have two pairs of parallel sides; a trapezoid has only one pair of parallel sides; other quadrilaterals have no parallel sides.
- Quadrilaterals can be classified by the measures of their angles: a rectangle has four 90° angles; a trapezoid may have zero or two 90° angles.
- Quadrilaterals can be classified by the number of congruent sides: a rhombus has four congruent sides; a square, which is a rhombus with four right angles, also has four congruent sides; a parallelogram and a rectangle each have two pairs of congruent sides.
- A square is a special type of both a rectangle and a rhombus, which are special types of parallelograms, which are special types of quadrilaterals.
- The sum of the measures of the angles of a quadrilateral is 360°.
- A chart, graphic organizer, or Venn Diagram can be made to organize quadrilaterals according to attributes such as sides and/or angles.

SOL 6.13 – Quadrilaterals



When naming a quadrilateral, start with its most specific name and read up the tree diagram.

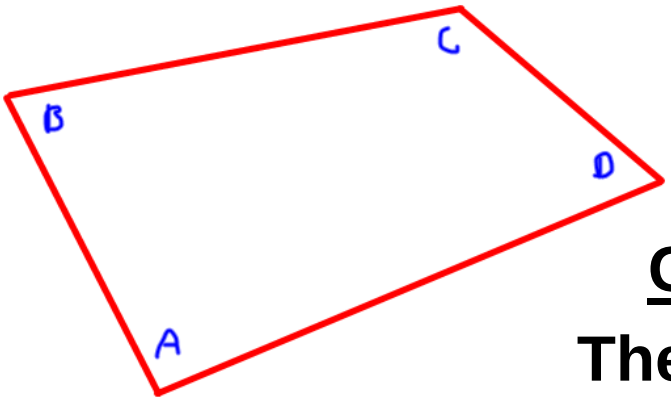
Example:

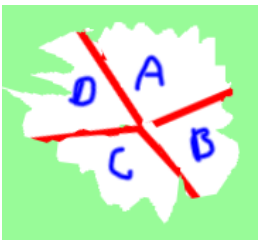
1. A square can also be called a rectangle, a rhombus, a parallelogram, a quadrilateral, and a polygon.
2. A kite can also be called a quadrilateral, and a polygon.
3. A rhombus can also be called a parallelogram, a quadrilateral, and a polygon.

SOL 6.13 – Finding the Sum of the Interior Angles of a Quadrilateral

Directions:

1. Draw a quadrilateral (with straight lines).
2. Label the angles as A, B, C, and D.
3. Tear off the angles with jagged edges.
4. Put all the corners/angles together.
5. How many degrees do the angles measure together?





GOOD!

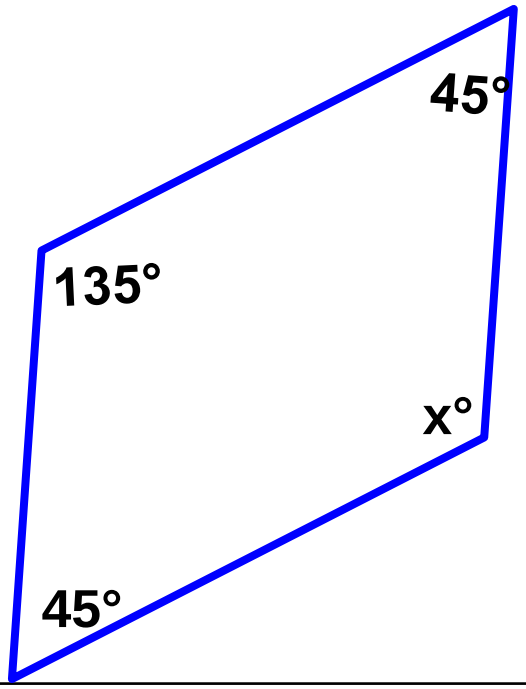
They add up to be 360°.

Thus to solve for a missing angle, add all the angles that are given to you, and then subtract the sum from 360°.

Now let's try it!

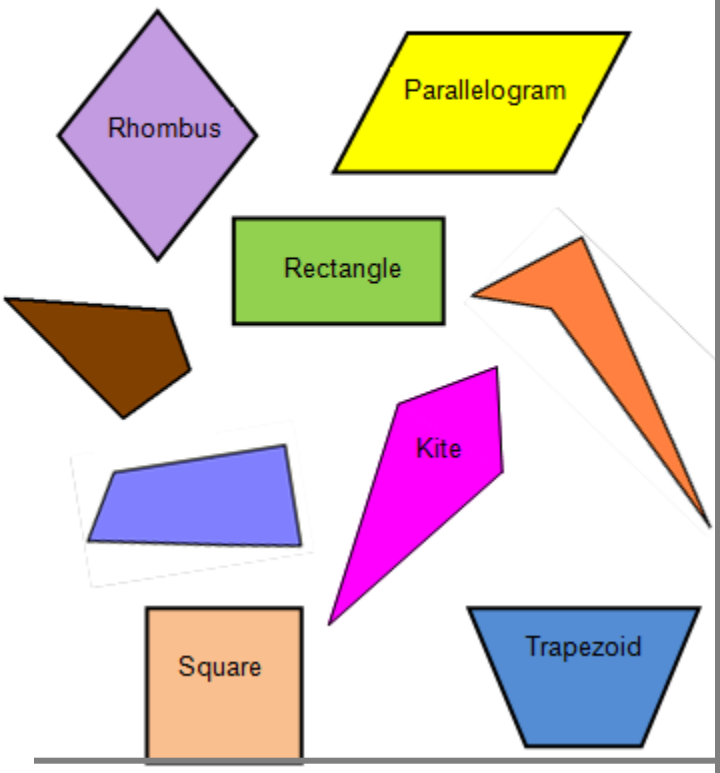
1.
135°
45°
+ 45°
225°

2.
360°
- 225°
135°

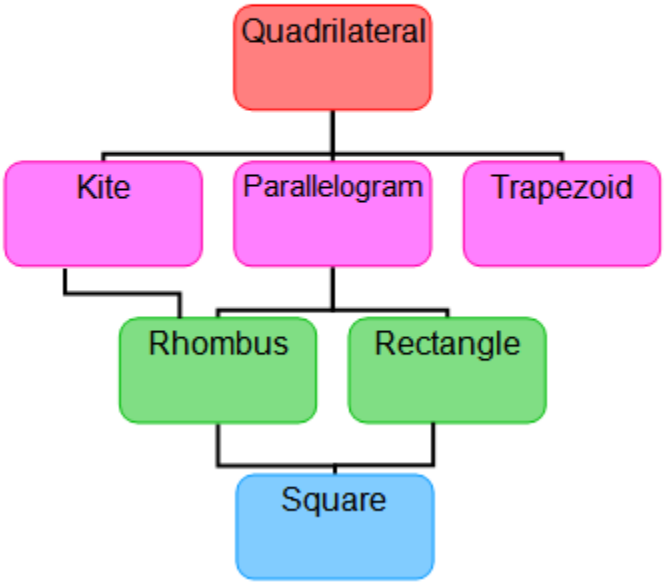


Vocabulary:

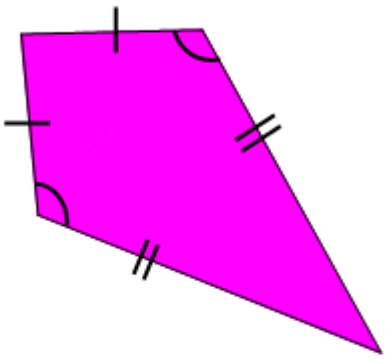
Quadrilaterals



Quadrilaterals Relationships

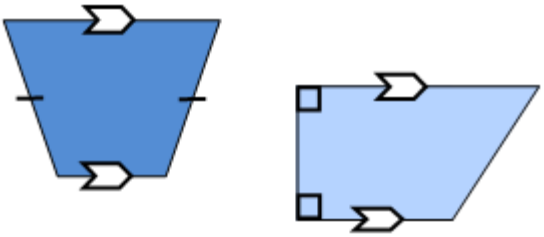


Kite



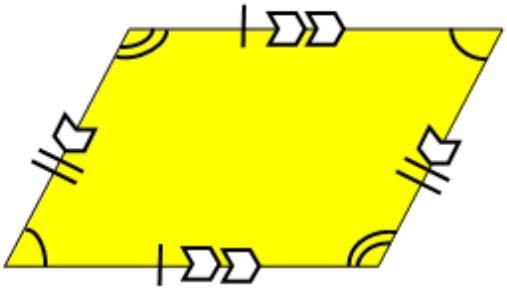
- one pair of opposite congruent angles
- 2 pairs of adjacent congruent sides

Trapezoid



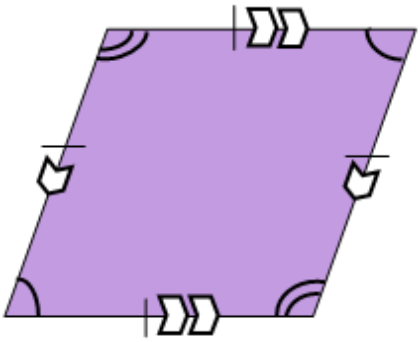
- may have zero or two right angles
- exactly one pair of parallel sides
- may have one pair of congruent sides

Parallelogram



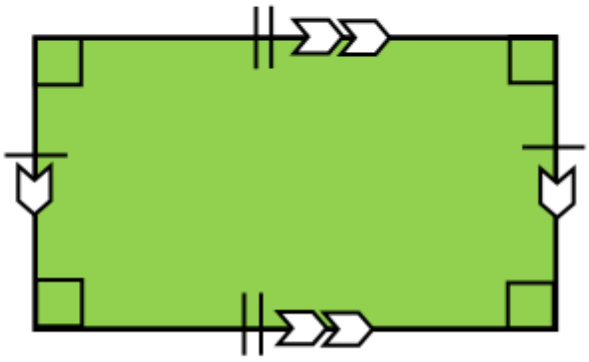
- opposite angles are congruent
- 2 pairs of parallel sides
- 2 pairs of opposite sides congruent

Rhombus



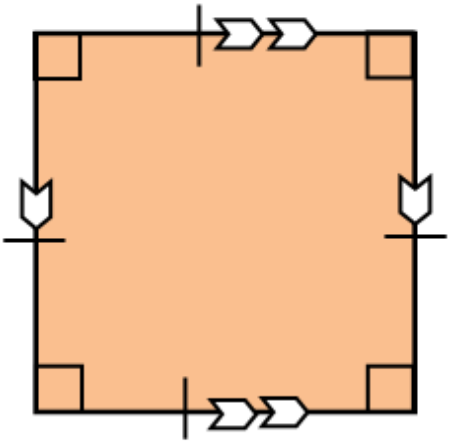
- opposite angles are congruent
- 2 pairs of parallel sides
- 4 congruent sides

Rectangle



- 4 right angles
- 2 pairs of parallel sides
- 2 pairs of opposite sides congruent

Square



- 4 right angles
- 2 pairs of parallel sides
- 4 congruent sides

Essential Understandings:

Can a figure belong to more than one subset of quadrilaterals? Yes

Remember they have the same attributes going up the tree diagram

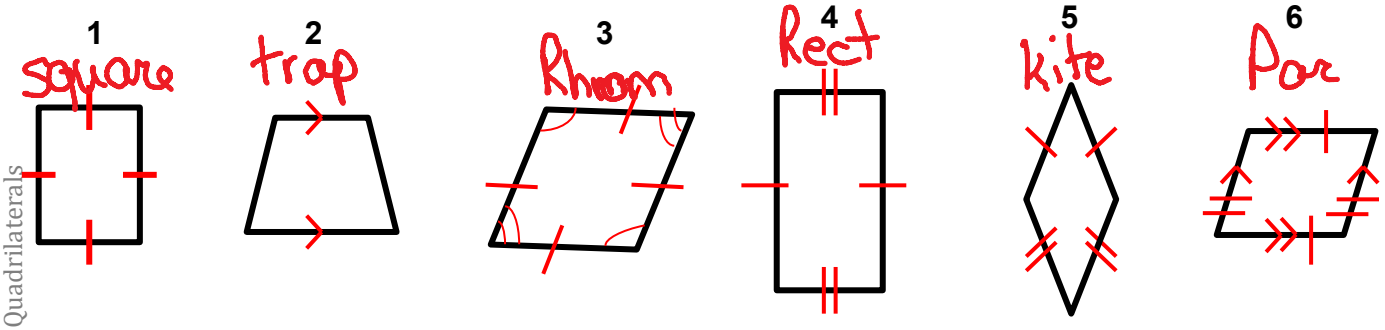
Essential Knowledge & Skills:

The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to

- Sort and classify polygons as quadrilaterals, parallelograms, rectangles, trapezoids, kites, rhombi, and squares based on their properties. Properties include number of parallel sides, angle measures and number of congruent sides.
- Identify the sum of the measures of the angles of a quadrilateral as 360°

Practice:

1. Name each figure using the given attributes with its most precise name. properties
2. What term most accurately classifies all of these figures? Quad
3. What term most accurately classifies figures 1, 3, 4, and 6? Par
4. What term most accurately classifies figures 1 and 3? Rhom



Released SOL Questions:

Which term most accurately classifies all of the figures below?

A Square

B Trapezoid

C Quadrilateral

D Parallelogram