

Polygon

Quadrilateral
(4 sides)

Kite

(2 pairs of
consecutive
sides congruent)

Parallelogram

(2 pairs of
parallel sides)

Trapezoid

(1 pair of
parallel sides)

Rhombus

(all sides have
same length)

Rectangle

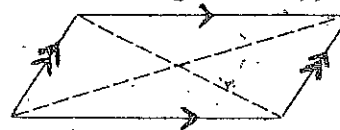
(4 right angles)

Square

(all sides have
same length)

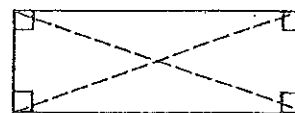
Parallelogram:

opposite sides are parallel
opposite sides are congruent
opposite angles are congruent
diagonals bisect each other
consecutive angles are supplementary



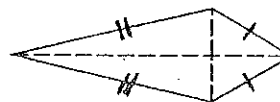
Rectangle:

all properties of a parallelogram
all angles are right angles
diagonals are congruent



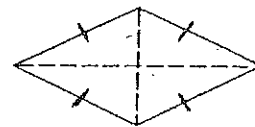
Kite:

2 disjoint pairs of consecutive sides are \cong
diagonals are \perp
one diagonal is \perp bisector of other
one diagonal bisects opposite angles
one pair of opposite angles are congruent



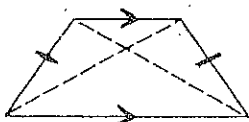
Rhombus:

all properties of a parallelogram
all properties of a kite
all sides congruent
diagonals bisect the angles
diagonals are \perp bisectors of each other
*diagonals divide rhombus into 4 congruent
right triangles*



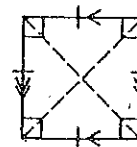
Isosceles Trapezoid:

legs are congruent
bases are parallel
upper and lower base angles are congruent
diagonals are congruent
*any lower base angle is supplementary to
any upper base angle*



Square:

all properties of a rectangle
all properties of a rhombus
diagonals form 4 isosceles right triangles



Proving That a Quadrilateral is a Parallelogram

Anyone of the following methods might be used to prove that quadrilateral is a parallelogram.

1. If both pairs of opposite sides of a quadrilateral are parallel, then the quadrilateral is a parallelogram (reverse of the definition).
2. If both pairs of opposite sides of a quadrilateral are congruent, then the quadrilateral is a parallelogram (converse of a property).
3. If one pair of opposite sides of a quadrilateral is both parallel and congruent, then the quadrilateral is a parallelogram.
4. If the diagonals of a quadrilateral bisect each other, then the quadrilateral is a parallelogram (converse of a property).
5. If both pairs of opposite angles of a quadrilateral are congruent, then the quadrilateral is a parallelogram (converse of a property).

Proving That a Quadrilateral is a Rectangle

To prove that a quadrilateral is a rectangle, you must first show it is a parallelogram and then use either of the following methods:

1. If a parallelogram contains at least one right angle, then it is a rectangle (reverse of the definition).
2. If the diagonals of a parallelogram are congruent, then the parallelogram is a rectangle.

You can also prove that a quadrilateral is a rectangle without first showing that it is a parallelogram.

3. If all four angles of a quadrilateral are right angles, then it is a rectangle.

Proving That a Quadrilateral is a Kite

To prove that a quadrilateral is a kite, either of the following methods can be used:

1. If two disjoint pairs of consecutive sides of a quadrilateral are congruent, then it is a kite (reverse of the definition).
2. If one of the diagonals of a quadrilateral is the perpendicular bisector of the other diagonal, then the quadrilateral is a kite.

Proving That a Quadrilateral is a Rhombus

To prove that quadrilateral is a rhombus, you must first show that it is a parallelogram and then apply either of the following methods.

1. If a parallelogram contains a pair of consecutive sides that are congruent, then it is a rhombus (reverse of the definition).
2. If either diagonal of a parallelogram bisects two angles of the parallelogram, then it is a rhombus.

You can also prove that a quadrilateral is a rhombus without first showing that it is a parallelogram.

3. If the diagonals of a quadrilateral are perpendicular bisectors of each other, then the quadrilateral is a rhombus.

Proving That a Quadrilateral is a Square

The following method can be used to prove that a quadrilateral is a square:

1. If a quadrilateral is both a rectangle and a rhombus, then it is a square (reverse of the definition).

Proving That a Trapezoid is Isosceles

Anyone of the following methods can be used to prove that a trapezoid is isosceles.

1. If the nonparallel sides of a trapezoid are congruent, then it is isosceles (reverse of the definition).
2. If the lower or the upper base angles of a trapezoid are congruent, then it is isosceles.
3. If the diagonals of a trapezoid are congruent, then it is isosceles.