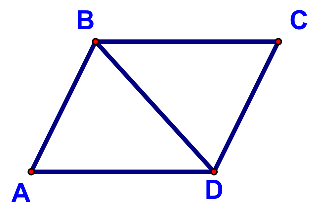
Proving that Figures are Special Quadrilaterals - Lesson 5-7

Here's the warmup!

Given: $\overline{AB} \parallel \overline{CD}$
$\angle ABC \cong \angle ADC$
$\overline{AB} \cong \overline{AD}$

Prove: ABCD is a rhombus



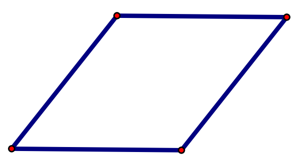
Statements	Reasons

Today, we're covering all the ways to prove that figures are special quadrilaterals. I'll say it for the last time...the key is memorizing that Venn Diagram...these all fall from there!

First, show the quadrilateral is a parallelogram. Then, use one of the following:

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.**

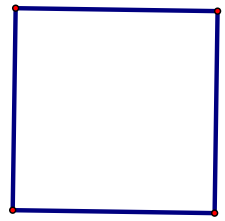
Alternatively, you can prove that all four angles of a quadrilateral are right angles.



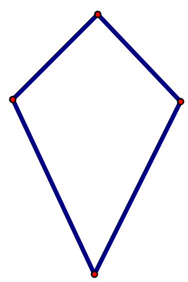
First, show the quadrilateral is a parallelogram. Then, use one of the following:

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.**

Alternatively, you can prove that the diagonals of a quadrilateral are $\perp$ bisectors of each other.

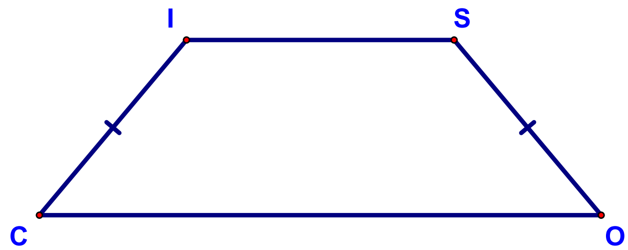


1. If a quadrilateral is both a rectangle and a rhombus, then it is a square (reverse of the definition).



Use one of the following to prove a quadrilateral is a kite:

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 $\perp$ bisector of the other diagonal, the the quadrilateral is a kite.



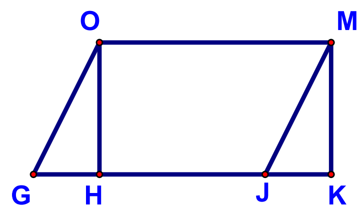
1. **If the nonparallel sides of a trapezoid are congruent, then it is isosceles (reverse of the definition).**
2. **If the lower or the upper base angles of a trapezoid are congruent, then it is isosceles.**
3. **If the diagonals of a trapezoid are congruent, then it is isosceles.**

The Chapter 5 Test is mostly from sections 5.4 through 5.7...remember...memorize that Venn Diagram!!

We'll wrap up by trying this example:

Given: ▱ GJMO
$\overline{OH} \perp \overline{GK}$
$\overline{MK}$ is an alt. of $\triangle MKJ$

Prove: OHKM is a rectangle



Statements	Reasons