# Kite, Parallelogram, and Rhombus Theorem

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I claim the statement "If ABCD is a kite, then it is a parallelogram." to be a false proposition. Then hypothesized that if a kite is a parallelogram if and only if said kite is a rhombus.

**Theorem 2.4.** A kite is a parallelogram if and only if said kite is a rhombus.

*Proof.* Using Conjecture D, we know if ABCD is a kite but not a rhombus, then ABCD is not a parallelogram.

By the definition of a kite, a kite is a quadrilateral with two pairs of adjacent and congruent sides. Hidden in Euclid's Proposition I.34 is the definition of a parallelogram which states opposite sides and angles of the parallelogram ABCD are equal to each other.Based upon these two definitions, to create a kite that is a parallelogram, the kite must have four adjacent and congruent sides where opposite angles are congruent to each other. If a figure has four adjacent and congruent sides where the opposite angles are congruent it is a rhombus.

If a kite is a rhombus, then the figure has four congruent and adjacent sides. Also opposite angles of the figure will be congruent. Based upon this definition we will also have a parallelogram which is when opposite sides and angles are congruent to each other. Refereed by Brandon Stuhr.
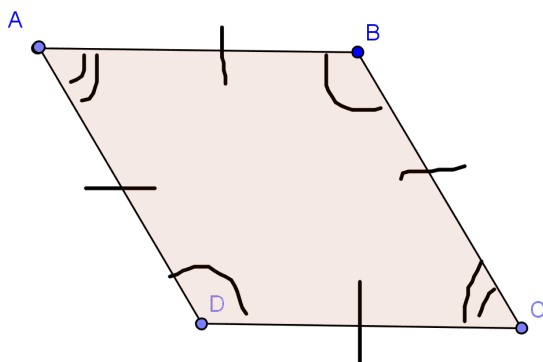


Figure 1: Figure ABCD is a kite, parallelogram, and a rhombus.