Opposite Angles of a Rhombus

Sarah Wright

February 5, 2019

Conjecture A was Ben's rephrasing of a portion of the original Conjecture 1.1. Andrew and Jake both gave initial ideas for the proof on 1/23 and Elijah presented a formal proof on 1/25.

The other half of Conjecture 1.1 was determined to be untrue and possibly corrected by Gianna into Conjecture B which is still to be proven at the time of this writing.

Theorem A. *The opposite angles in a rhombus are congruent.*

Proof. Let $ABCD$ be a rhombus. Our aim is to show that each pair of opposite angles are congruent. Without loss of generality, we choose to show that angle ABC is congruent to angle CDA.

Use Euclid's Postulate 2, construct the diagonal AC. This creates two triangles and we aim to show these triangles are congruent.

First notice that segments AB and CD are congruent by the definition of a rhombus. Similarly, segments BC and DA are congruent to one another. Lastly the diagonal segment AC is congruent to segment AC by Euclid's Common Notion 4.

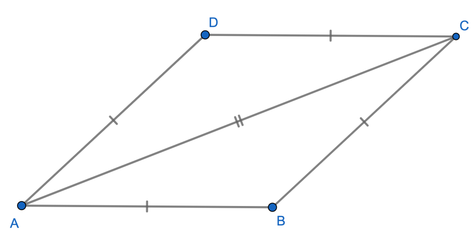

Figure 1: $\overline{AB} \cong \overline{CD}, \overline{BC} \cong \overline{DA}, \overline{AC} \cong \overline{AC}$

All together, that gives three pairs of corresponding sides of each triangle congruent to one another. By Euclid I.8, triangles ABC and CDA are congruent, and the corresponding angles, namely angles ABC and CDA are congruent.

Since our choice of a pair of opposite angles was arbitrary, we have proven our claim.

$\square$

If there is any narrative that makes sense here, or closing remarks, feel free to include something. ☺