A Kite, that is Not a Rhombus, is Not a Parallelogram

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Theorem Conjecture D. A kite, that is not a rhombus, is not a parallelogram.

Proof. We know that the kite is not a rhombus, which mean at least one side of the kite cannot be congruent to the others. By the definition of a kite we know that the adjacent sides are congruent. This means one set of sides has to be larger then the other set of sides. Construct segment AC. You now have 2 triangles, triangle ADC and triangle ABC.

Euclid 1.18 tells us that the greater side of a triangle subtends the greater angle. Therefore, we know that angle ADC is greater then angle DAB.In triangle ADC we know that angle DCA is not congruent to angle DAC because of Euclid 1.18.

Diagonal DB will make a right angle with diagonal AC by Mr Schulte's theroem. Label the point of intersection of diagonal AC and DB X. We now have triangle AXD, triangle DXC, triangle AXB, and triangle BXC. Angle CDX is not congruent to angle ADX because of proposition 1.28. Also, we know that angle AXD and angle DXC are right angles, and that angle DAX is not congruent to angle DCX.

This means, that in order for the triangles angles to add up to two right angles, angles ADX cannot be congruent to angle CDX. Since triangle ADC is congruent to ABC by Euclid 1.8 , then angles ABX is not congruent to angle CBX. We know that line AD is not parallel to line BC by Euclid 1.32. Therefore, because line AD is not parallel to BC than kite ABCD cannot be a parallelogram. □

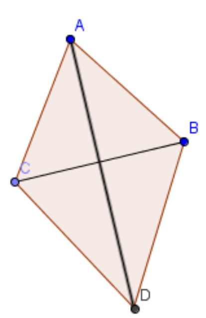

Figure 1: The image for Conjecture D