The Extended Diagonals of a Non-convex Kite

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Theorem . Let ABCD be a non-convex kite. Extend the diagonals AC and BD to lines. The extended diagonals meet at a right angle.

Proof. We are given a non-convex kite. We will show that if you extend the diagonals of a non-convex kite, they will meet at a right angle. Extend the diagonals AC and BD into lines and label the point that they intersect X. Triangle DAC is congruent to Triangle BAC by Euclid 1.8. We know triangle DBC is an isosceles triangle, so angle ADC is congruent to angle ABC. Angle CDA is congruent to angle CBA because triangle DAC is congruent to triangle BAC. We know that angle ADX is congruent to angle ABX. This means triangle CDX is congruent to triangle BCX by Euclid 1.4. Therefore, line segment DX is congruent to line segment BX. Since the extended diagonal AC intersects diagonal DB at the median of DB, then extended AC meets DB at a perpendicular as proven in Miss Van Nevele's argument for conjecture H. Therefore, if you extend the diagonals of a non-convex kite, then the diagonals will meet at a right angle.

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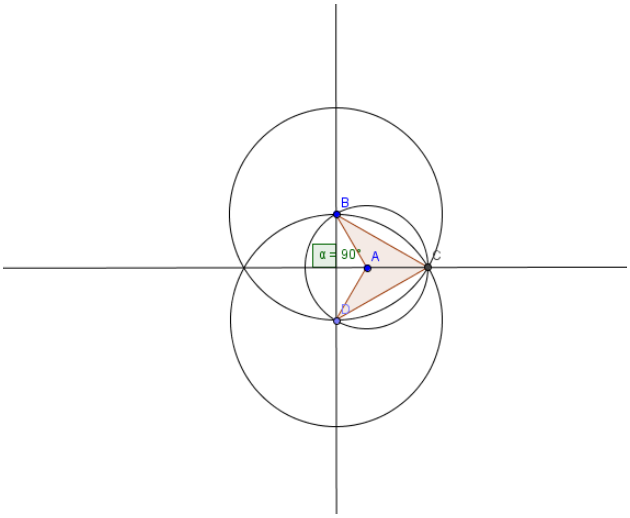

Figure 1: Non-convex kite ABCD with extended diagonals

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