

Geometry

1. In a parallelogram $ABCD$, the angle bisector at A meets side BC in its midpoint M . Assume that $\angle BDC = 90^\circ$. Find the angles of the parallelogram $ABCD$.
2. In a trapezoid $ABCD$ with the parallel sides AD and BC , the diagonals are orthogonal. The line parallel to AD and passing through the intersection of the diagonals meets the lateral sides AB and CD at points K and L respectively. Point M on side AB is such that $AM = BK$. Prove that $LM = AB$.
3. The incircle of an isosceles triangle ABC with $AB = BC$ is tangent to BC and AB at E and F respectively. A half-line through A inside the angle EAB intersects the incircle at points P and Q . The lines EP and EQ meet the line AC at P' and Q' . Prove that $P'A = Q'C$.
4. Prove or disprove that any triangle of area 3 can be covered by an axially symmetric convex polygon of area 5.