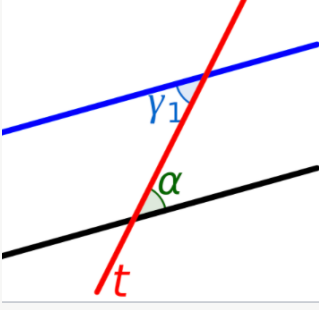
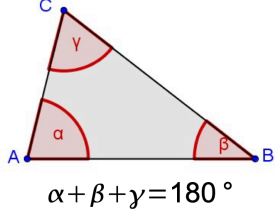
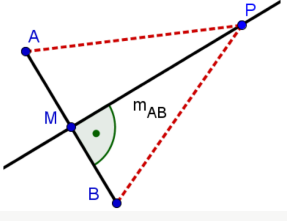
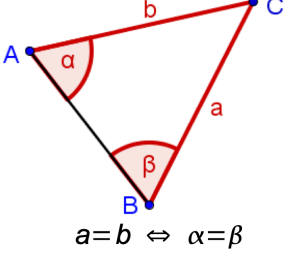
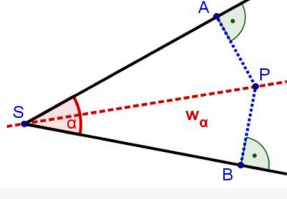
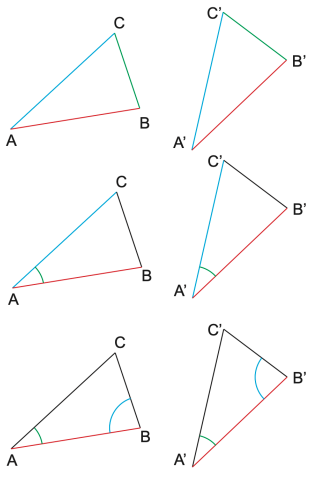
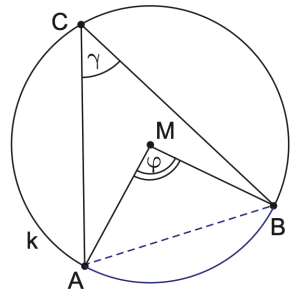
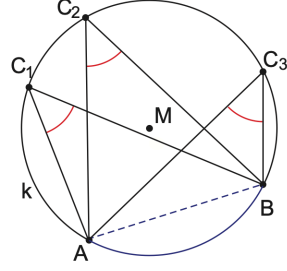
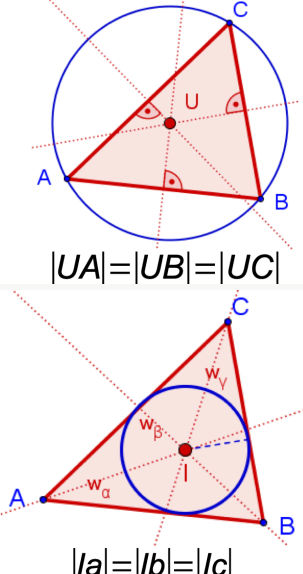
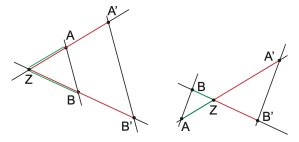
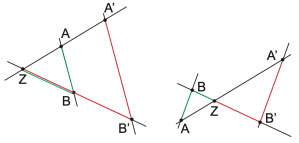
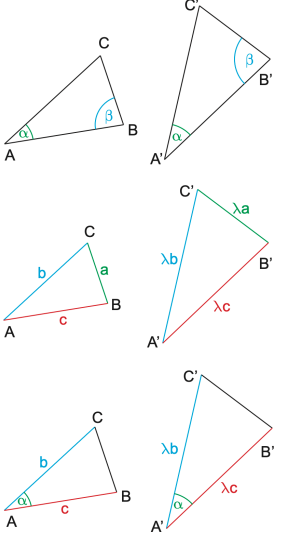


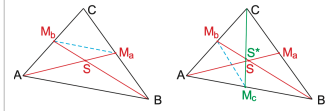
Some important terms and theorems in geometry

0	Two lines are parallel if and only if the two angles of any pair of corresponding angles of any straight line are equal in measure.	
1	The sum of the angles in the triangle is 180	
2	Perpendicular bisector	
3	The base angle theorem	
4	Angle bisector	

<p>5</p>	<p>Congruence conditions for triangles</p> <p>(SSS)</p> <p>(SAS)</p> <p>(ASA)</p>	
<p>6</p>	<p>The central angle is twice as large as the inscribed angle over the same cord.</p>	
<p>7</p>	<p>Inscribed angles over the same cord have the same measure.</p>	
<p>8</p>	<p>The circumcircle and the incircle</p>	 <p>$UA = UB = UC$</p> <p>$Ia = Ib = Ic$</p>

<p>9</p>	<p>If two intersecting straight lines are cut by two parallel straight lines (which do not pass through the point of intersection of the given straight lines), the lengths of the sections on the first straight line behave like the lengths of the corresponding sections on the second straight line.</p>	
<p>10</p>	<p>If two intersecting straight lines are intersected by two parallel straight lines (which do not pass through the point of intersection of the given straight lines), the lengths of the parallel sections behave like the lengths of the corresponding sections on one of the intersected straight lines.</p>	
<p>11</p>	<p>Similarity theorem (AA) If two triangles have two pairs of congruent angles, the triangles are similar.</p> <p>Similarity theorem (SSS) If all three sides of two triangles have the same ratio of length, the triangles are similar.</p> <p>Similarity theorem (SAS) If two pairs of sides of two triangles are in the same ratio of length and the included angles are congruent, the triangles are similar.</p>	

12 (Side bisector in a triangle) In a triangle, the side bisectors intersect at a point. This intersection divides the bisectors in the ratio 2 : 1.

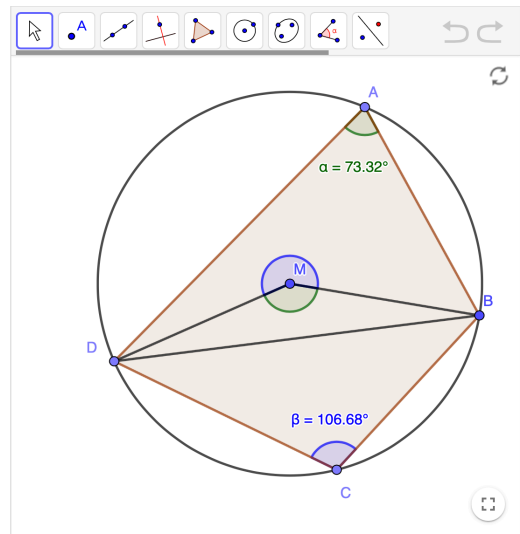


Task 1

An inscribed quadrilateral is a quadrilateral whose vertices all lie on a single circle.
Find out a relationship between opposite angles of inscribed quadrilaterals and prove it.

Discover properties in the figure!

<https://www.geogebra.org/m/z48rkzxq>



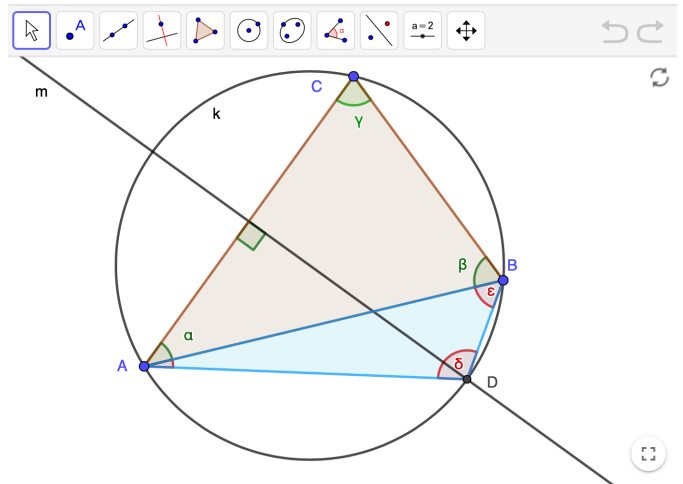
Task 2

Let ABC be a triangle in which side AB is longer than side BC .
 Let the angles at A and at B be denoted by α and by β .
 The perpendicular bisector m of side AC intersects the circumcircle k of the triangle.

Let the point of intersection which lies on the same side of the straight line through A and C as the point B be denoted by D .

<https://www.geogebra.org/m/qwfppngp>

Discover properties in the figure!

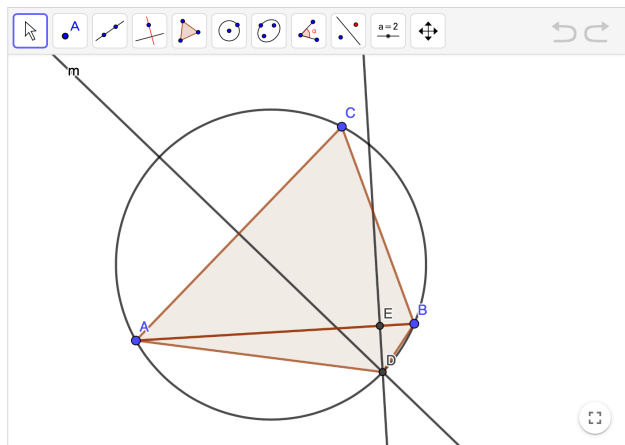


- a) Express δ in terms of α and β .
- b) Express ϵ in terms of α and β .

Let E be the base of the perpendicular of D on the straight line through A and B .

<https://www.geogebra.org/m/d7uazf8y>

- c) Prove that for the side lengths AE , EB and BC the equation $AE = EB + BC$ holds.

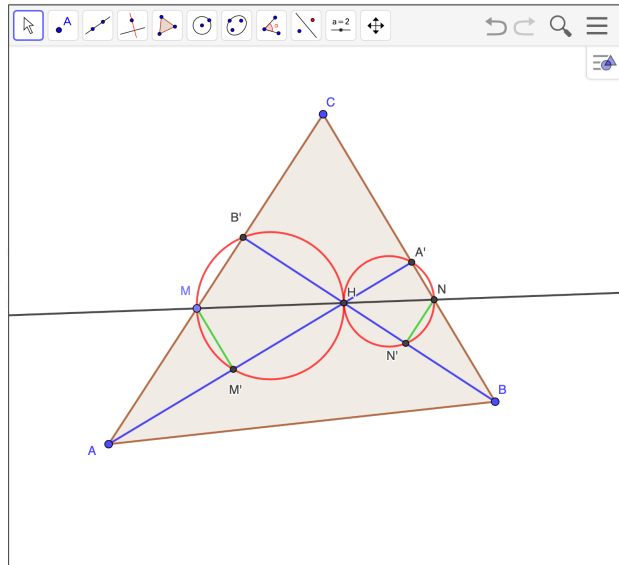


Task 3

In the acute triangle ABC the segments BB' and AA' are altitudes.
 Let l be a straight line through H and let M, N be the points of intersection of l and AC, BC , respectively.
 Let M' be the foot of the perpendicular from M to AA' and let N' be the foot of the perpendicular from N to BB' .

<https://www.geogebra.org/m/hxhbcpsa>

Discover properties in the figure!



a) Prove that the circumcircles of the triangles MHB' and HNA' touch each other.

<https://www.geogebra.org/m/cpxmtesq>

b) Prove that the segments $M'B'$ and $N'A'$ are parallel to each other.

