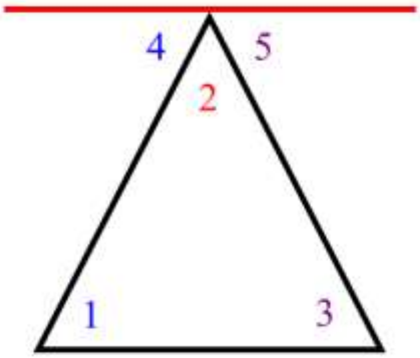
Theorem 4: The angles in any triangle add to 180°.

Given: Triangle with angles 1, 2 and 3.

To Prove: $|\angle 1| + |\angle 2| + |\angle 3| = 180°$.

Construction: Draw line through $\angle 2$ parallel to the base.



Proof: $|\angle 4| + |\angle 2| + |\angle 5| = 180°$

Straight line angle = 180°

$|\angle 1| = |\angle 4|$

$|\angle 3| = |\angle 5|$

Alternate angles

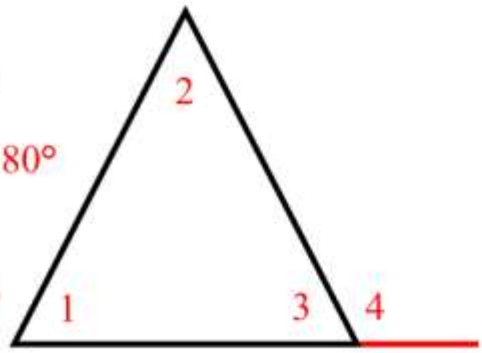
$\therefore |\angle 1| + |\angle 2| + |\angle 3| = 180°$

Theorem 6: Each exterior angle of a triangle is equal to the sum of the interior opposite angles.

Given: Triangle with angles 1, 2 and 3.

Construction: Extend base line and label $\angle 4$.

To Prove: $|\angle 1| + |\angle 2| = |\angle 4|$.



Proof: $|\angle 1| + |\angle 2| + |\angle 3| = 180°$

Angle sum of triangle = 180°

$|\angle 3| + |\angle 4| = 180°$

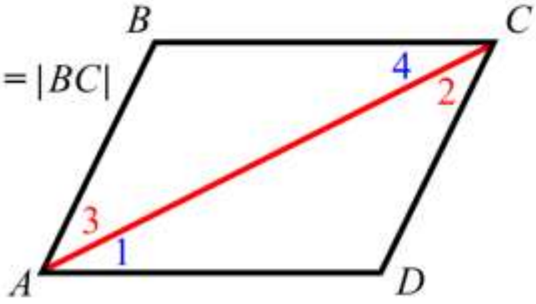
Straight line angle = 180°

$\therefore |\angle 1| + |\angle 2| + \cancel{|\angle 3|} = \cancel{|\angle 3|} + |\angle 4|$

$\therefore |\angle 1| + |\angle 2| = |\angle 4|$

Theorem 9: In a parallelogram, opposite sides are equal and opposite angles are equal.

Given: Parallelogram $ABCD$.



To Prove: $|AB| = |CD|$ and $|AD| = |BC|$
$|\angle ABC| = |\angle ADC|$
$|\angle BAD| = |\angle BCD|$

Construction: Diagonal $|AC|$

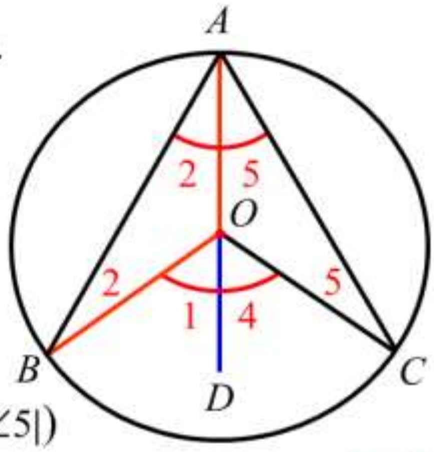
Proof: $|\angle 1| = |\angle 4|$ Alternate angles
$|AC| = |AC|$ Common
$|\angle 2| = |\angle 3|$ Alternate angles
$\therefore \Delta ABC \equiv \Delta ADC$ ASA
$\therefore |AB| = |CD|$ and $|AD| = |BC|$ Corresponding sides
$\therefore |\angle ABC| = |\angle ADC|$
$\therefore |\angle BAD| = |\angle BCD|$ Corresponding angles

Theorem 19: The measure of the angle at the centre of the circle is twice the measure of the angle at the circumference, standing on the same arc.

Given: Circle, centre O, containing the points A, B, and C.

To Prove: $|\angle BOC| = 2\,|\angle BAC|$.

Construction: Join A to O and extend to D.



Proof: $|\angle 1| = |\angle 2| + |\angle 3|$
Exterior angle of triangle
$|AO| = |BO|$ Radii of circle
$\therefore |\angle 2| = |\angle 3|$ Base angles
$\therefore |\angle 1| = 2\,|\angle 2|$
Similarly $|\angle 4| = 2\,|\angle 5|$
$\therefore |\angle 1| + |\angle 4| = 2\,(|\angle 2| + |\angle 5|)$
$\therefore |\angle BOC| = 2\,|\angle BAC|$