

Homework 5,

Due Wednesday, February 20.

Prove, using two column form:

Theorem 25. The following statements are equivalent:

- a) A quadrilateral is a parallelogram.
- b) Opposite angles are equal.
- c) Opposite sides are equal.
- d) The point of intersection of the diagonals is also the midpoint of both diagonals.

Theorem 29. Let us fix a circle with the center at the point O. Then:

- a) Diameter perpendicular to a chord divides it in two equal parts.
- b) Diameter that goes through the midpoint of a chord (which is not a diameter) is perpendicular to this chord.
- c) Perpendicular segment bisector of a chord goes through the point O (the center of the circle).
- d) If AB and CD are chords on the same circle and $|AB|=|CD|$, then $\angle AOB=\angle COD$.
- e) If AB and CD are chords on the same circle and $\angle AOB=\angle COD$, then $|AB|=|CD|$.
- f) If AB and CD are chords on the same circle and $|AB|=|CD|$, then the distance from the center O to the lines AB and CD are equal.
- g) If AB and CD are chords on the same circle and the distance from the center O to the lines AB and CD are equal, then $|AB|=|CD|$.

Problem 26. Let $\triangle ABC$ is a right triangle, $\angle C=90^\circ$. Assume that M is the midpoint of the side AB. Prove, that $|CM|=|AM|=|BM|$.