Assignment 1

Classical Plane Geometries and their Transformations

Released: Monday, September 21, 2026

Due: Thursday, October 1, 2026, at 5:00 p.m. (Toronto time).
Submit on Quercus.

Answer all seven problems. Give clear geometric proofs using results from lectures, and identify the congruence criteria or circle theorems you use. Figures are schematic; measurements from a figure are not proofs.

Problem 1. Congruence in a parallelogram

Let $ABCD$ be a parallelogram whose diagonals AC and BD meet at M. Suppose that $AC \perp BD$.

(a) Prove that $AB = BC = CD = DA$.

(b) Prove that AC bisects both $\angle DAB$ and $\angle BCD$.

Problem 2. Parallel chords