Euclid, Bolyai and the exemplification in teaching of geometry

Norbert Bogya [1]   Lajos Szilassi [2]   Zoltán Kovács [1]

[1]University of Szeged, Bolyai Institute

[2]University of Szeged, Juhász Gyula Faculty of Education

Euclid,

Bolyai,
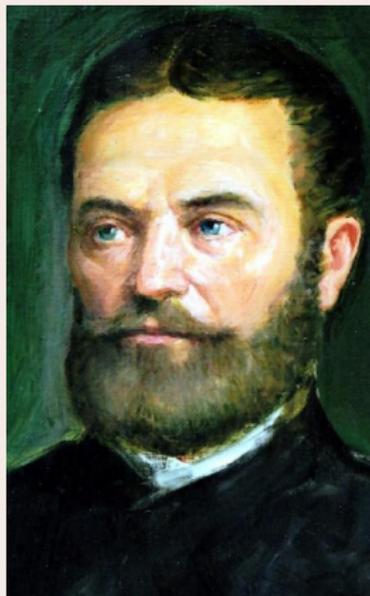
and the exemplification in teaching of geometry

GeoGebra

Poincaré disk model

Objects to model

- Plain
- Point
- Line

- Segment
- Circle
- Reflection through a line
- ...

The model of the objects

- An open disk
- Point inside the disk
- Arc orthogonal to the boundary of the disk
- Arc of a „line"
- Circle
- Inversion respect to a „line"
- ...
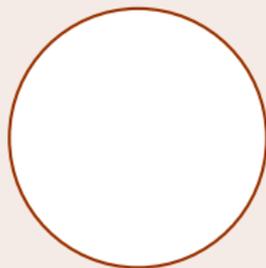
Poincaré disk model

Problem 1
What can we say about Thales' theorem?

## Problem 2
Construct the tangent through an external point
to a circle.
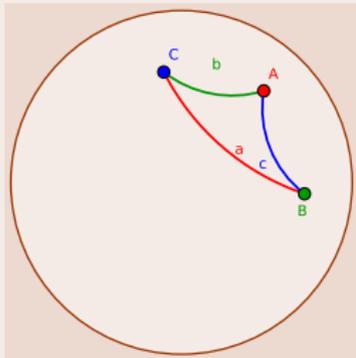
Points and lines
associated with a triangle
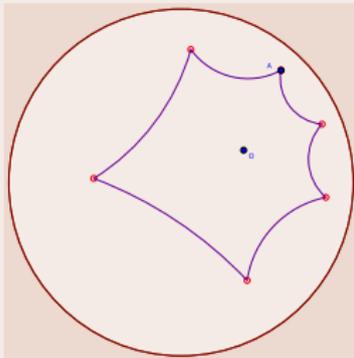
Regular polygon
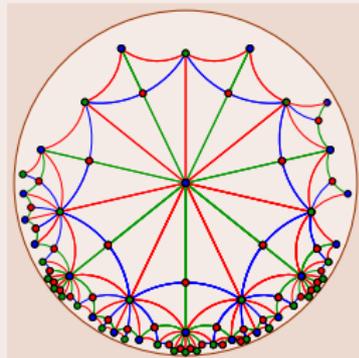
Tessellations with
congruent triangles
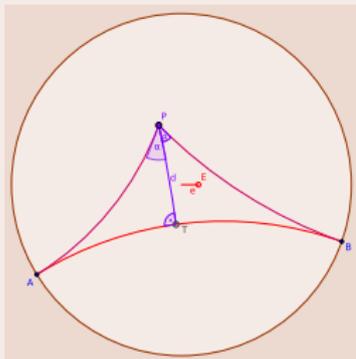
Angle of parallelism
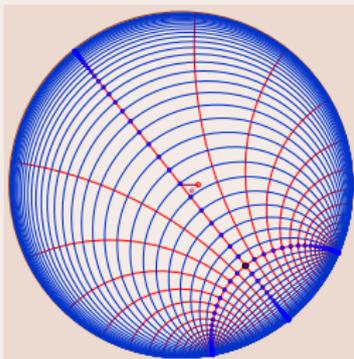
Concurrent lines
and circles
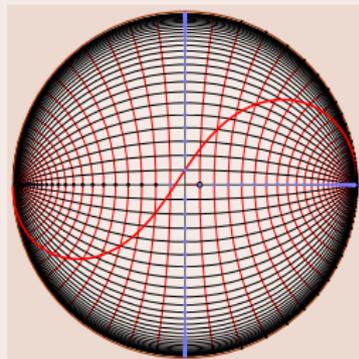
Coordinate system

Mihály Babits: Bolyai

God had imprisoned our minds in space.
Those puny things have remained prisoners.
Thought, the hungry bird of prey fought the curse,
but never breached its diamond bars embrace

I'm though a happy bird who manages to cope
By peeking outside through a window of my cage,
from nothing a new universe I learned to stage,
like from spiderwebs prisoners weave a rope.

With new natural laws, past the narrow sky.
I opened up a new infinity past the thinkable;
no king in history has conquered more than I

by stealing the secret treasures of the impossible.
Listen Euclid, your laws command you not to plod
beyond your prison; I just laugh at you with God.

Translated by Paul Sohar

Thank you for your attention.