

WORKSHEET — Non-Euclidean Geometries

Mathematics A – 10th Grade

Estimated duration: 120 minutes

Theme: Elliptical and Hyperbolic Geometry

Objectives of the Fact Sheet

- Investigate fundamental concepts of non-Euclidean geometries.
- Compare properties with Euclidean geometry.
- Prepare a structured and rigorous summary.
- Develop mathematical research, synthesis and communication skills.

Part A — Knowledge Activation (Individual – 10 min)

1. Explain, in your own words, what a **postulate** is.
2. It indicates the statement of **Euclid's 5th postulate**.
3. It describes an everyday situation where Euclidean geometry is suitable.

Part B — Group Research (40 min)

Divide yourself into groups of 3–4 elements. Each group receives one of the following themes:

- Elliptical Geometry
- Hyperbolic Geometry
- Comparison between geometries
- History of the 5th postulate

Guiding questions

1. How are "lines" defined in this geometry?
2. How do triangles behave?
3. What is the sum of the interior angles?
4. Are there parallels? How many?
5. Where does this geometry come from in the real world?
6. What differences do you have with Euclidean geometry?

Record your conclusions in an organized way.

Part C - Summary Production (20 min)

Elaborates a **10–12 line summary** containing:

- Essential concepts
- Visual examples or applications
- Differences from Euclidean geometry
- A final sentence that summarizes the importance of this geometry

Format: A3 poster, single slide or A4 sheet.

Part D — Presentation (20 min)

Each group presents their work in **3 minutes**.

Evaluation criteria:

- Clarity of ideas
- Mathematical correction
- Ability to synthesize
- Visual quality
- Relevance of the examples

Part E — Individual Summary (10 min)

Answer individually:

1. What changes when we change the 5th postulate?
2. Which of the non-Euclidean geometries seems more intuitive to you? Why?
3. Write down **3 key ideas** that you take away from this class.