Math club designs

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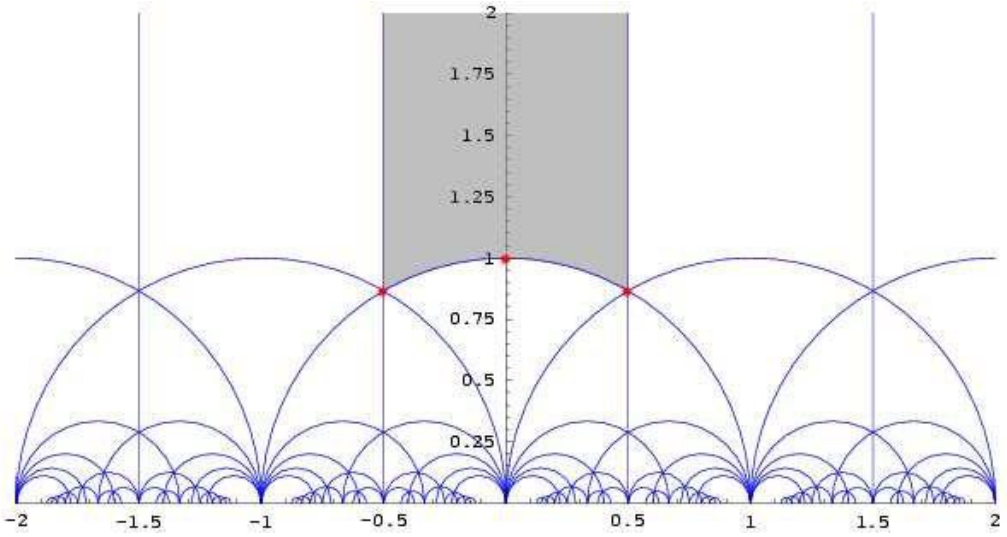
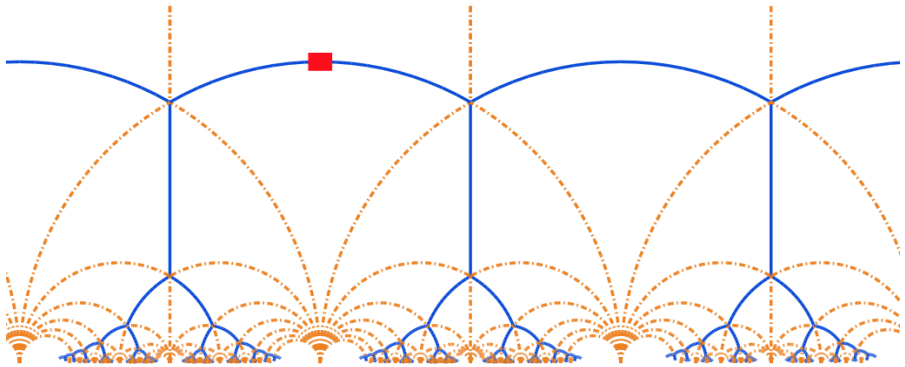
Fundamental domains

- used in geometry to represent a shape that, when repeated in certain ways, fills up a bigger space without any overlaps or gaps.
- Imagine a tile on the floor: its fundamental domain is the smallest part of the tile that, when repeated, covers the entire floor without leaving any spaces in between.
- fundamental domains are important for studying symmetry, tiling, and understanding shapes in different dimensions.
- They're like the building blocks that help us explore and understand how shapes fit together in various patterns.

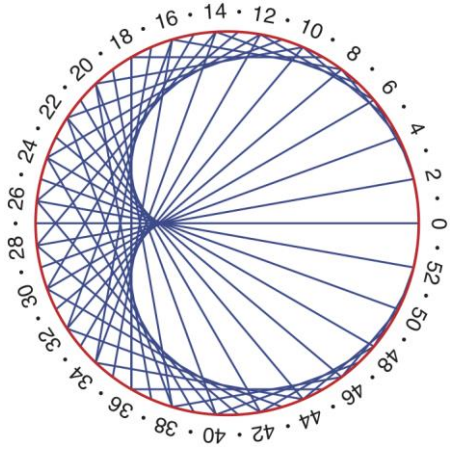


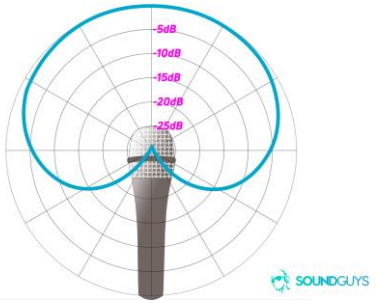
Fundamental Domains on the Upper Half-plane

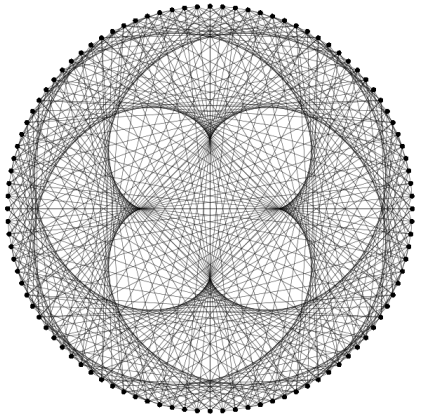


cardiods

- They are a specific form of the mathematical shape called an epitrochoid.
- **r = a ± cosθ** i
- Mathematically, they're defined as the set of points traced by a fixed point on a circle as that circle rolls around another fixed circle.
- Cardioids have applications in physics, engineering, and various areas of mathematics, especially in geometry and calculus.
- They appear in different natural phenomena and are used in designing curves for specific functions or aesthetic purposes.





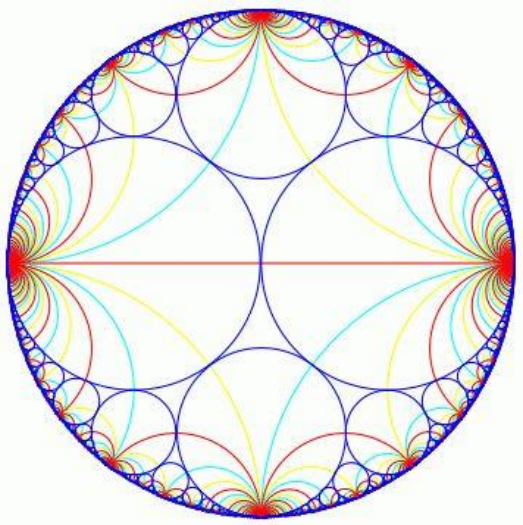


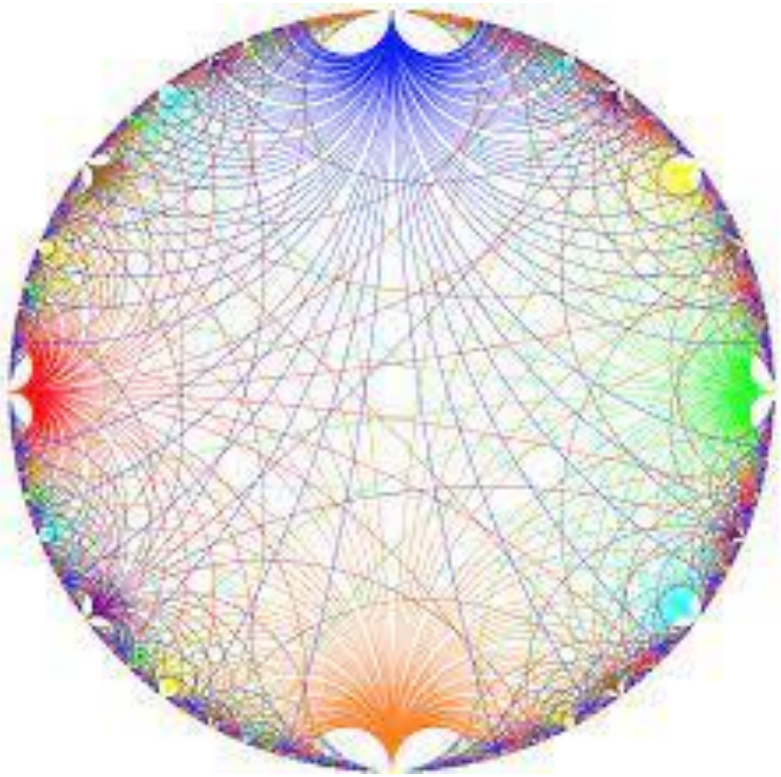
Tokarsky’s unillumanable room

- Tarski's unilluminable room challenges the idea that any enclosed space can be entirely lit.
- It envisions a room where, regardless of light placement or quantity, certain areas always remain in shadow.
- This concept explores limitations in illuminating certain geometric spaces.
- It highlights the complexities of light distribution within confined areas.

Farey diagrams

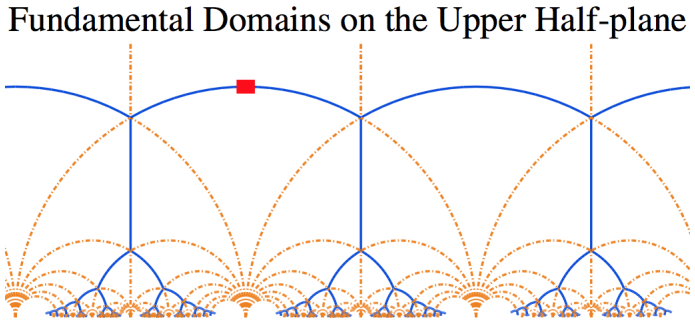
- Farey diagrams depict fractions between 0 and 1 in order from smallest to largest denominators.
- They show all irreducible fractions within a given range.
- Each point represents a fraction, illustrating their relative sizes and relationships.
- Useful in number theory, studying approximations, and understanding rational numbers' patterns.



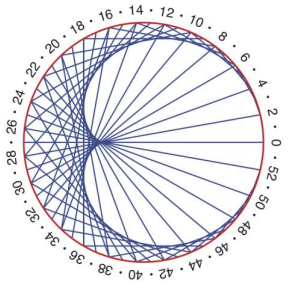


voting

Fundamental domains



cardiods



Tokarsky's unillumanable room

Farey diagrams