

## Math-Art-Abstraction Venn Diagrams

**Target Audience:** Ages 11-Adult

*One of the pages in the cavalcade features an art piece, Additive Mixing, created by Bronna Butler and Jessica K. Sklar. The piece consists of a Venn diagram with three circles labeled, respectively, Math, Art, and Abstraction. Bronna and Jessica illustrate the regions with mathematical, artistic, and abstract concepts. We invite you to illustrate the regions in your own way!*

**Duration:** 20-30 minutes (or longer depending on enthusiasm).

**Goal:** To invite participants to explore links between math, art, and abstraction by illustrating regions of a Venn diagram.

**Materials:**

- Templates containing 3-circle Venn diagrams, with the circles labeled, respectively, Math, Art, and Abstraction.
- Colored pencils, crayons, markers, or the like.

**Suggested staffing requirements:** This activity generally does not need any special supervision beyond age appropriate guidance and safety measures of the venue.

**Instructions:**

1. Take a template and choose your drawing implements.
2. Fill in and decorate the circles!

**The Math:**

The math involved is up to you; you get to choose how to fill in/decorate all of the Venn diagram regions! You can also put things in the region that's entirely outside of the Venn diagram; those would be things that you don't associate with math, art, or abstraction!

Bronna and Jessica made particular choices for their version, based on their backgrounds and preferences. They chose to include secant lines and a tangent line (key concepts in differential calculus) in and adjacent to the Math-only circle; put a commutative diagram (a key concept in category theory) in the intersection of the Math and Abstraction circles; tiled the intersection of all three circles with an adaptation of Coxeter's 30-45-90 tiling of the hyperbolic plane; and filled in the Math-Art region with an Escher-like tiling by fish patterns. But your choices will likely be very different!

Maybe you like arithmetic, or pentagons, or binary trees. You can fill in everything as you see fit!

### **Where can I learn more?**

Venn diagrams: <https://mathworld.wolfram.com/VennDiagram.html>

Additive mixing: [https://en.wikipedia.org/wiki/Additive\\_color](https://en.wikipedia.org/wiki/Additive_color)

Secant lines: <https://mathworld.wolfram.com/SecantLine.html>

Tangent lines: <https://mathworld.wolfram.com/TangentLine.html>

Differential calculus: <https://mathworld.wolfram.com/DifferentialCalculus.html>

Commutative diagrams: <https://mathworld.wolfram.com/CommutativeDiagram.html>

Category theory: <https://mathworld.wolfram.com/CategoryTheory.html>

H. S. M. Coxeter: <https://www.science.ca/scientists/scientistprofile.php?plD=5>

Hyperbolic plane: <https://mathworld.wolfram.com/HyperbolicPlane.html>

Coxeter's 30-45-90 tiling of the hyperbolic plane:

[https://www.maa.org/sites/default/files/pdf/upload\\_library/22/Evans/dunham\\_0403.pdf](https://www.maa.org/sites/default/files/pdf/upload_library/22/Evans/dunham_0403.pdf)

f

M. C. Escher: <https://mcescher.com/>