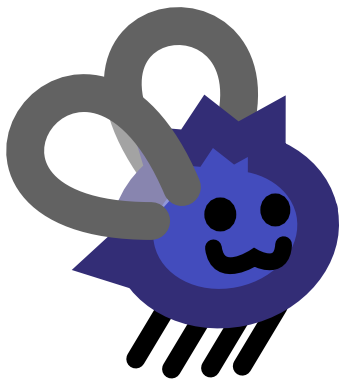
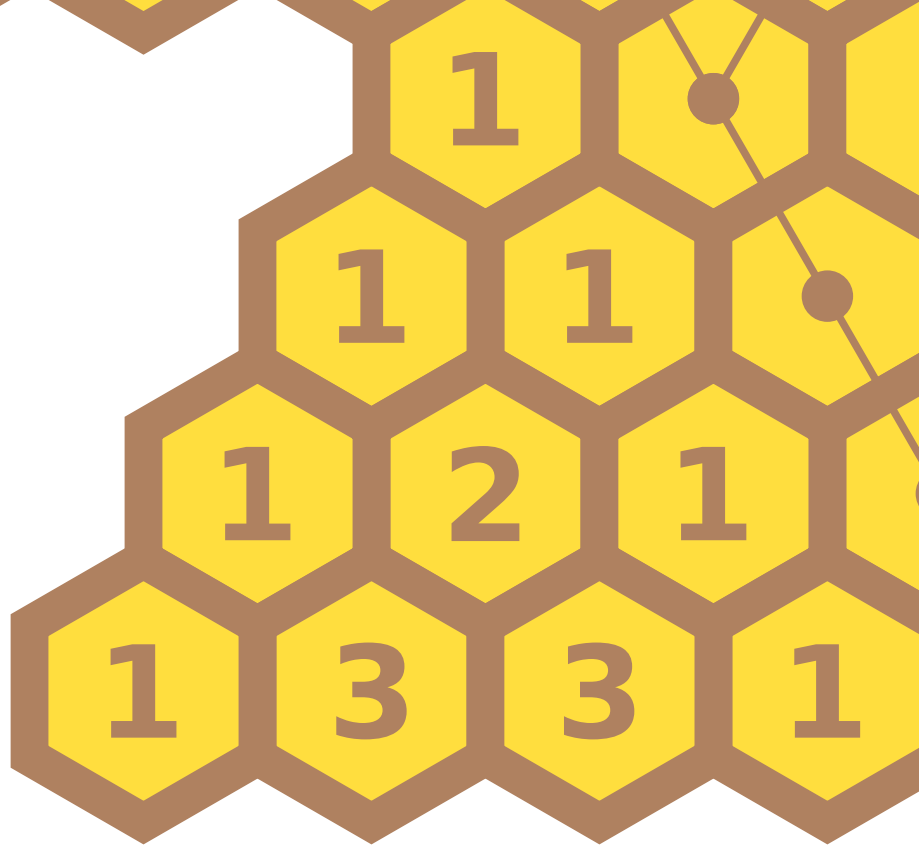


Math I L y 2020



# MathILy the Record of Mathematics (RoM)

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## Welcome

...all to the first issue of the MathILy RoM in 2020! We got a bunch of fun things lined up in this edition! In the first week of MathILy, students split into three *root* classes and began to dig down deep into the soil, planting their foundation in mathematical logic and processes [...see more in *The Weekly Digest*]. Next, we present insider info on our Daily Gathers and other events on guest lecturers and unique topics [...see more in *DaILy Gathers & Such*!] Don't forget to have your weekly dose of fun in *The Fun Fun* section. Stay tuned for next week!

## Weekly Cutie!



Sasha combined with an English bee.

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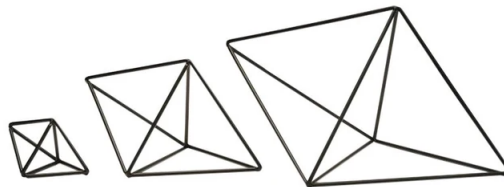
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## 2 Daily Gathers & Such

### 2.1 Tom—Name that Hexahedron

by Jonathan

In the first ever quarantine Daily Gather, Tom introduced us to modular origami by asking us to fold frogs. Specifically, if we folded three frogs and kindly asked each frog to cannibalize another, we would create a “three frog cycle of cannibalistic death” hexahedron. Possible names for this hexahedron were tossed around: isosceles right hexahedron, trigonal bipyramid, and froggyhedron were all mentioned, though the rest of society appears to refer to this hexahedron as Molly’s hexahedron. Through a variety of methods, we also computed the volume of the hexahedron, which turned out to be  $\frac{1}{24}$  if the side length of the original origami paper was assumed to be 1. Tom then asked us to think of methods of fitting 24 of our hexahedrons into a cube with side length 1. Eventually, Tom revealed a few Mathematica visualizations that arranged 24 of our hexahedrons (specifically 48 half-hexahedrons) in a cube of side length 1.



Molly’s Hexahedron.

### 2.2 Daniel—What is “Settlers of Catan” minus “SET”?

by Jonah

#### 2.2.1 Introduction

Daniel is a lead instructor and gave us some personal background into why he chose to embrace mathematics in his life: it’s something he enjoys, whether teaching, learning, or creating it. His eyes were first opened up to the excitement of doing math when he attended a high school math camp. Perhaps we MathILy students can experience something similar this summer!

#### 2.2.2 Defining the Game

The game that Daniel described is turn-based with two players. In the first example of a game, he called one player Josh and the other Nadav. The board consists of a finite number of stacks of blocks. Each block is colored either green or red and each player is assigned a color. A player’s move consists of removing one block of his/her color from the board as well as all blocks stacked on top of the chosen block. The winner of the game is the last player who can make a move on their turn. Here is an example game that Daniel illustrated:

## 2.3 Math Movies!

by Saskia

After working around some technical difficulties related to copyright, MathILy watched, laughed, and cringed at four (loosely) math-related short films. The first of these films, entitled “The Hypercube: Projections and Slicings” illustrated some rotations and slicings of two, three, and four dimensional cubes. The second film discussed and demonstrated how infinitely long curves can fill a space and therefore have non-zero area: These are called space-filling curves. This movie also featured some intriguing proof techniques (such as “(the proof) will not be given here” and “(the claim) can be proved) and the musical genius of Ellen Hoffman. Next, we watched a film which illustrated some of the practical applications of voronoi diagrams, which divide a plane into regions closest to different points respectively. The fourth film was about square dancing. Literal squares. dancing.

### 2.3.1 Notable Quotes (from chat, intentionally out-of-order)

*by the Editors*

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sarah-marie: “Jonah, I do NOT KNOW. WHY. SO. LOUD.”

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Saskia: “when cheese gets moldy, it turns into a grey screen”  
Easton: “Are you in danger of being hit by a tsunami??”  
Benjamin G: “is it canned tuna?”  
Jake: “obtuse?”  
Ellina: “Furry?”  
Jiakang: “the wacky tube men?”  
Michael: “illuminati confirmed”

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Kishore: “four dimensional Sasha: mmmm”  
sarah-marie: “Don’t eat Josh’s cat!!!!”  
Dylan: “(sarcastic response)”  
Jonah: “(sarcastic response to your sarcastic response)”

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Lindsey: “imagine having 10,000 friends”  
Pablo: “10,000 friends = 10,000 birthday presents”  
Nadav: “you must also give that many”  
Pablo: “not if you unfriend them right after your birthday!”