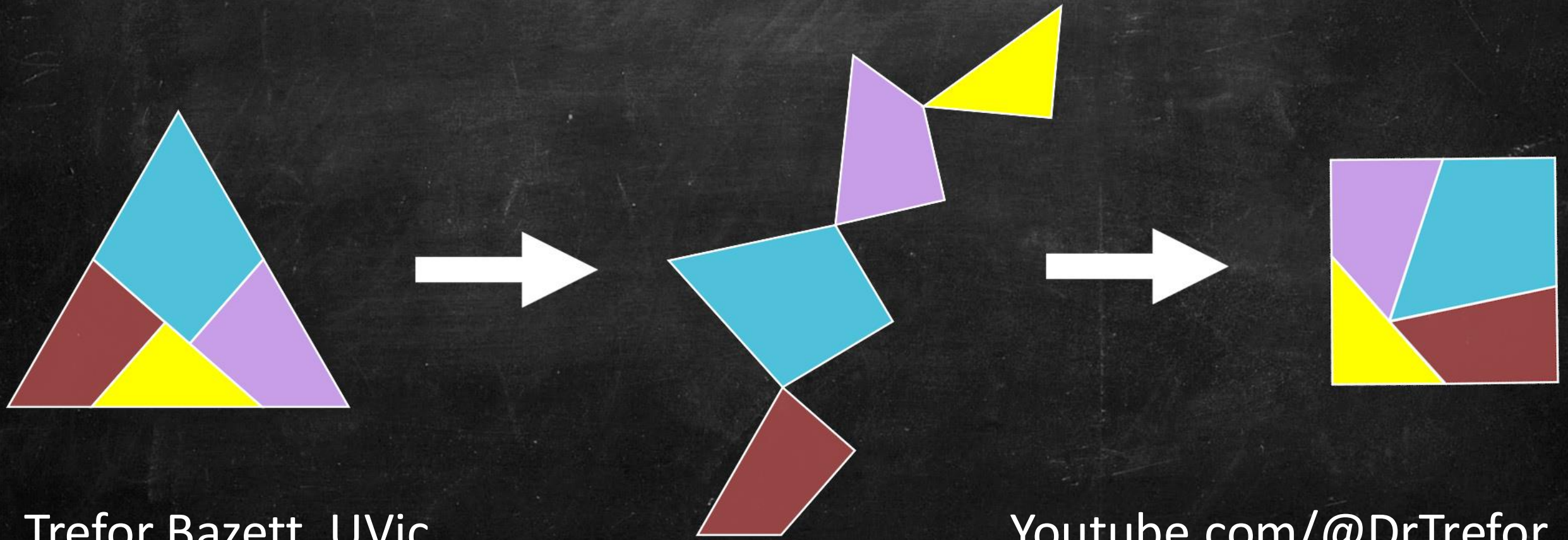
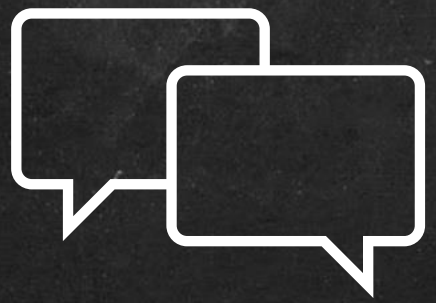
Inspiring an Appreciation for Math in 2025



Trefor Bazett, UVic
tbazett@uvic.ca

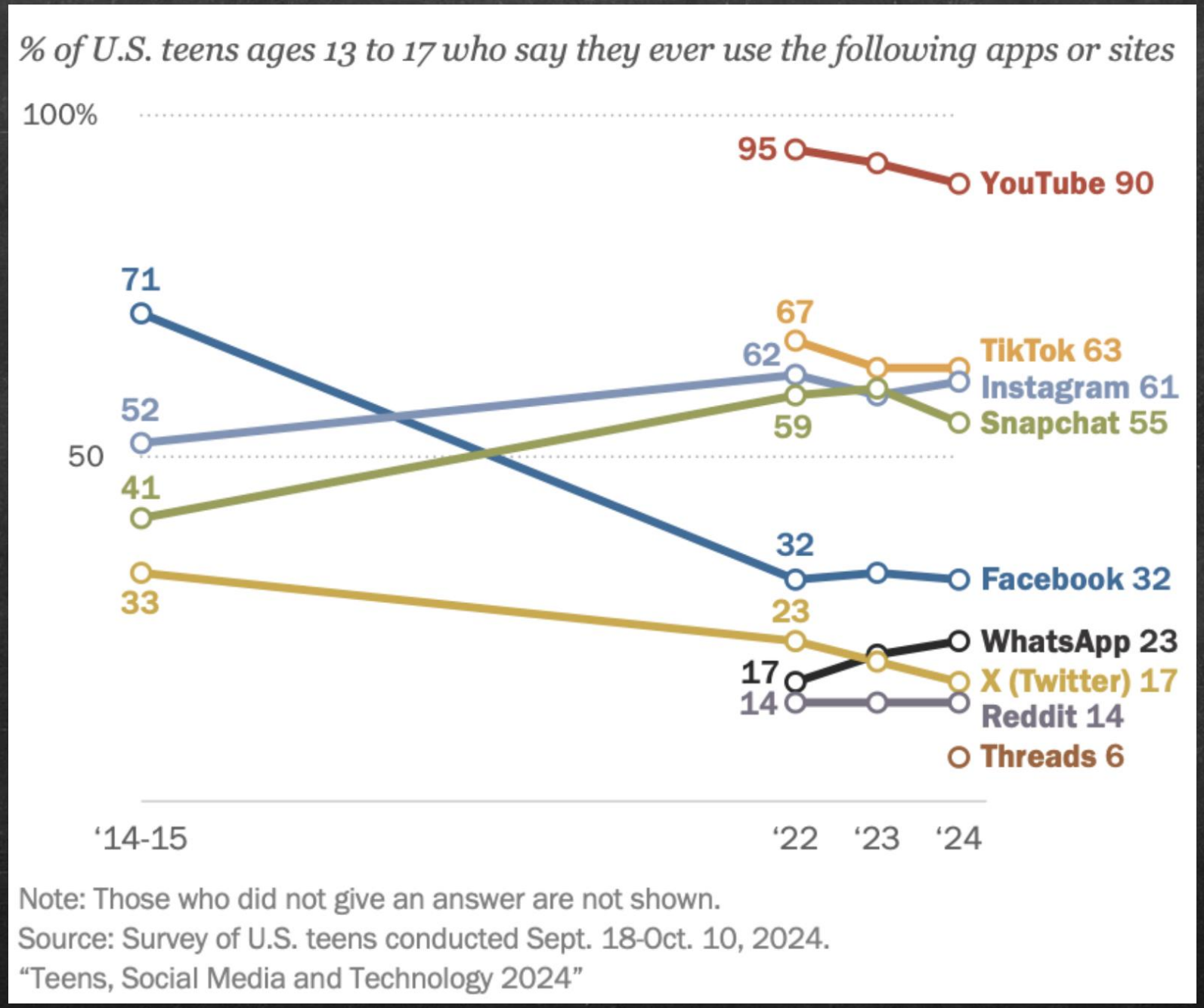
Youtube.com/@DrTrefor
X.com/treforbazett

Think of a memory where you appreciated math as a student?



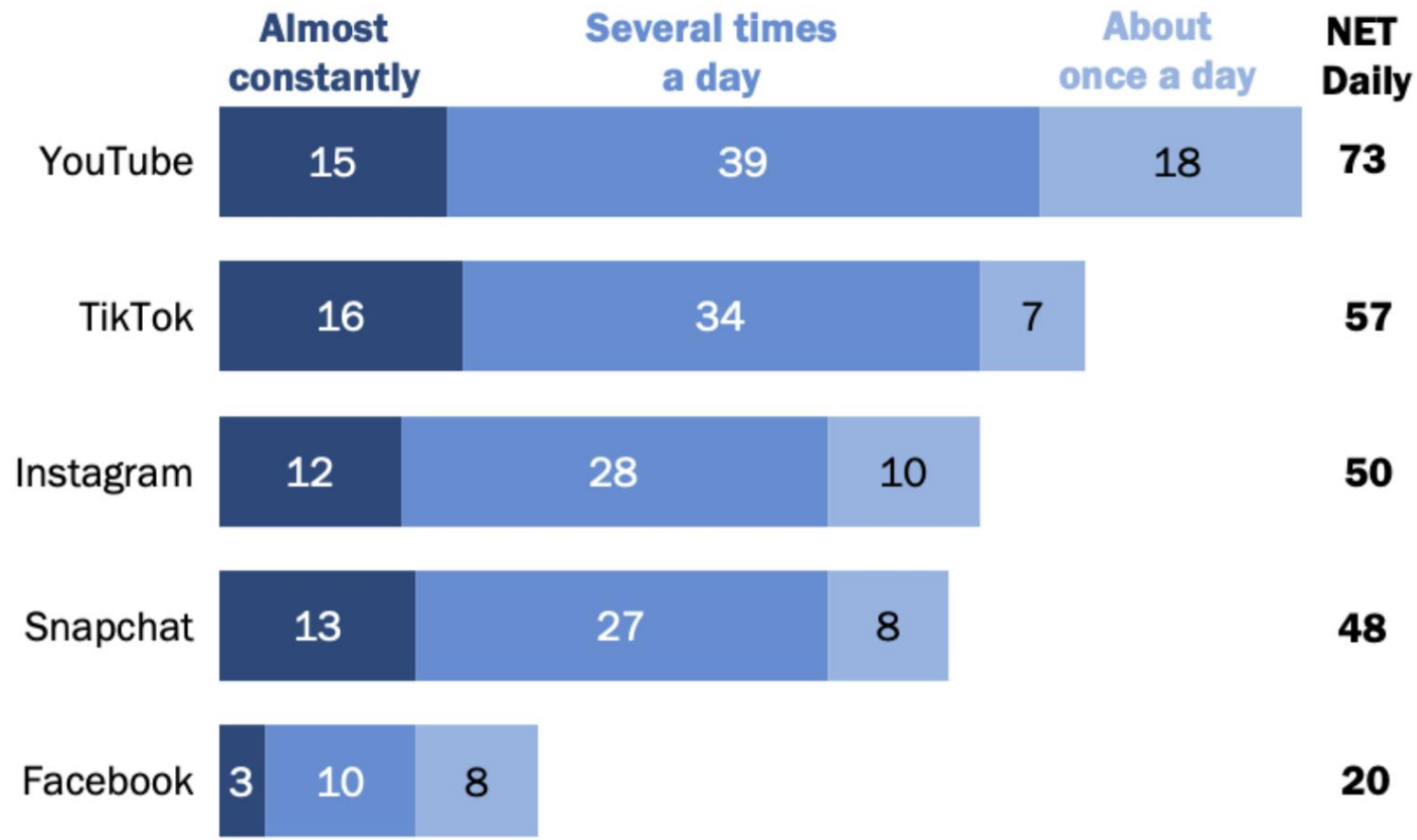
Where do students discover and sustain enthusiasm for math…

…*in 2025*?



Source: Pew Research Center

% of U.S. teens ages 13 to 17 who say they visit or use the following apps or sites ...



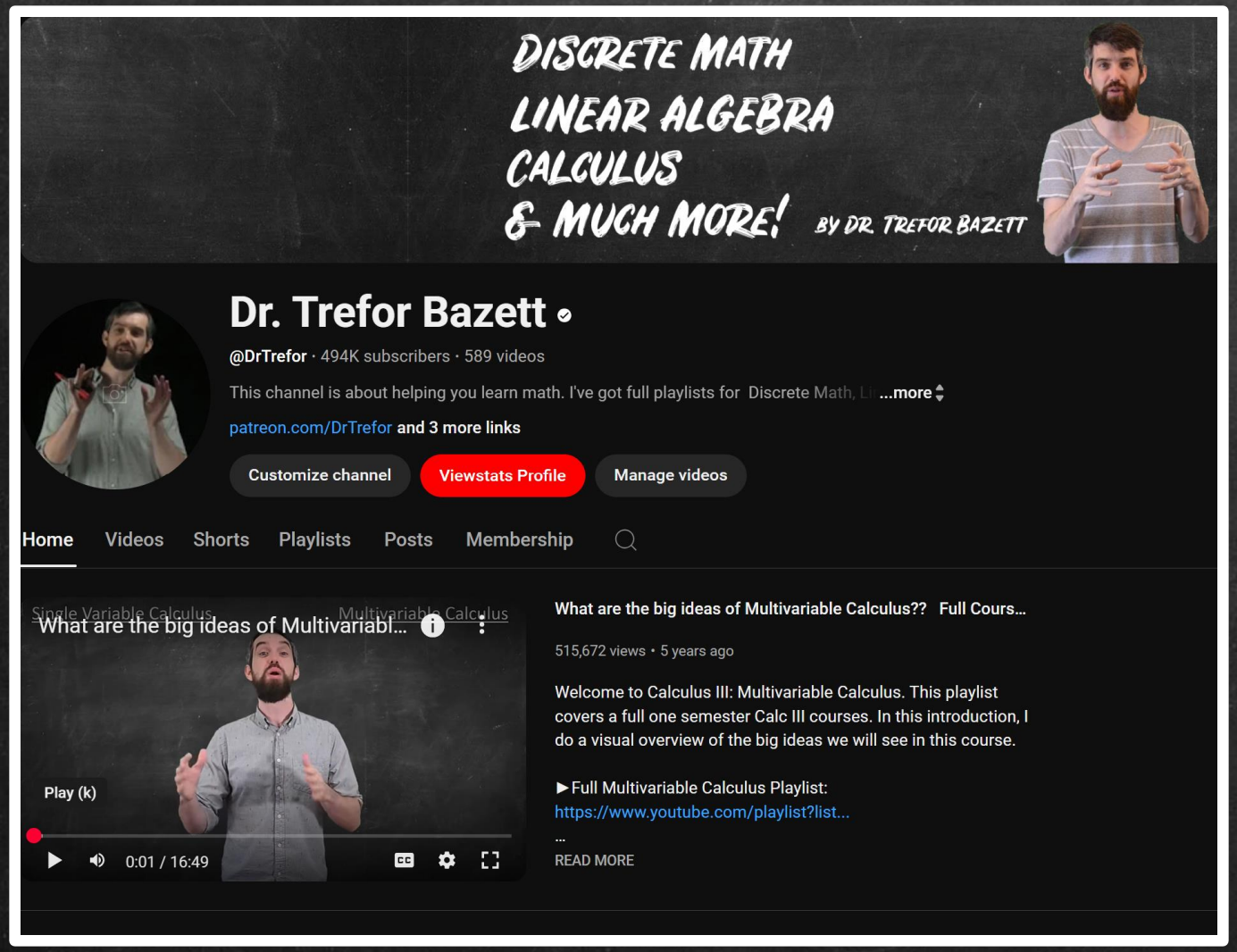
Note: Figures may not add up to NET values due to rounding. Those who did not give an answer or gave other responses are not shown.
Source: Survey of U.S. teens conducted Sept. 18-Oct. 10, 2024.
"Teens, Social Media and Technology 2024"

Source: Pew Research Center

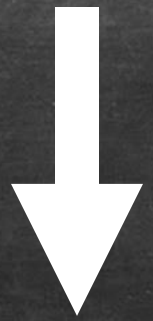
Social media is where teens are.

I want math to be there too.

YouTuber vs Math Prof



Understand Social Media

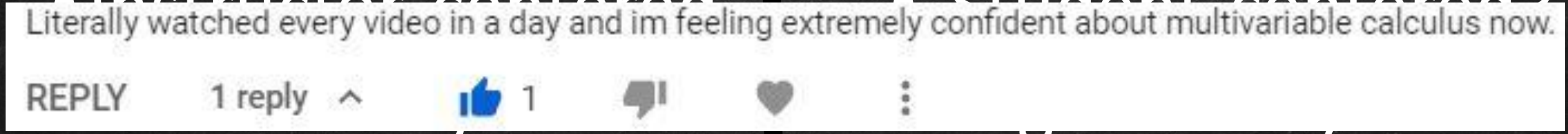


Lessons for Classrooms?

YouTuber vs Math Prof

- Breadth
- Want to watch
- Coolest Topics
- Passive
- Instructor centered

- Depth
- Required?
- Curriculum?
- Active?
- Student centered?



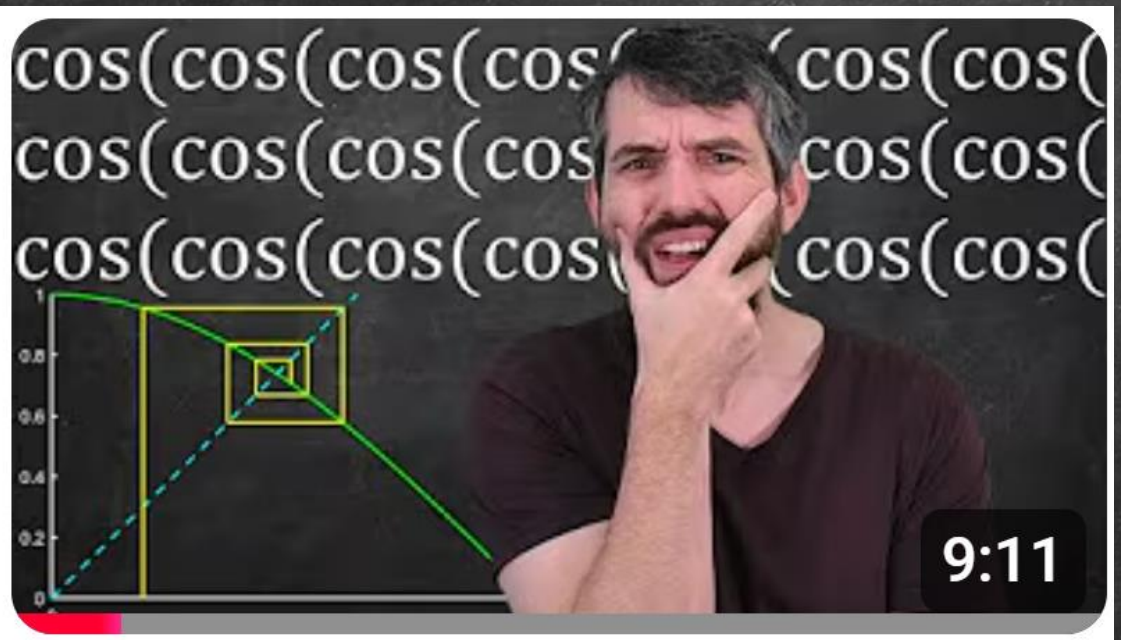
- Polished

- Uh...:D

CRUSHING the Sicilian with the Alapin | Amazing Checkmate!! | GM Naroditsky's...

LG Washer Drain Pump Fix in 7 Minutes

Outreach Content

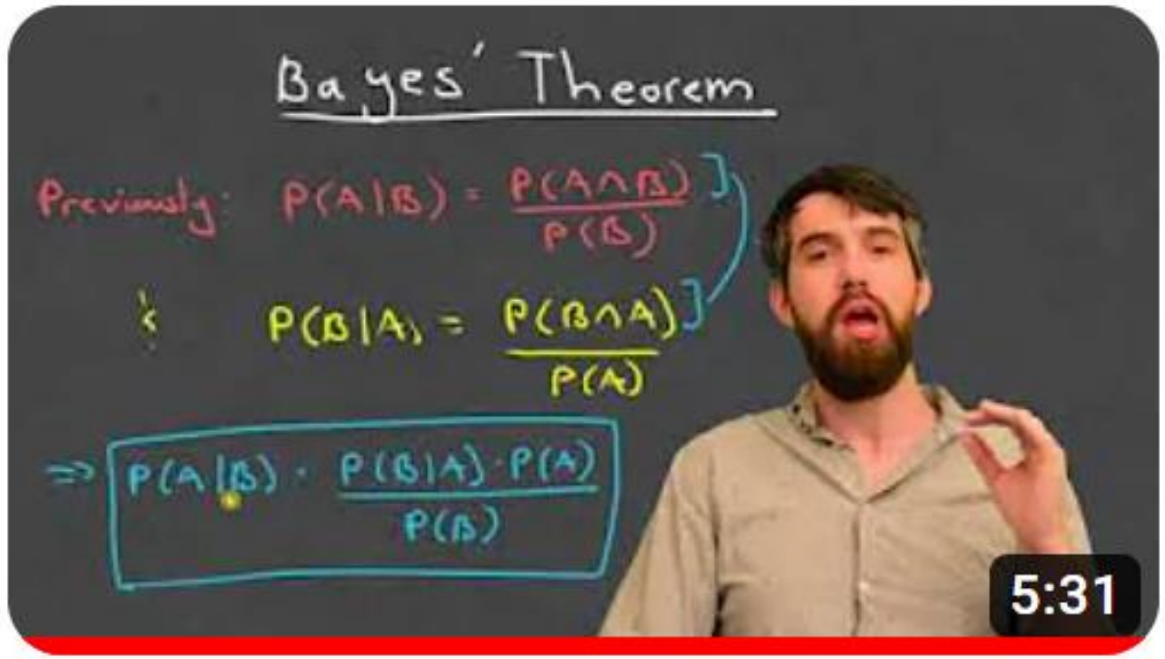


What is cos(cos(cos(cos(cos(cos(cos(cos(cos(co...

Dr. Trefor Bazett

605K views • 3 years ago

Course Content



Bayes' Theorem - The Simplest Case

1.4M views • 6 years ago

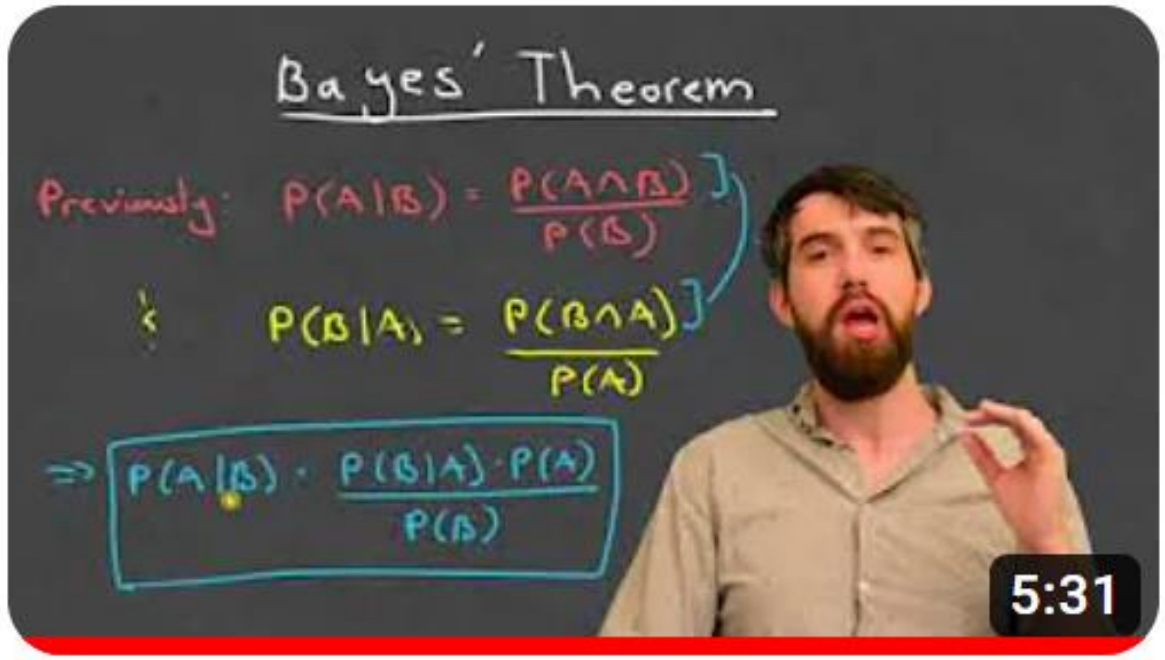
Recommendation Algorithm

What is cos(cos(cos(cos(cos(cos(cos(cos(cos(co...

Dr. Trefor Bazett

605K views • 3 years ago

Search Algorithm



Bayes' Theorem - The Simplest Case

1.4M views • 6 years ago

Recommendation Algorithm

How viewers find this video

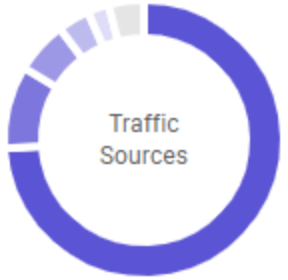
Views · Since published

Browse features	91.5%
Suggested videos	2.4%
Direct or unknown	1.9%
Channel pages	1.1%
YouTube search	1.0%
Others	2.1%

Search Algorithm

How viewers find this video

Views · Last 28 days



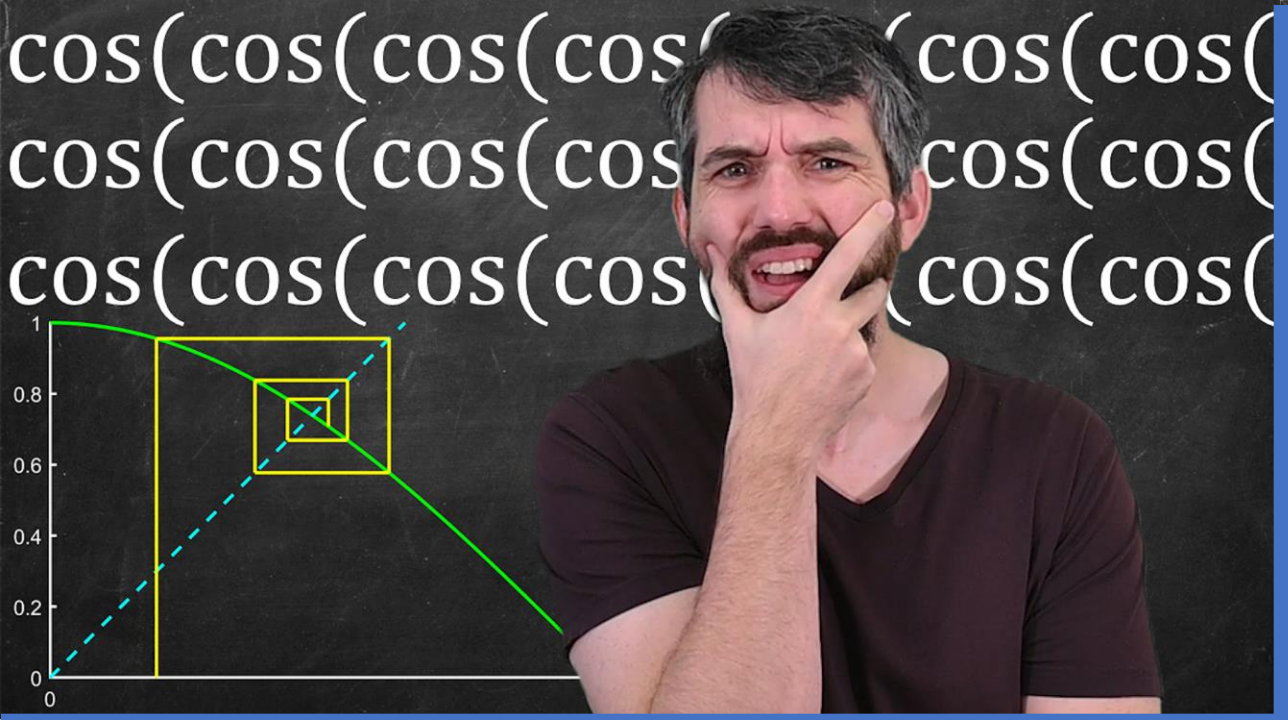
YouTube search	74.0%
External	9.6%
Suggested videos	6.1%
Direct or unknown	3.7%
Browse features	2.5%
Others	4.1%

Lesson #1: Add more “outreach” content to my courses

- Showcases the coolest parts of math
- Inspires and sustains interest in math

What the YouTube algorithm cares about:

- Click Through Rate (CTR)
- Average View Duration (AVD)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0.2
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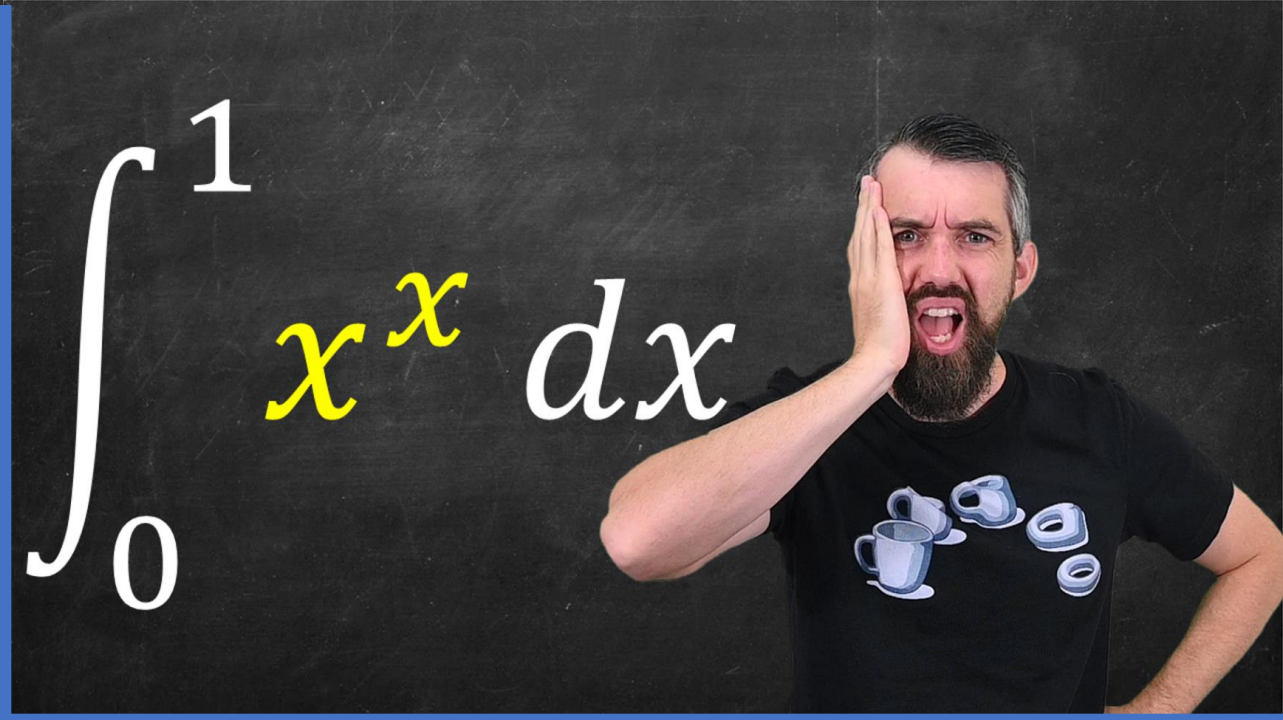
0


$\int_0^1 x^x \, dx$

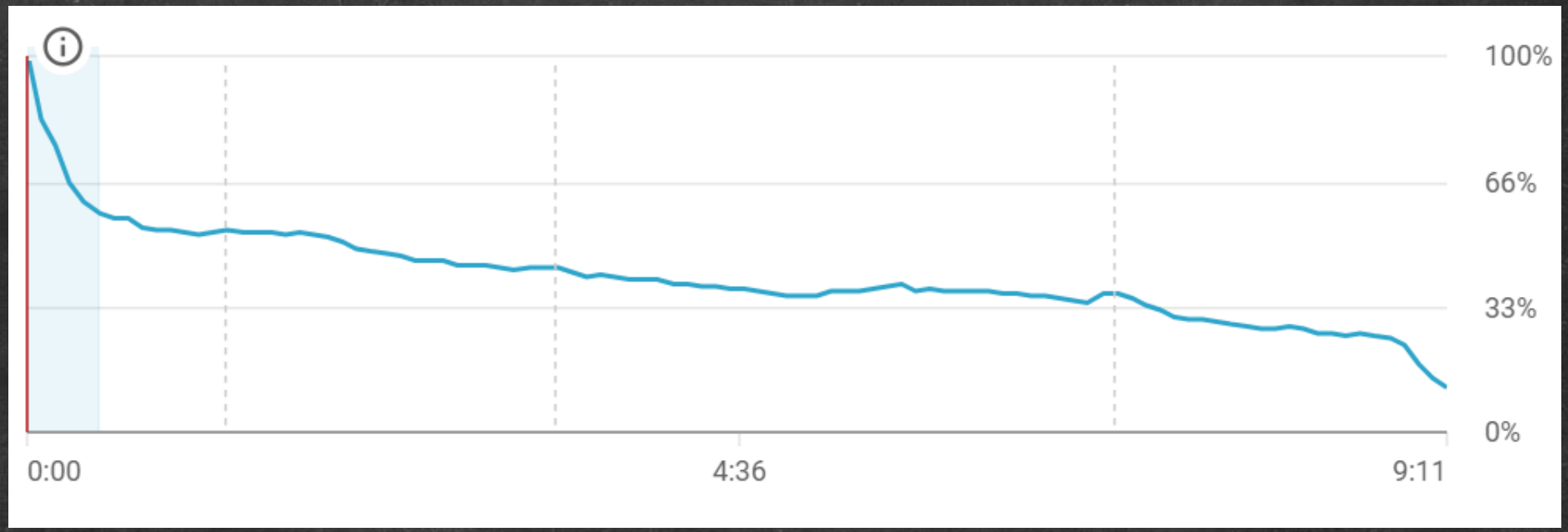

Minimal
Surfaces


Voronoi Cells

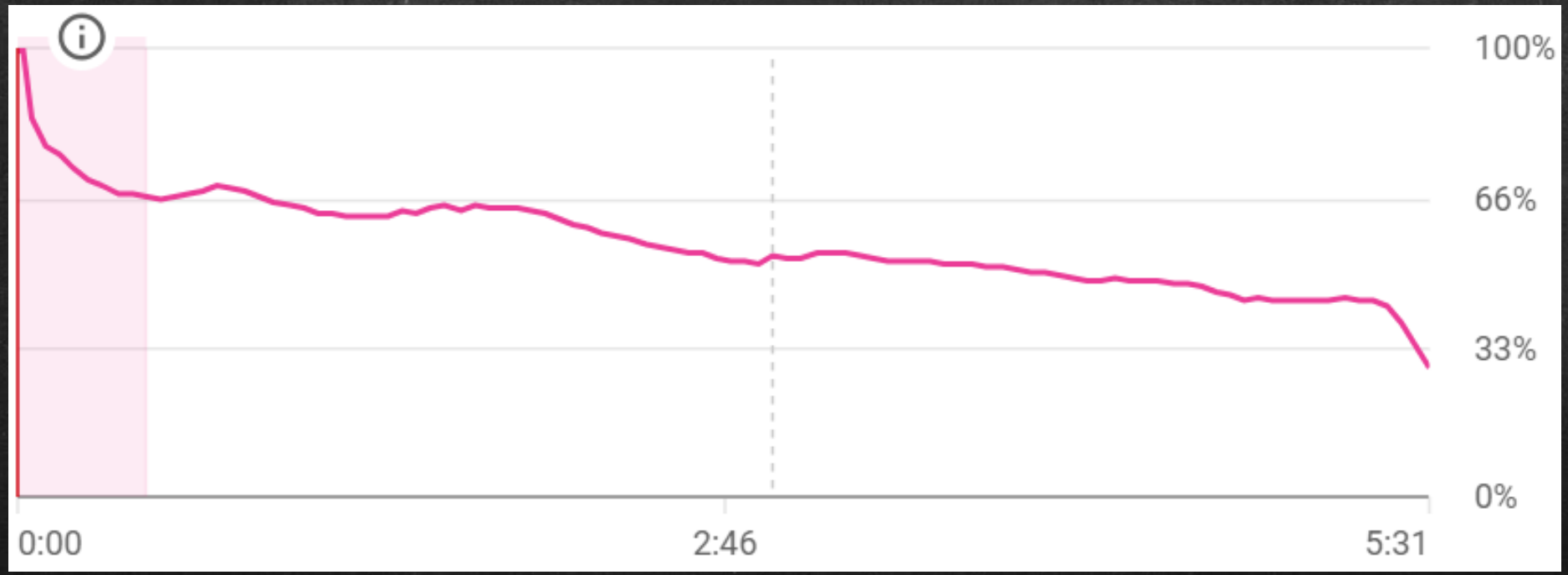
Effective Thumbnails/Titles:

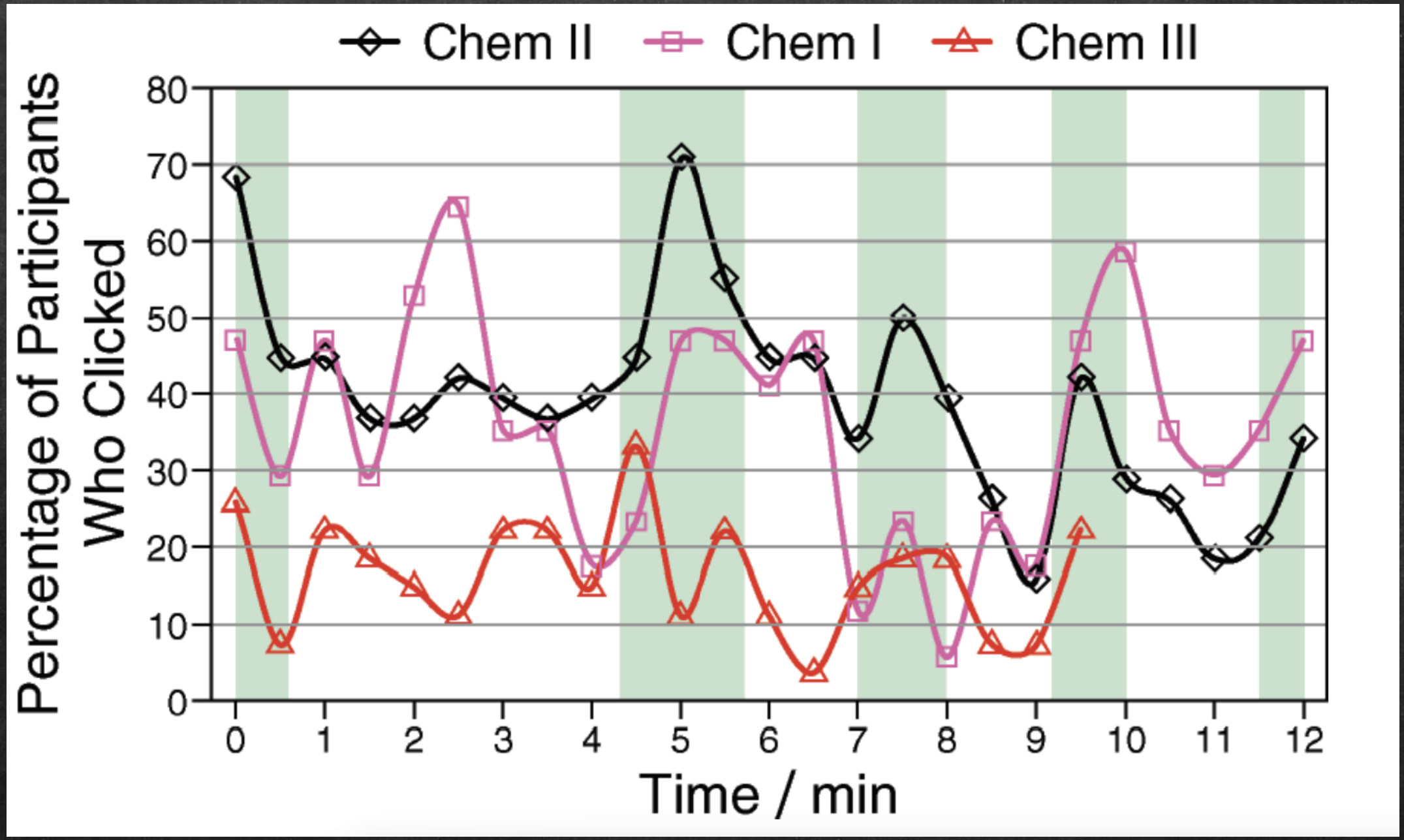
- Visual
- Interesting/Unexpected
- Pose a question

Cos(cos(



Bayes

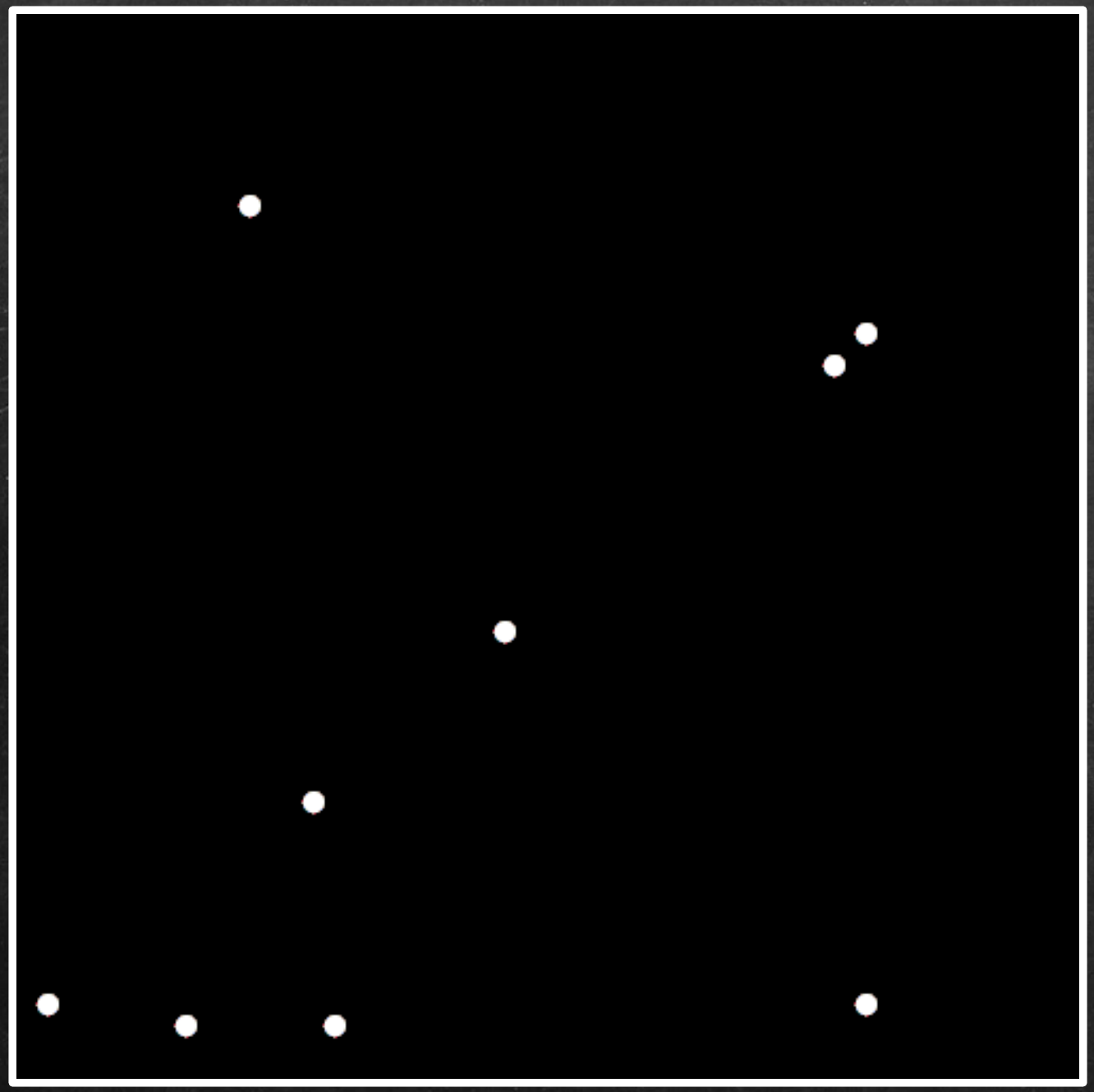




Bunce, Diane M., Elizabeth A. Flens, and Kelly Y. Neiles. "How long can students pay attention in class? A study of student attention decline using clickers." *Journal of Chemical Education* 87.12 (2010): 1438-1443.

Kolmogorov-Avrami Model of Crystallization Dynamics

$$Y = 1 - \exp(-Kt^n)$$



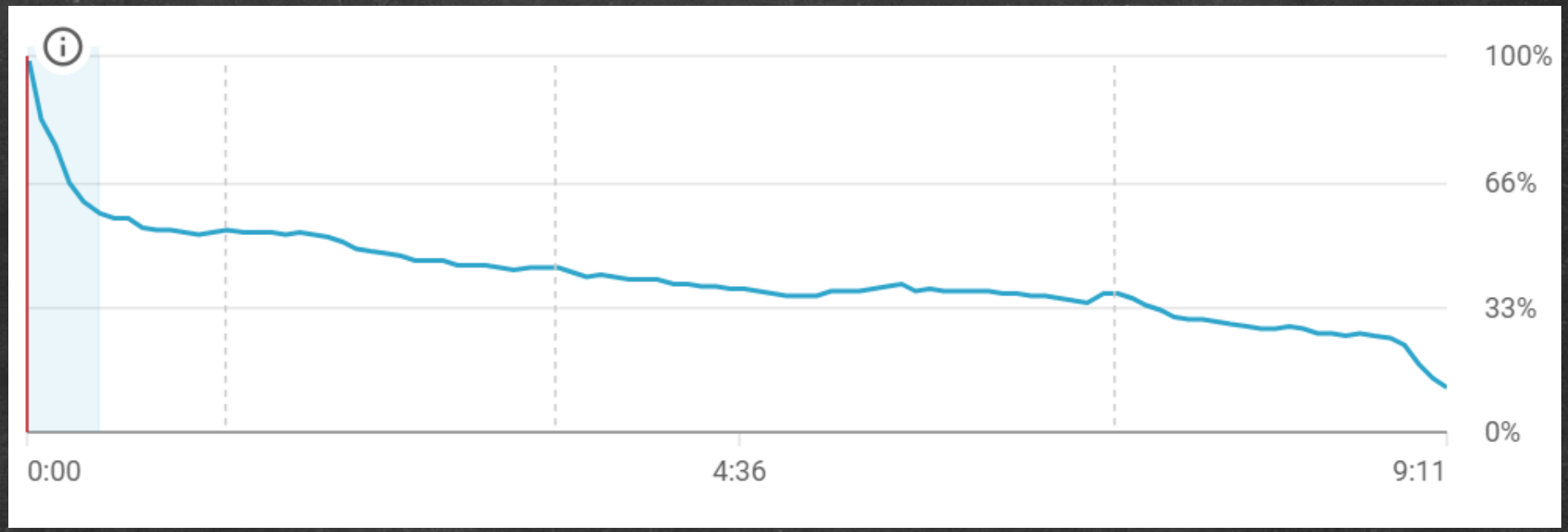
Effective Hooks:

- Visual
- Interesting/Unexpected
- Pose a question

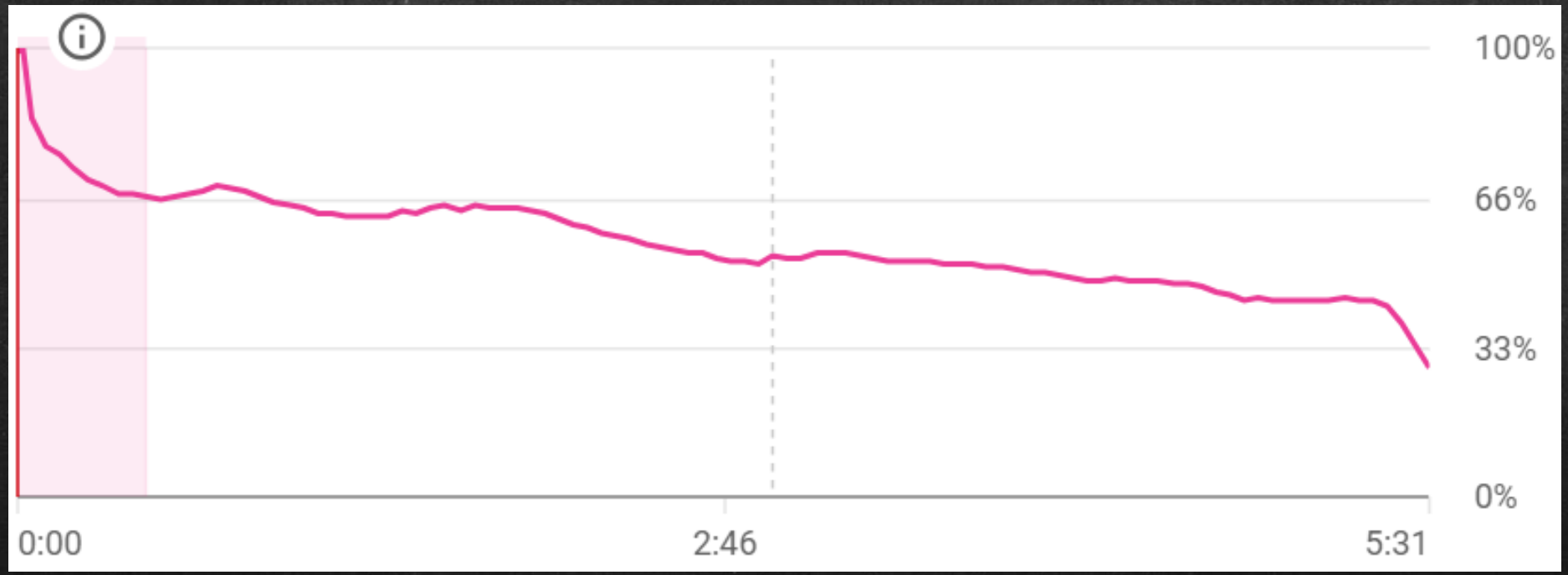

the
office

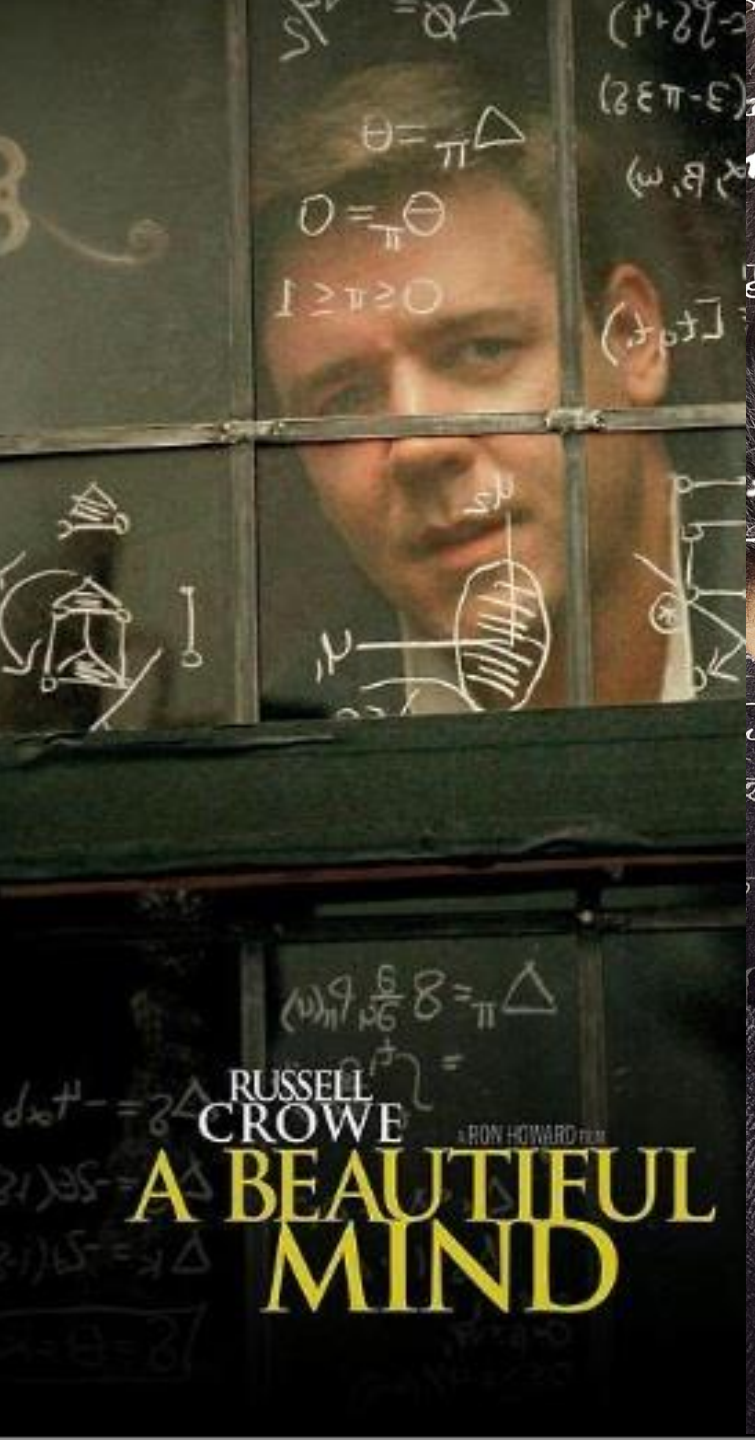
Lesson #2: Obsess about 1st couple minutes

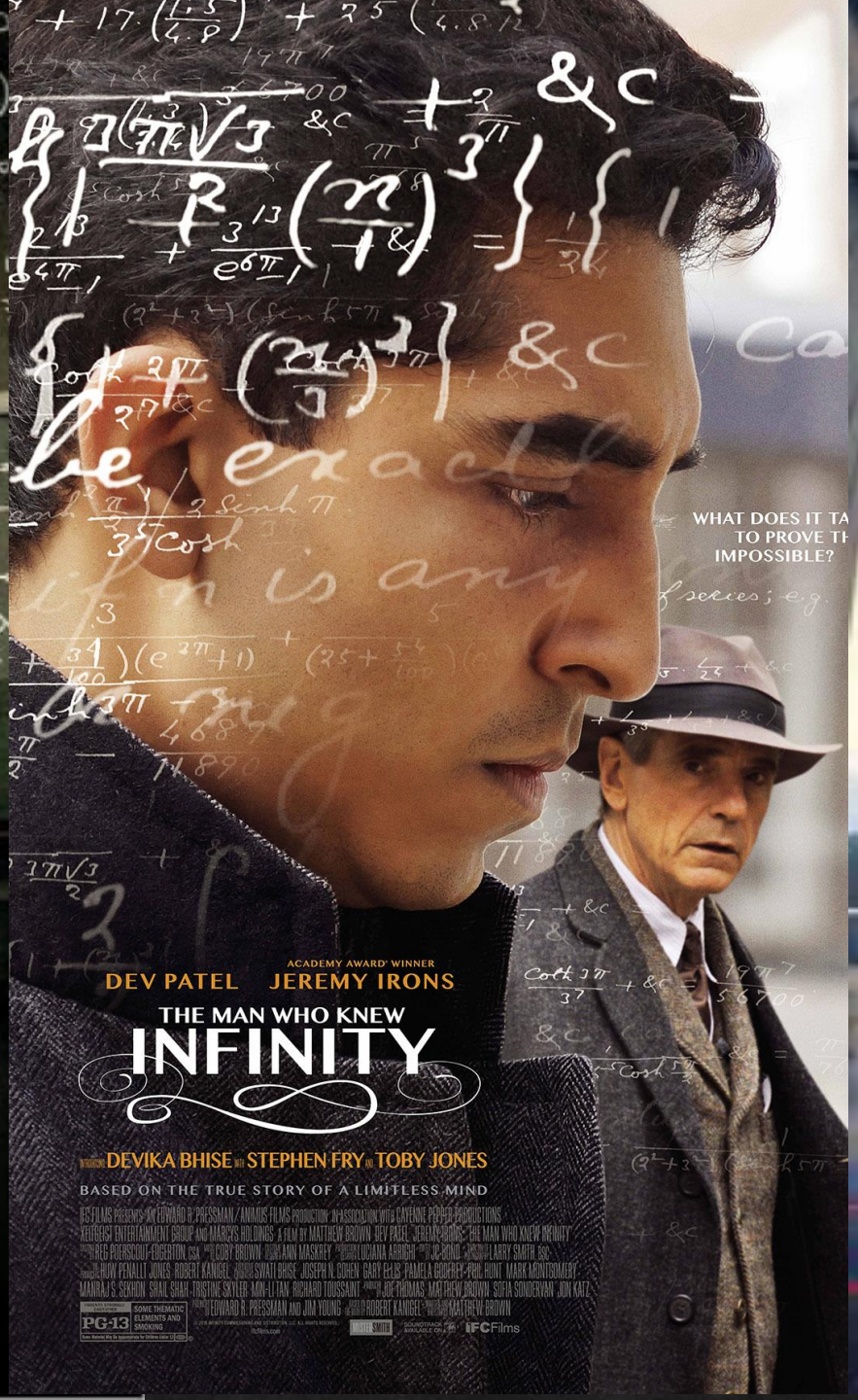
Cos(cos(



Bayes



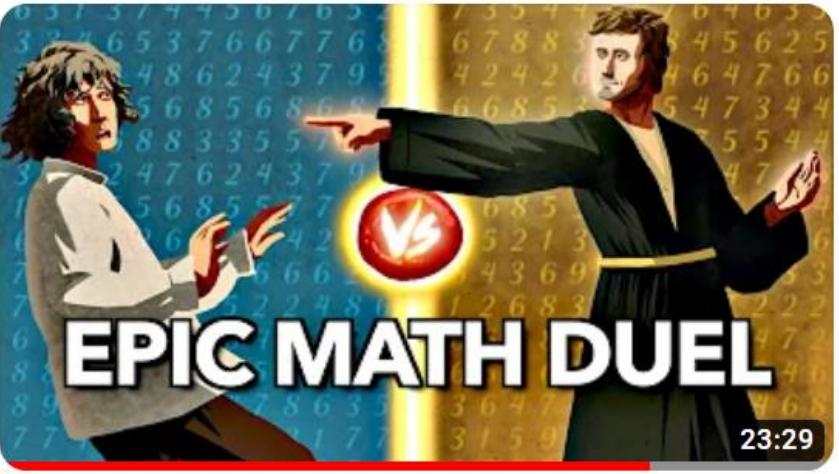

RUSSELL
CROWE
A RON HOWARD FILM
A BEAUTIFUL
MIND


WHAT DOES IT TA
TO PROVE TH
IMPOSSIBLE?
ACADEMY AWARD® WINNER
DEV PATEL
JEREMY IRONS
THE MAN WHO KNEW
INFINITY
DEVIKA BHISE
STEPHEN FRY
TOBY JONES
BASED ON THE TRUE STORY OF A LIMITLESS MIND
PG-13
IFCFilms


BASED ON THE UNTOLD TRUE STORY
MEET THE WOMEN YOU DON'T KNOW
BEHIND THE MISSION YOU DO
HIDDEN
FIGURES

Storytelling

- Historical Impact
- Personalities



How Imaginary Numbers Were Invented

16M views • 2 years ago

Veritasium

Thanks to Dr Amir Alexander, Dr Alexander Kontorovich, Dr Chris Ferrie, and Dr Adam Becker for the helpful advice and feedback ...

4K CC

Introduction | Luca Pacioli | The Depressed Cubic | Cardano | Schrdinger

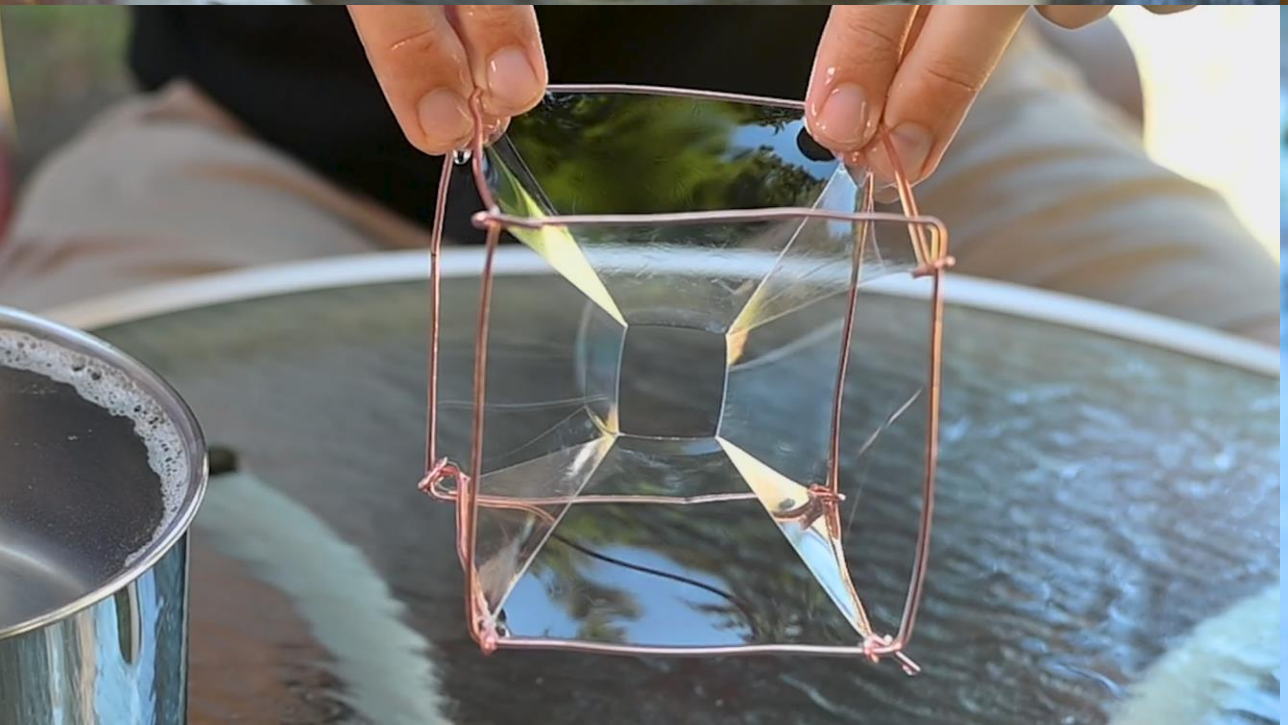
5 chapters

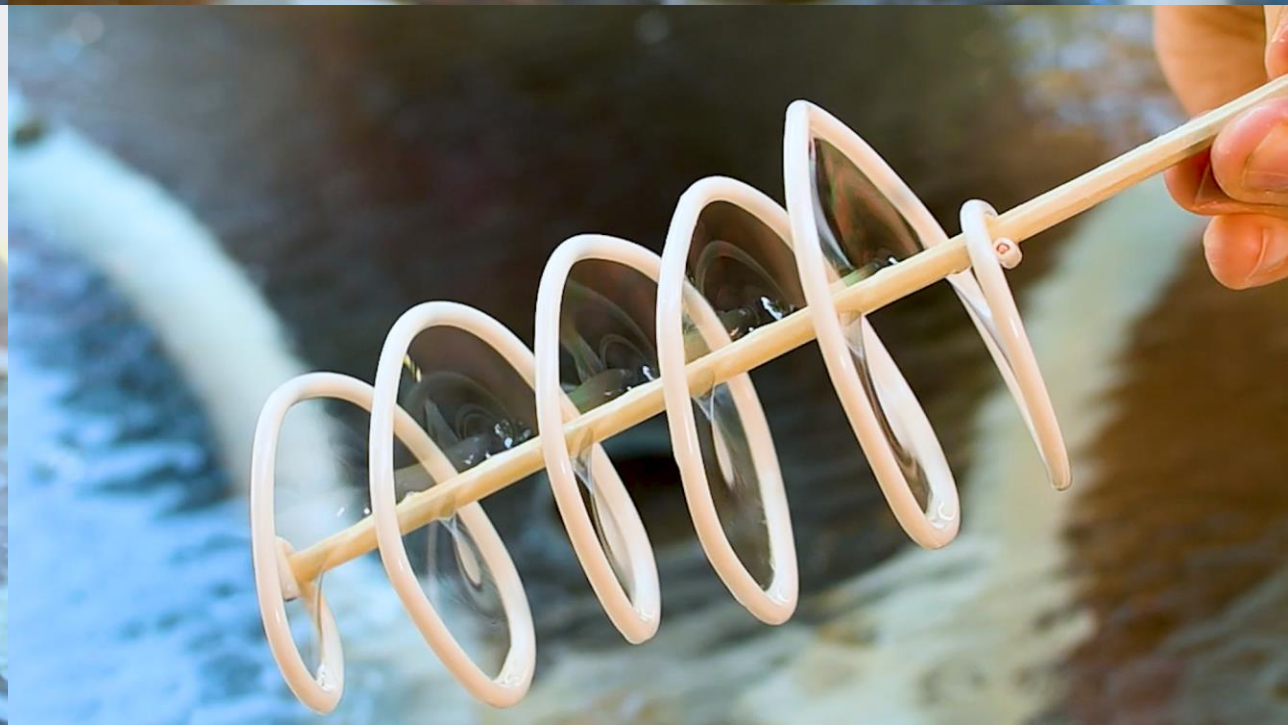
The Beautiful Story of Non-Euclidean Geometry

“You must not attempt this approach to parallels…I have traversed this bottomless night, which extinguished all light and joy in my life. I entreat you, leave the science of parallels alone”.

Storytelling

- Historical Impact
- Personalities
- Explanatory Stories
- Significance/Application Stories
- Geometric Stories
- Physical Stories
- Connections
- Beauty/Art
- Intriguing/Surprising
- Outliers





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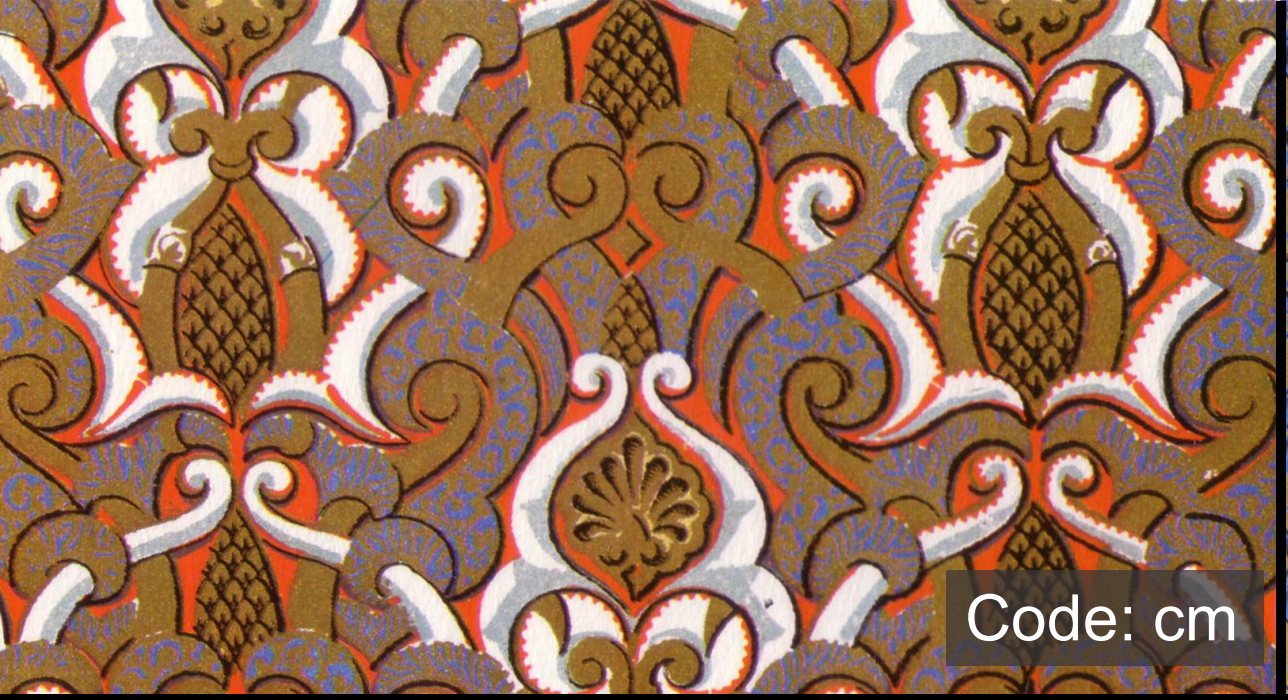
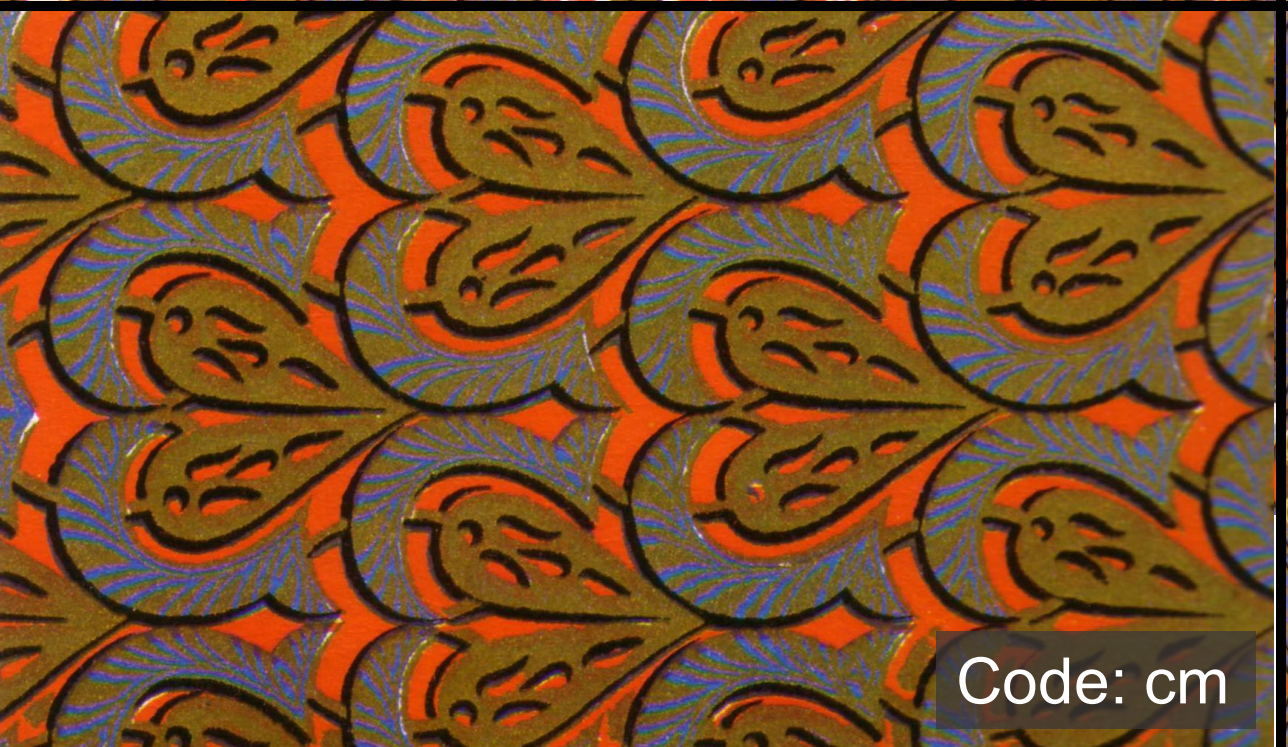
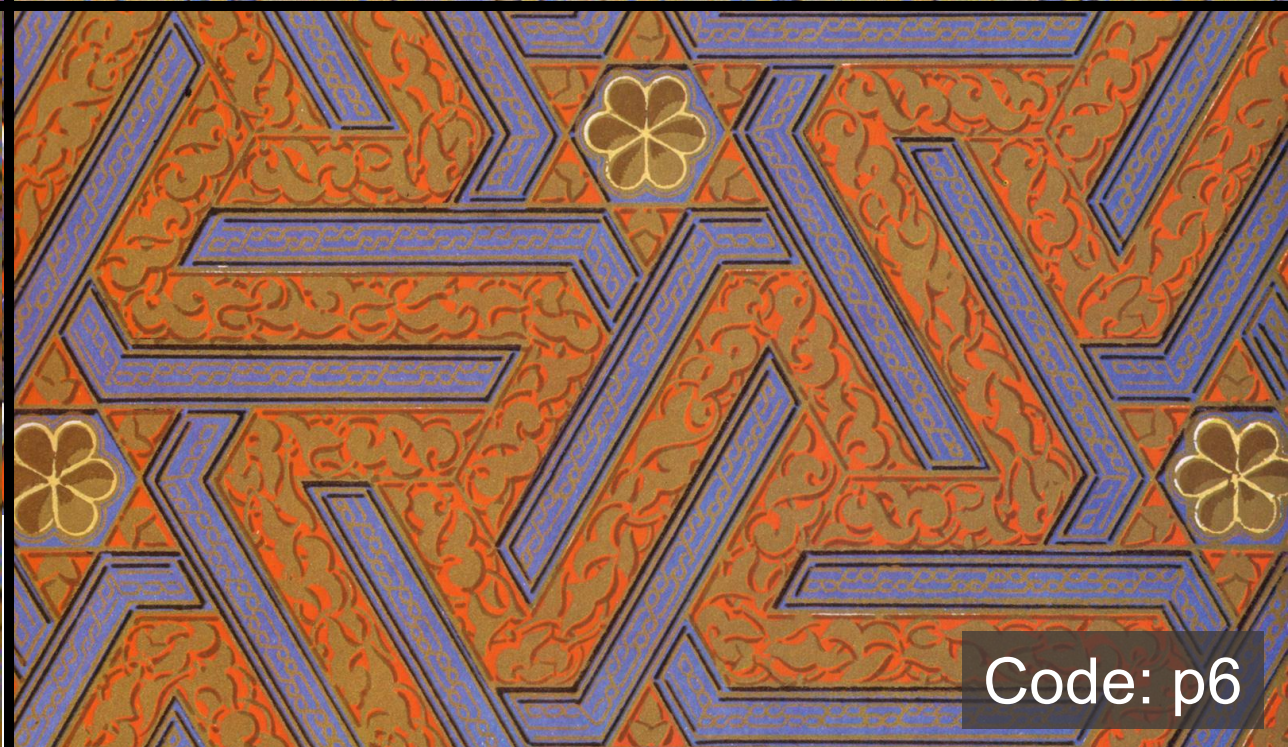
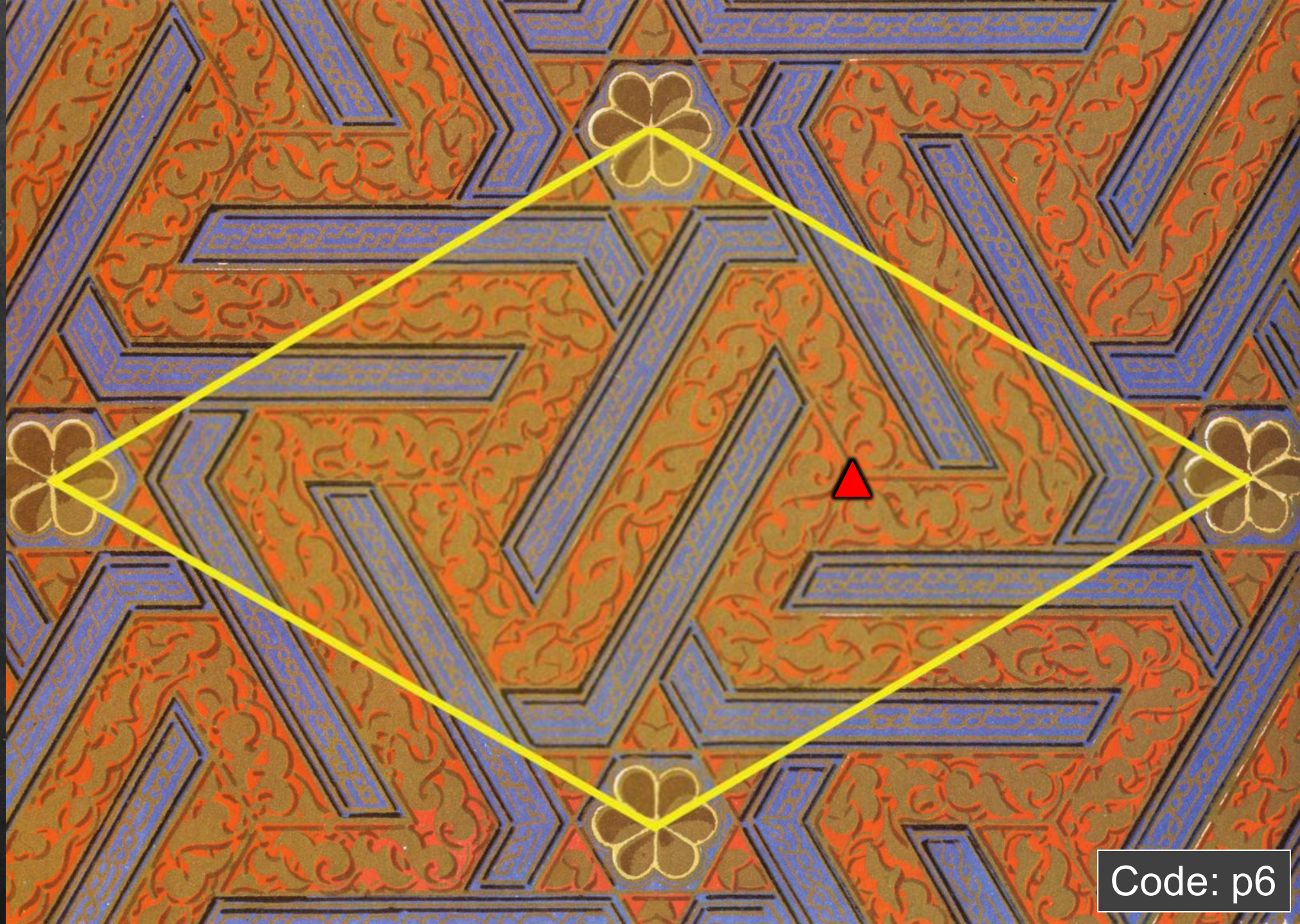
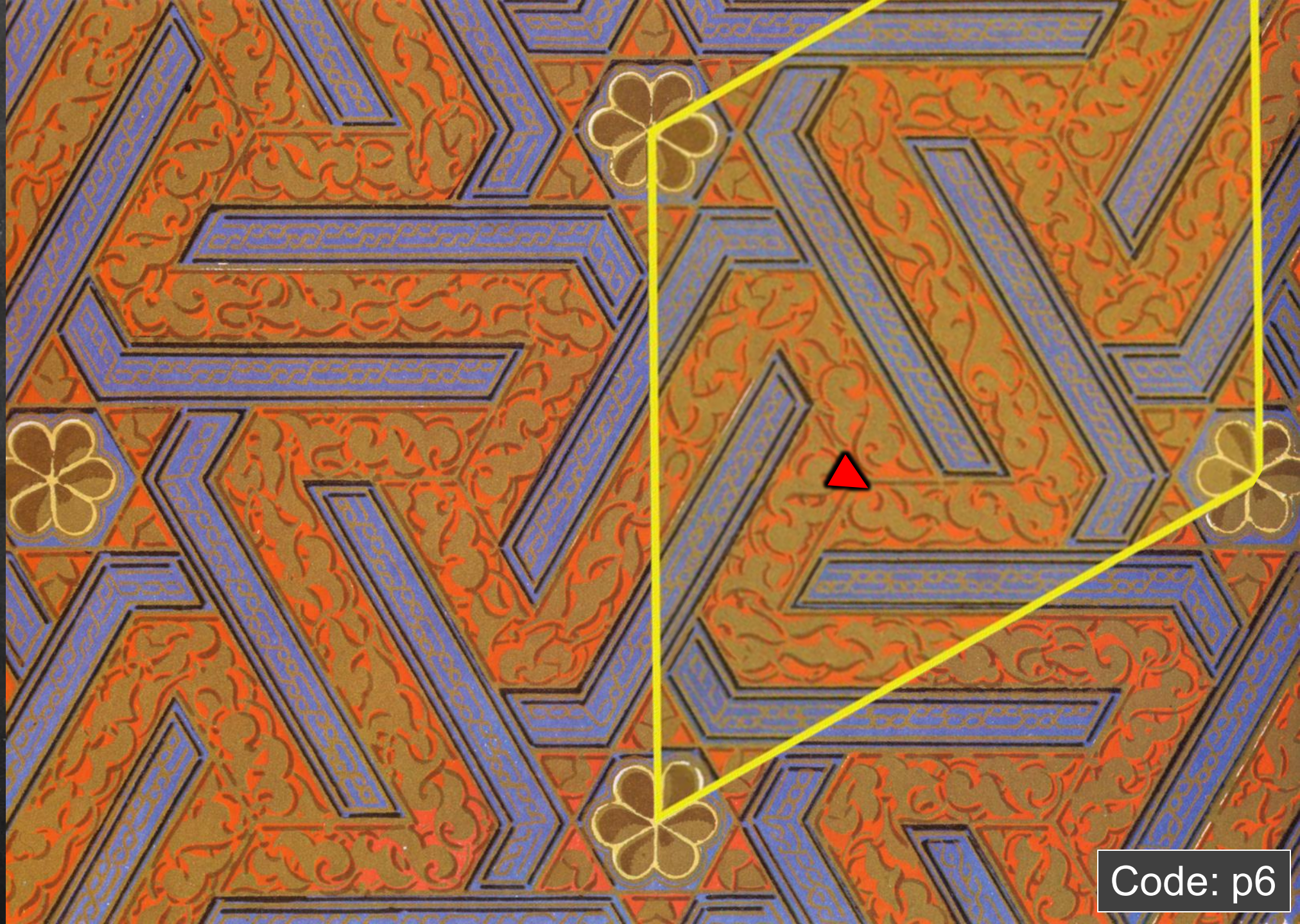

Code: cm


Code: p4


Code: cm


Code: p6


Code: p6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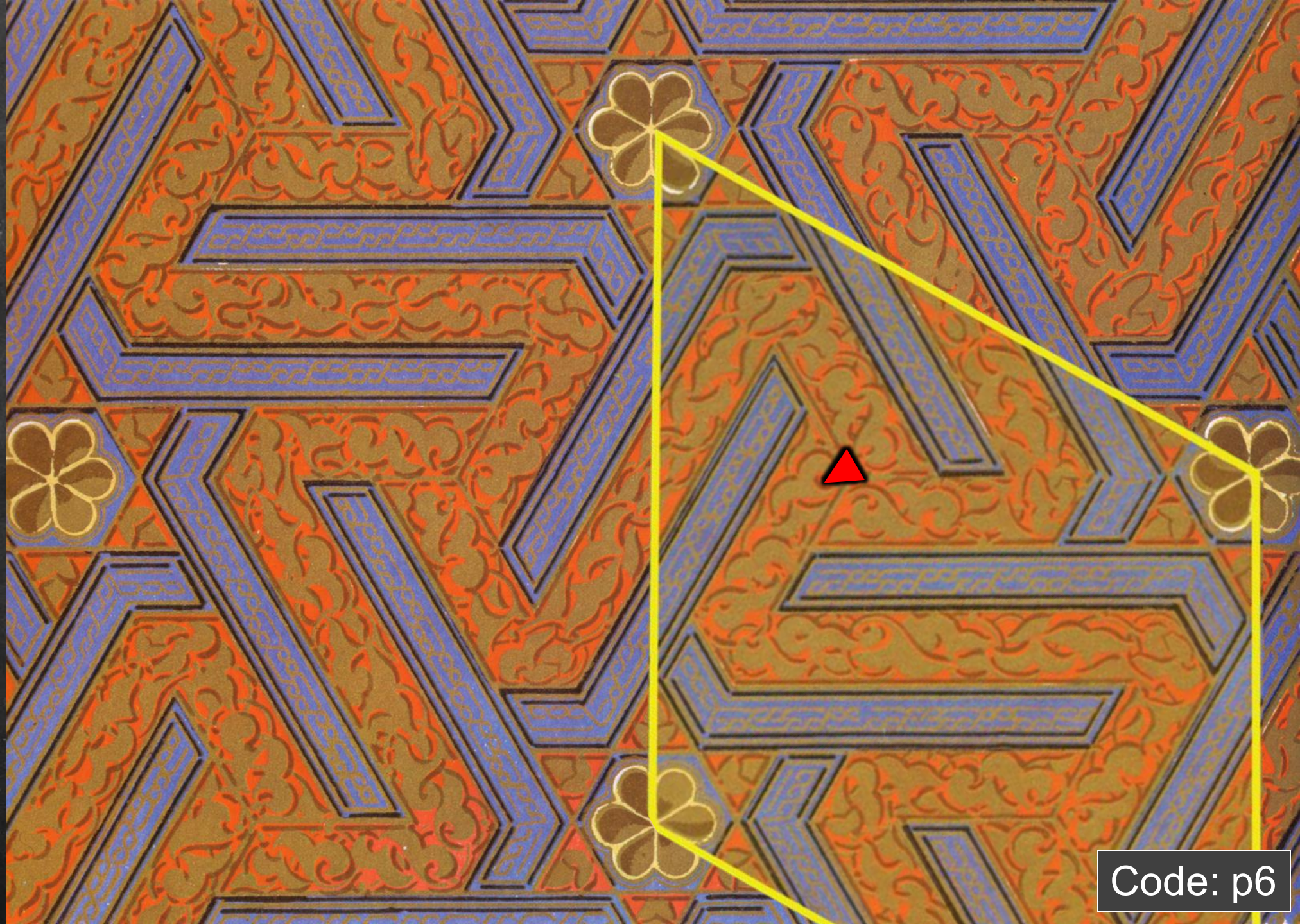
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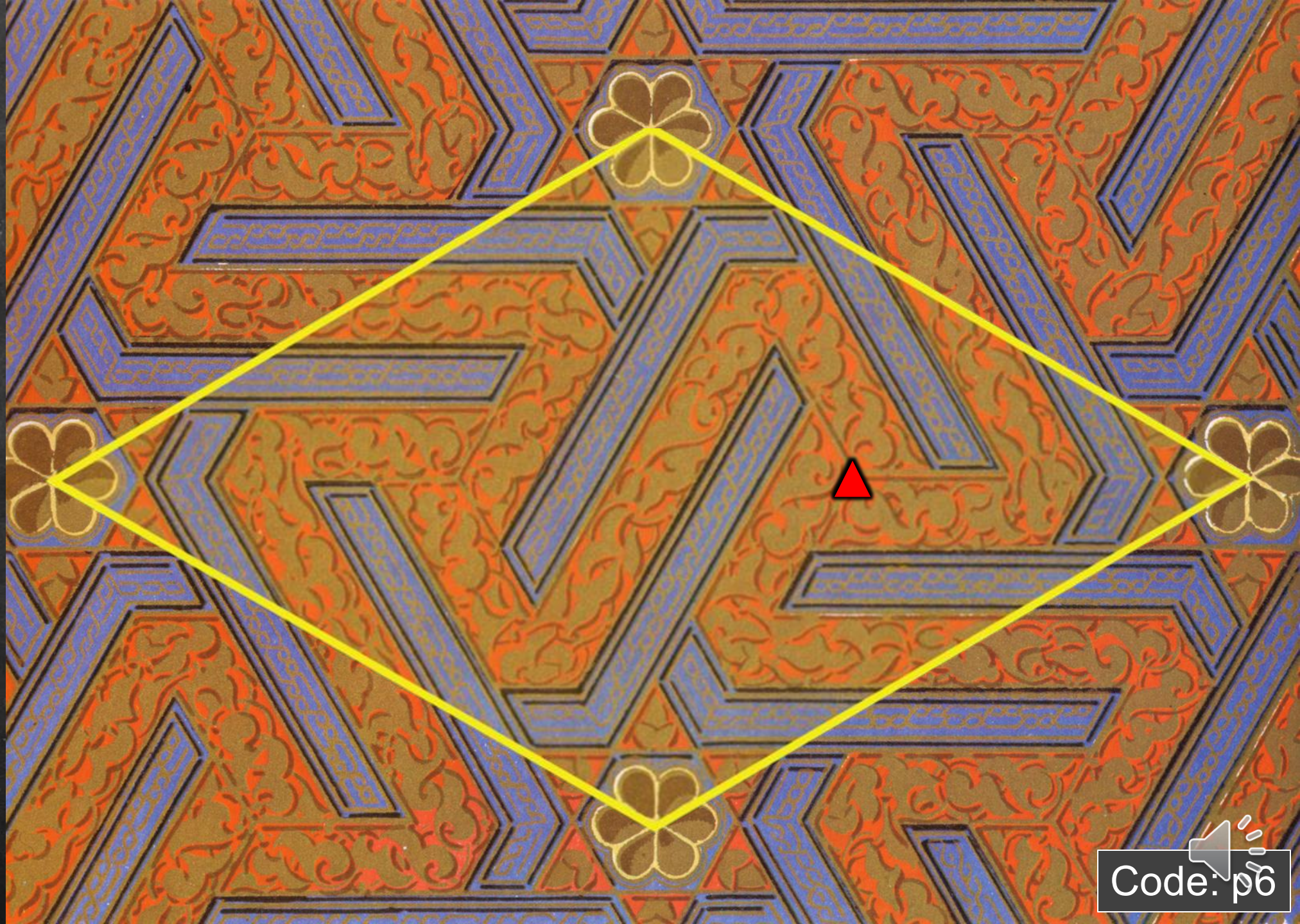
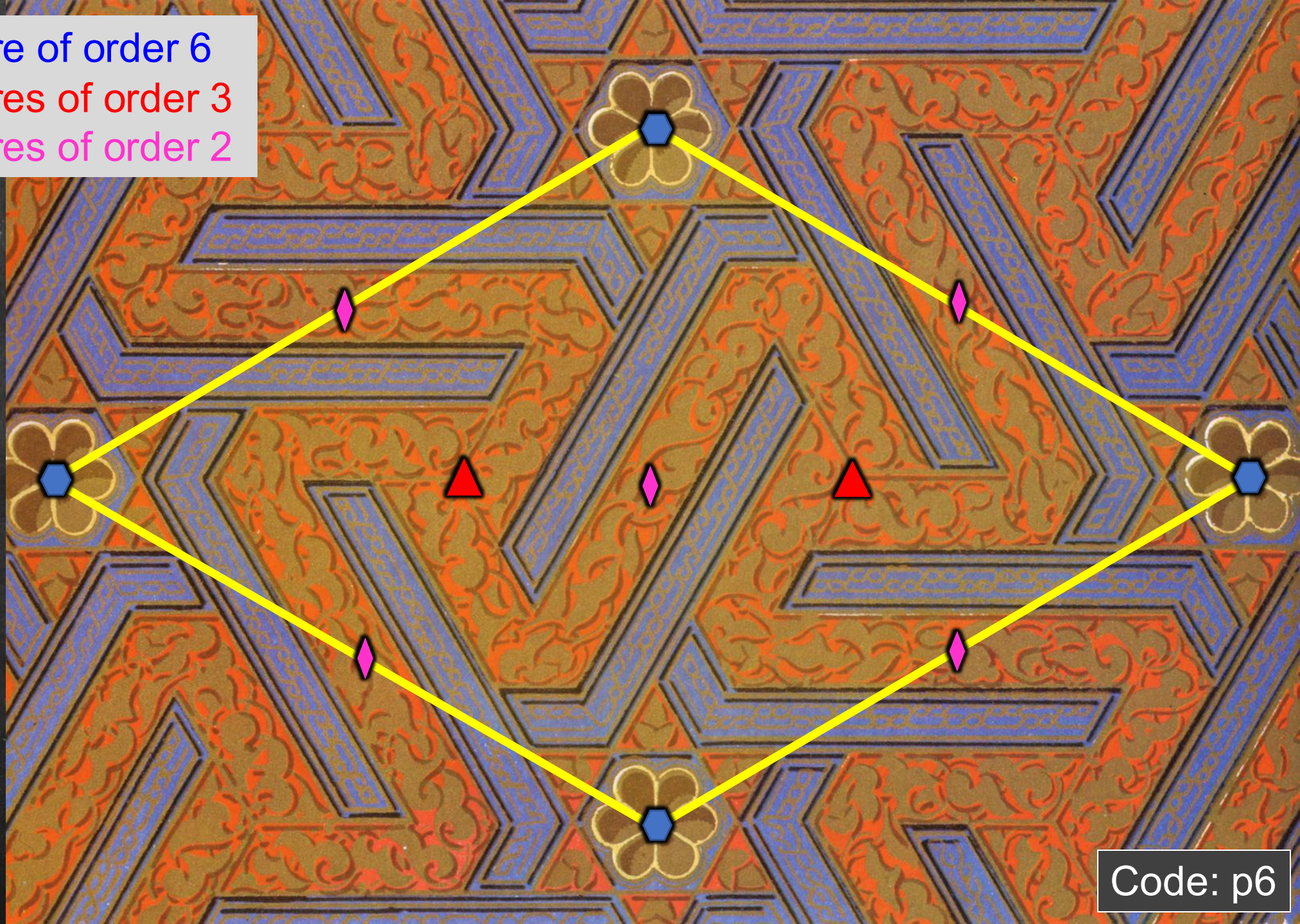

Code: p6

- 1 rotation centre of order 6
- 2 rotation centres of order 3
- 3 rotation centres of order 2



Code: p6

Storytelling

- Historical Impact
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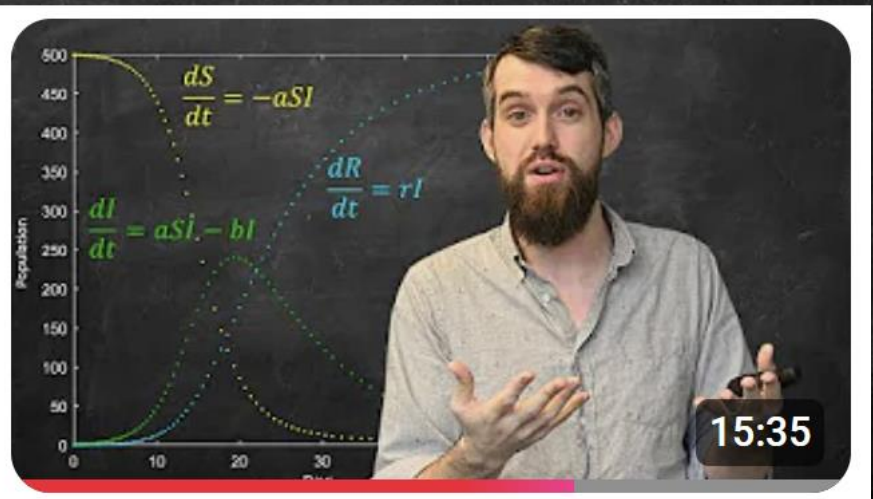
- Outliers

How to fairly split weird bills using GAME THEORY



The MATH of Pandemics | Intro to the SIR Model

Storytelling

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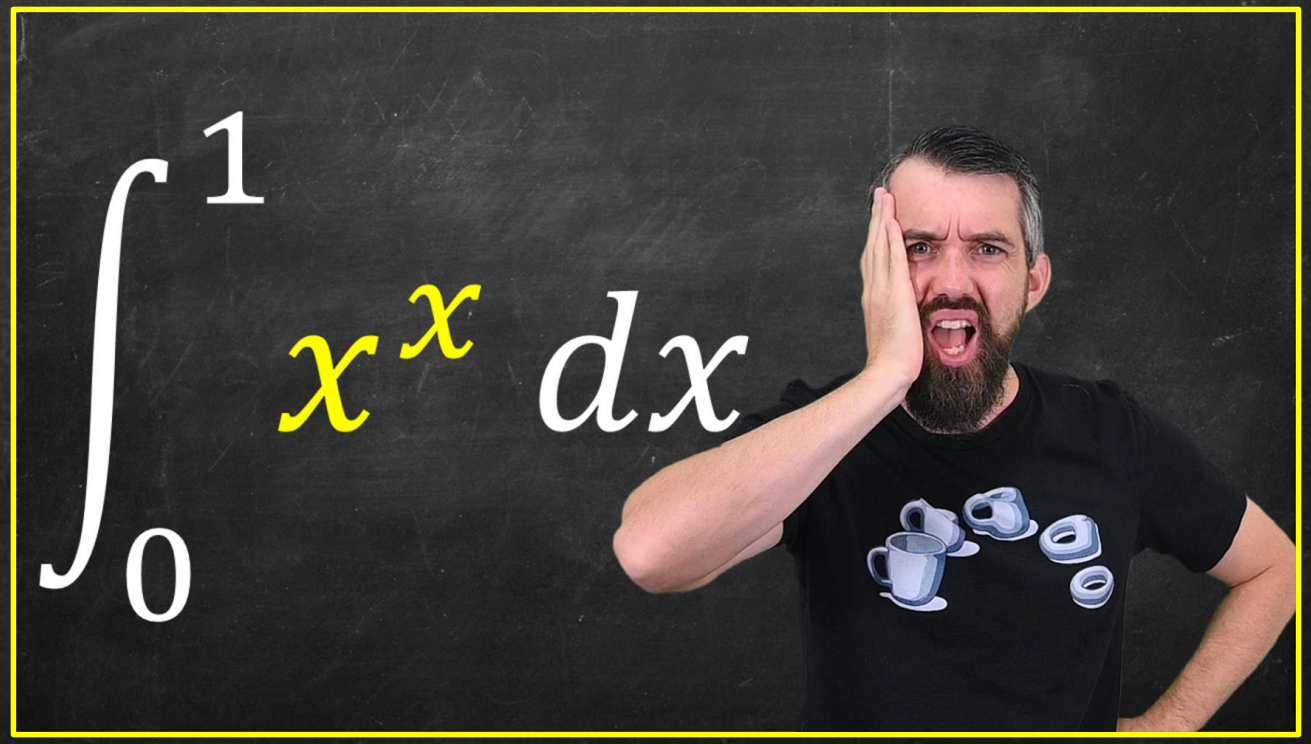
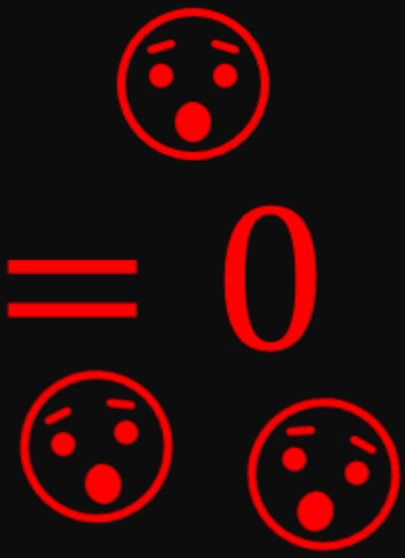


Go to your phone app
(in Scientific Calculator mode)

$$10^{100} + 1 - 10^{100} = ???$$

$$10^{100} + 1 - 10^{100} = 0$$



$$10^{100} + 1 - 10^{100} = 1$$

Storytelling

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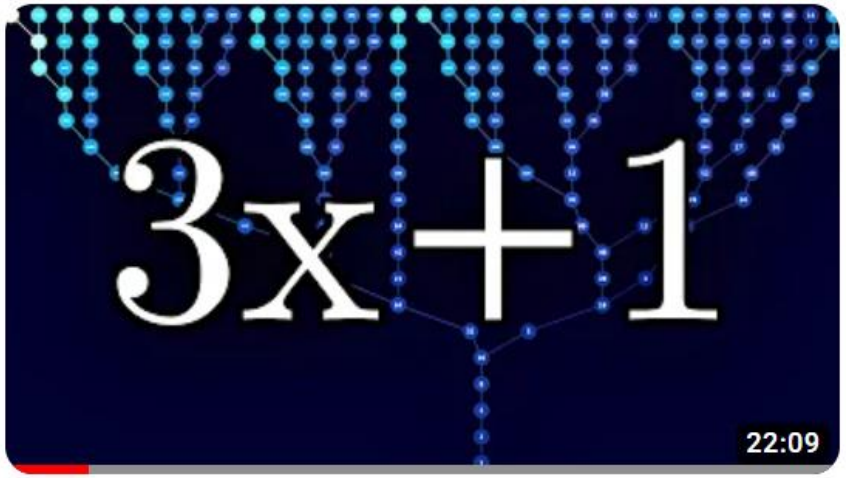
- Physical Stories
- Connections
- Beauty/Art
- Intriguing/Surprising
- Outliers

The Largest Numbers Ever Discovered // The Bizarre World of...

274K views • 3 years ago

The fastest matrix multiplication algorithm

292K views • 1 year ago



The Simplest Math Problem No One Can Solve - Collatz Conjecture

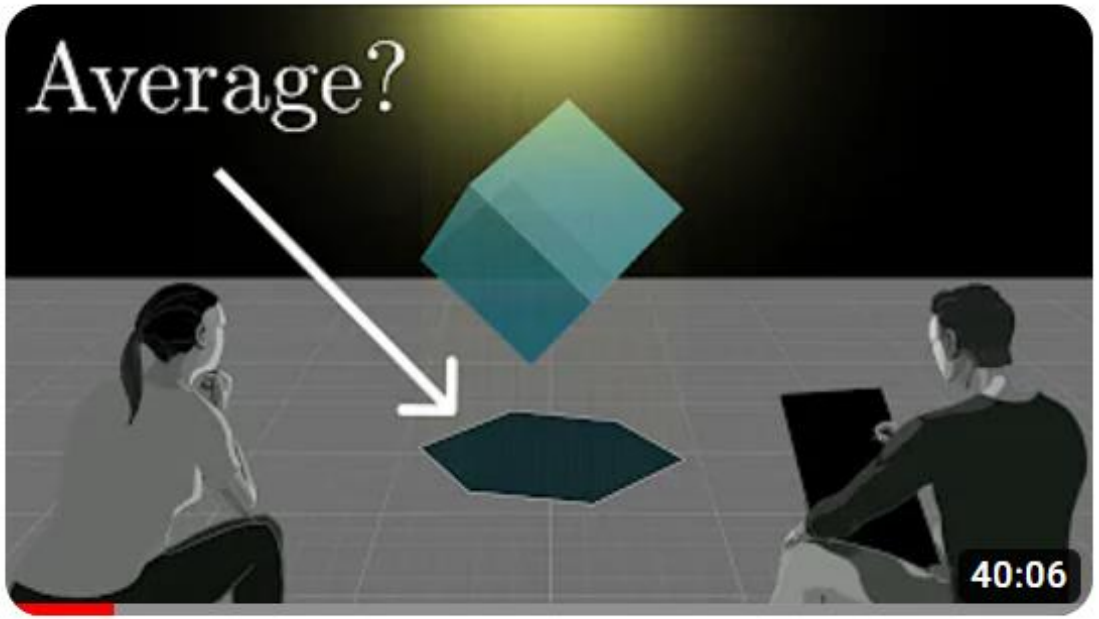
38M views • 2 years ago

Veritasium

Special thanks to Prof. Alex Kontorovich for introducing us to this topic, filming the interview, and consulting on the script and ...

4K CC

COLLATZ CONJECTURE | HASSE'S ALGORITHM | 10,5, 16,8, 4, 2, 1 | DIRECTED GRAPH 4 moments



A tale of two problem solvers (Average cube shadows)

2.5M views • 2 years ago

3Blue1Brown

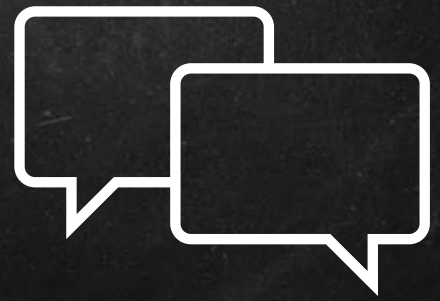
There's a small error at 19:30, I say "Divide the total by 1/2", but of course meant to say

4K CC

The players | How to start | Alice's initial thoughts | Piecing together the c

Storytelling

What is a math story you like to tell?



Storytelling

Fact 1

and

Fact 2

and

Fact 3

Storytelling

Fact 1

but

Fact 2

therefore

Fact 3

Storytelling

Hook

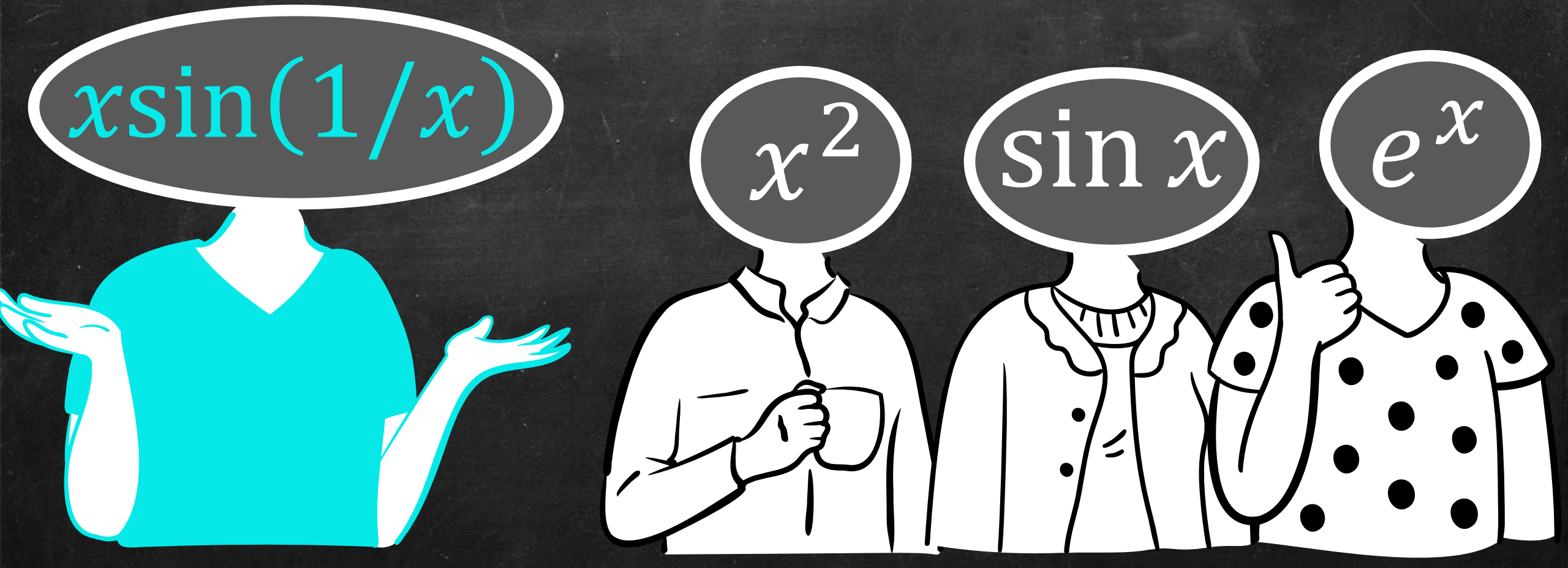
but

Tension

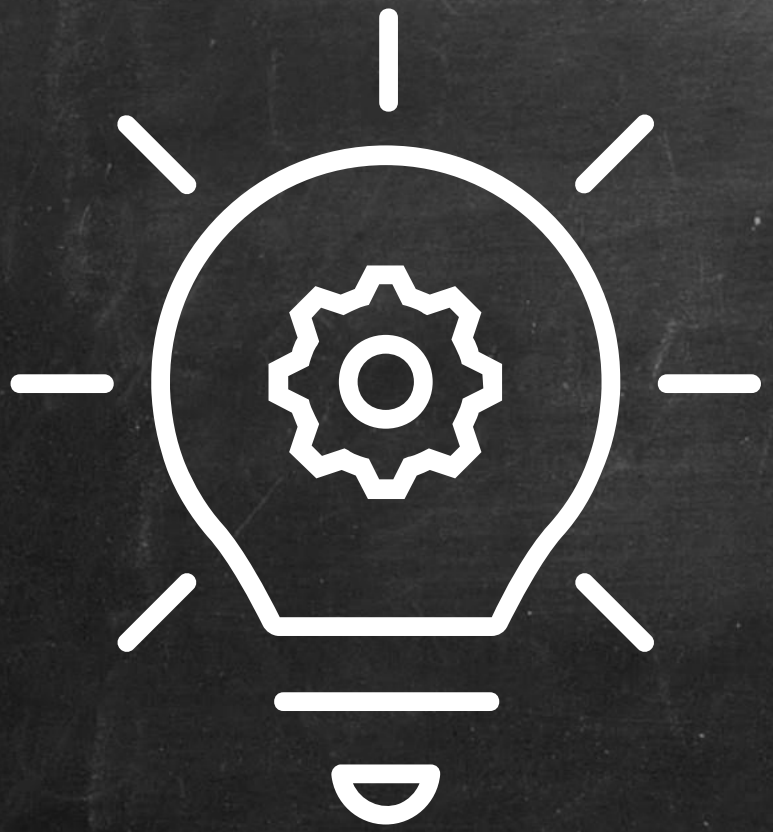
therefore

Resolution

Storytelling



Storytelling



Aha! moments

Lesson #3: Structure as stories

Show and Tell:

vs

Mayer RE. Applying the science of learning: evidence-based principles for the design of multimedia instruction. Cogn Instr. 2008;19:177–213.

People click away when….

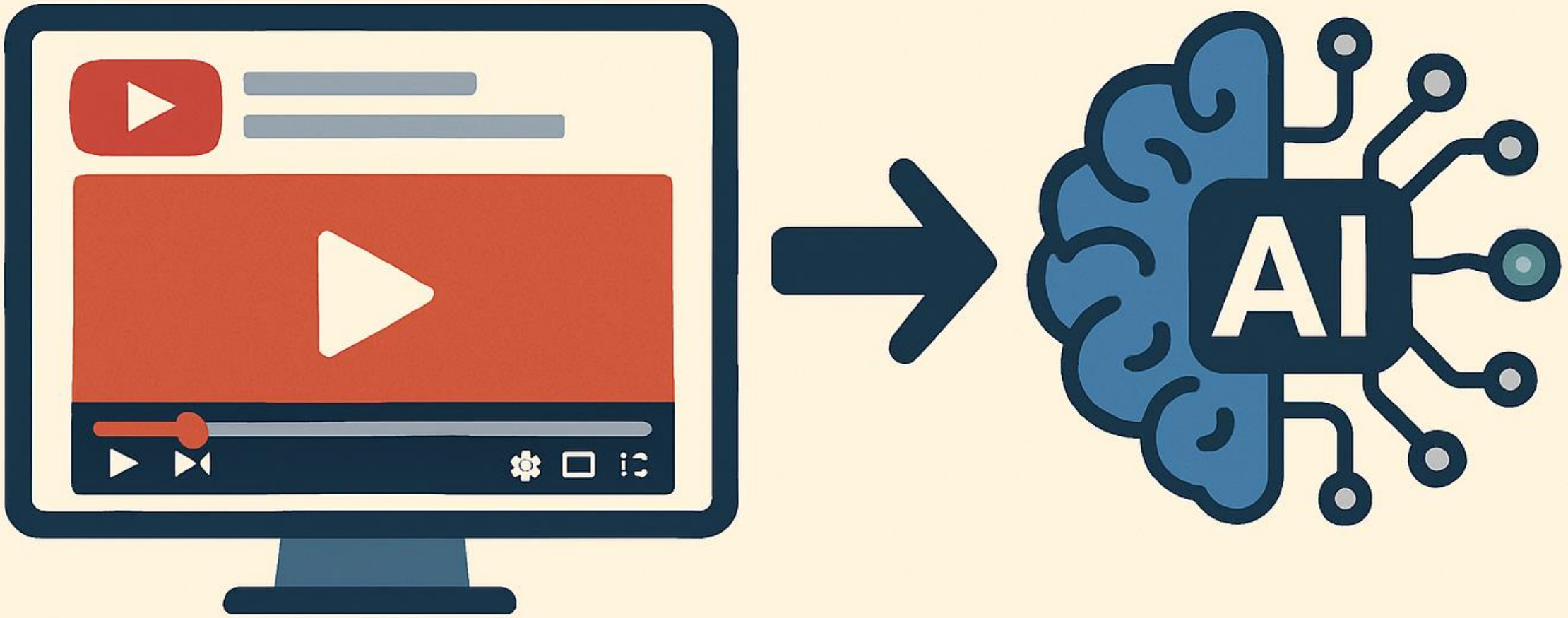
- Lots of talking no visuals
- Technical computations
- Not central to the narrative

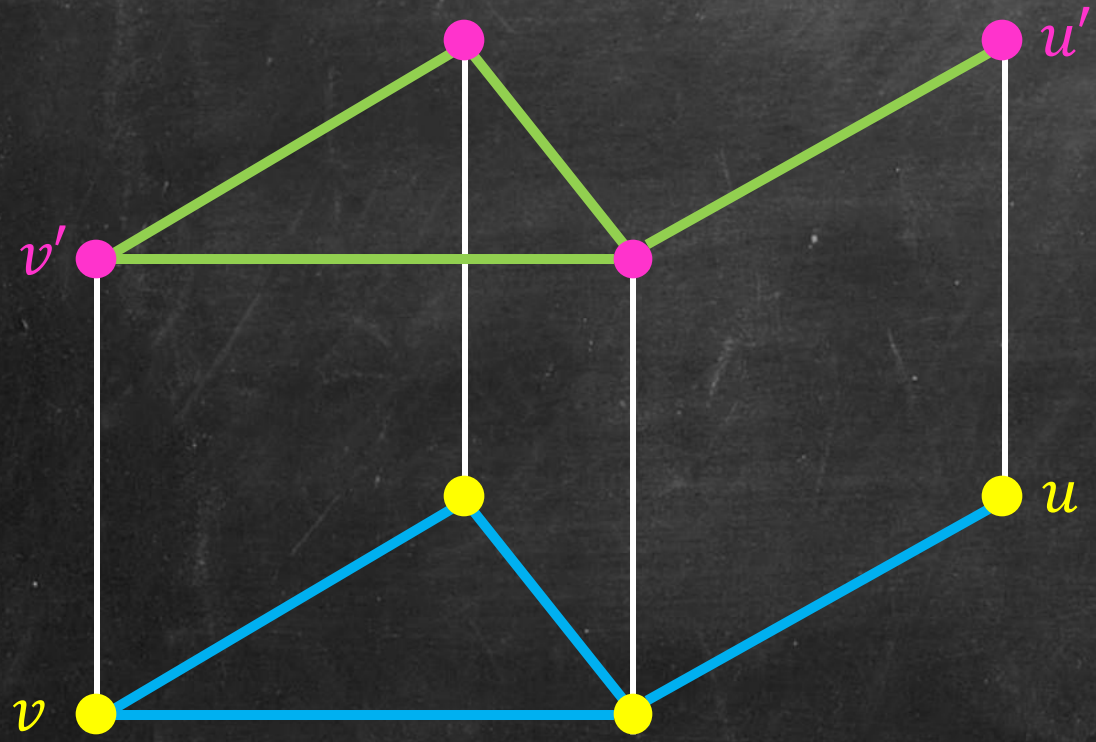
Lesson #4: Add key visuals!

Community

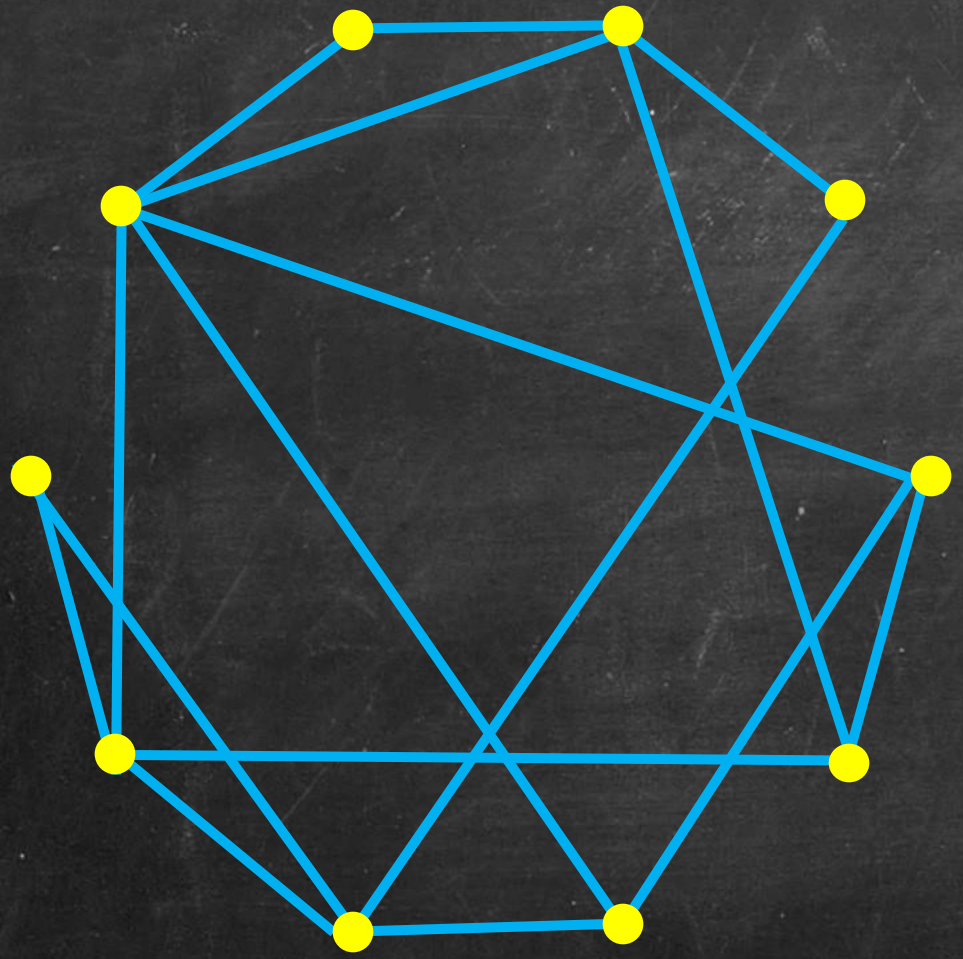
- It’s OK to like math…millions do!
- Anyone can like math!
- Low Anxiety

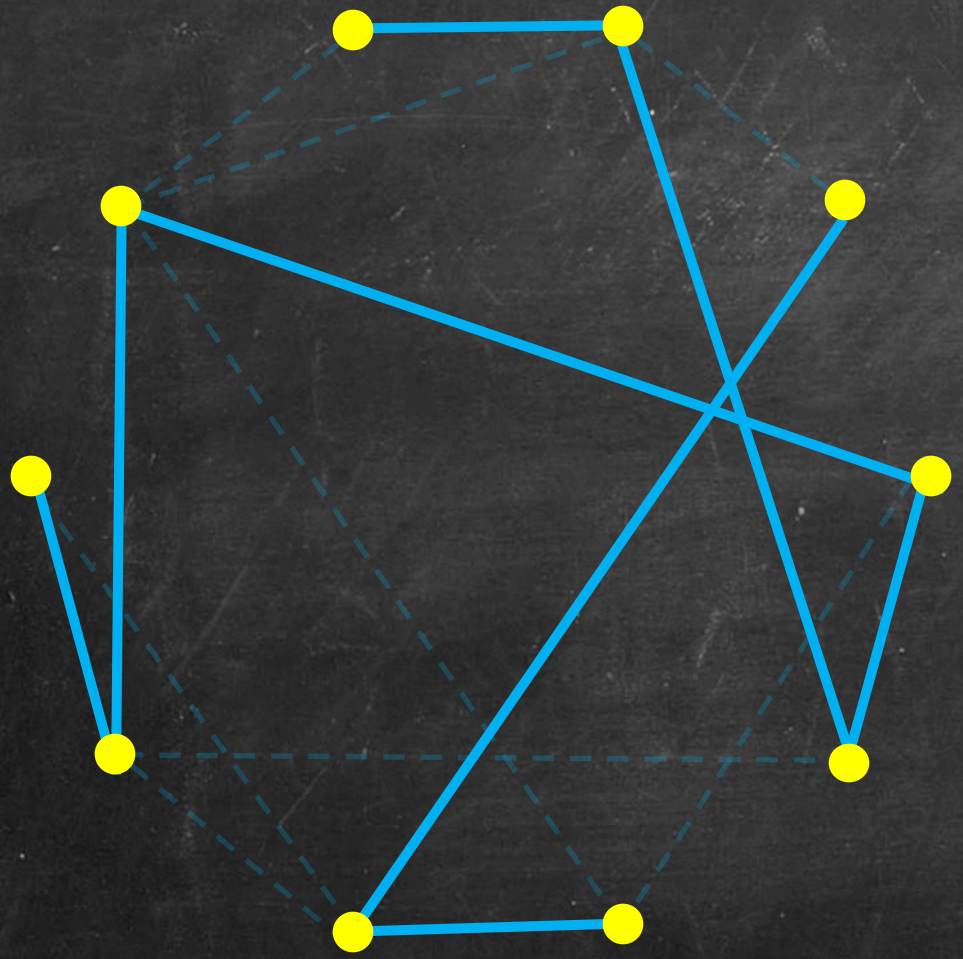
Where does AI fit in?

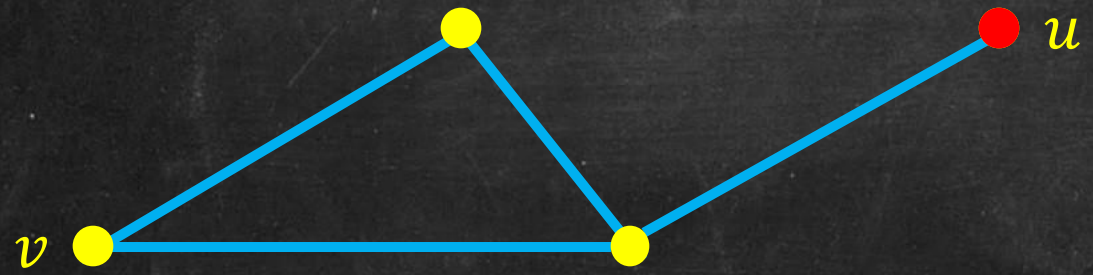




The Bunkbed Conjecture is False, Nikita Gladkov, Igor Pak, Aleksandr Zimin 2024



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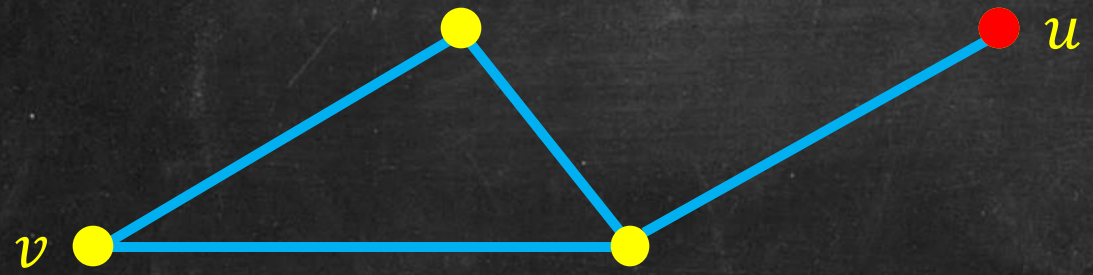
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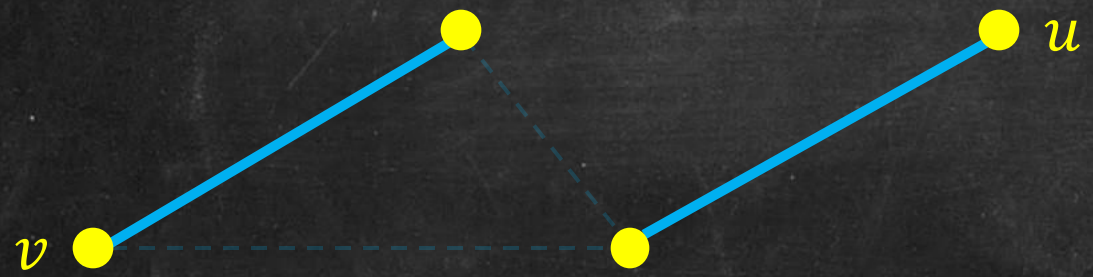
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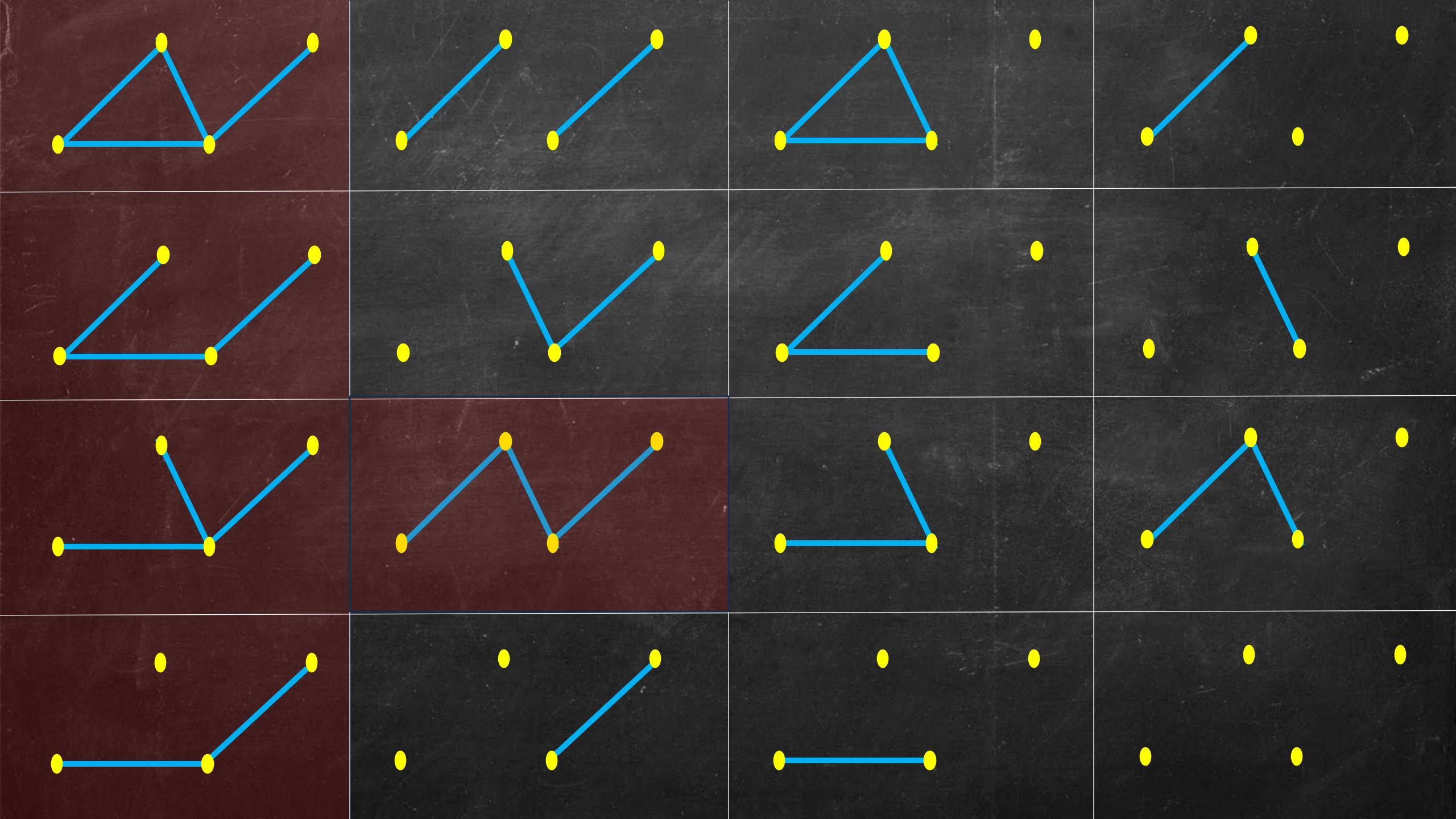

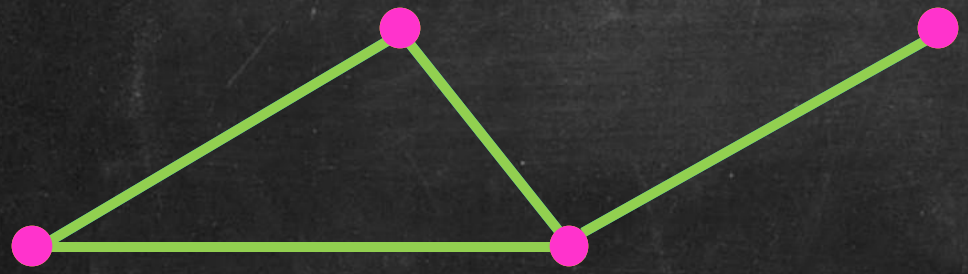

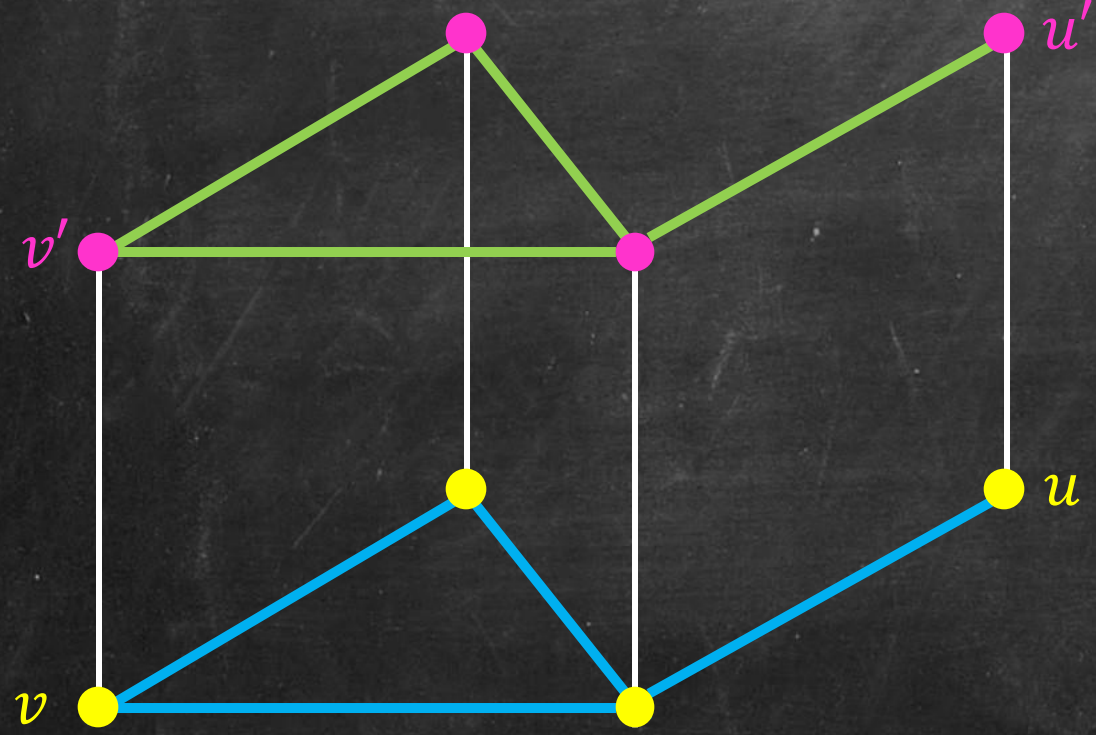
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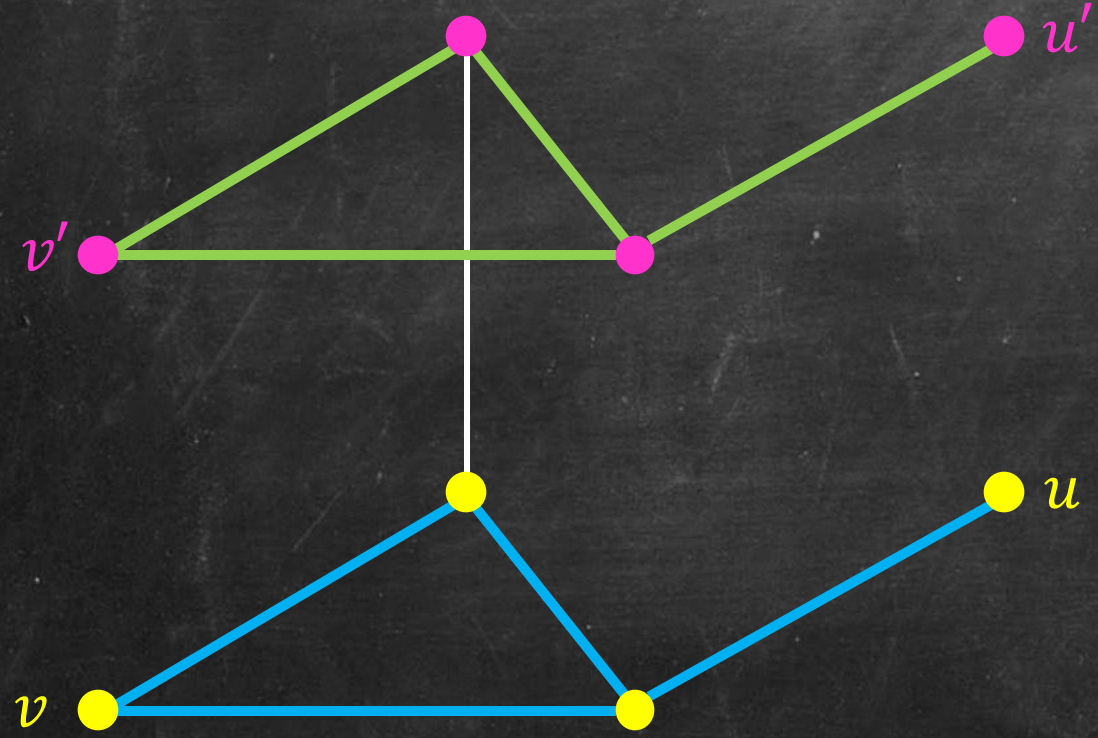
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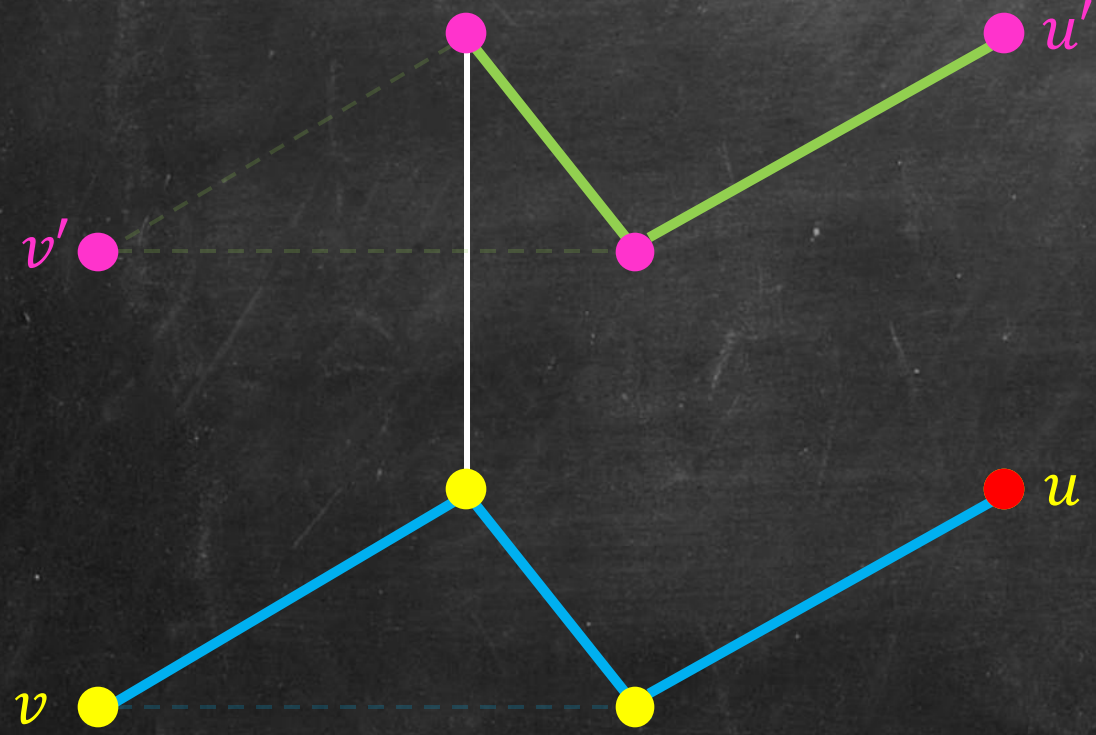
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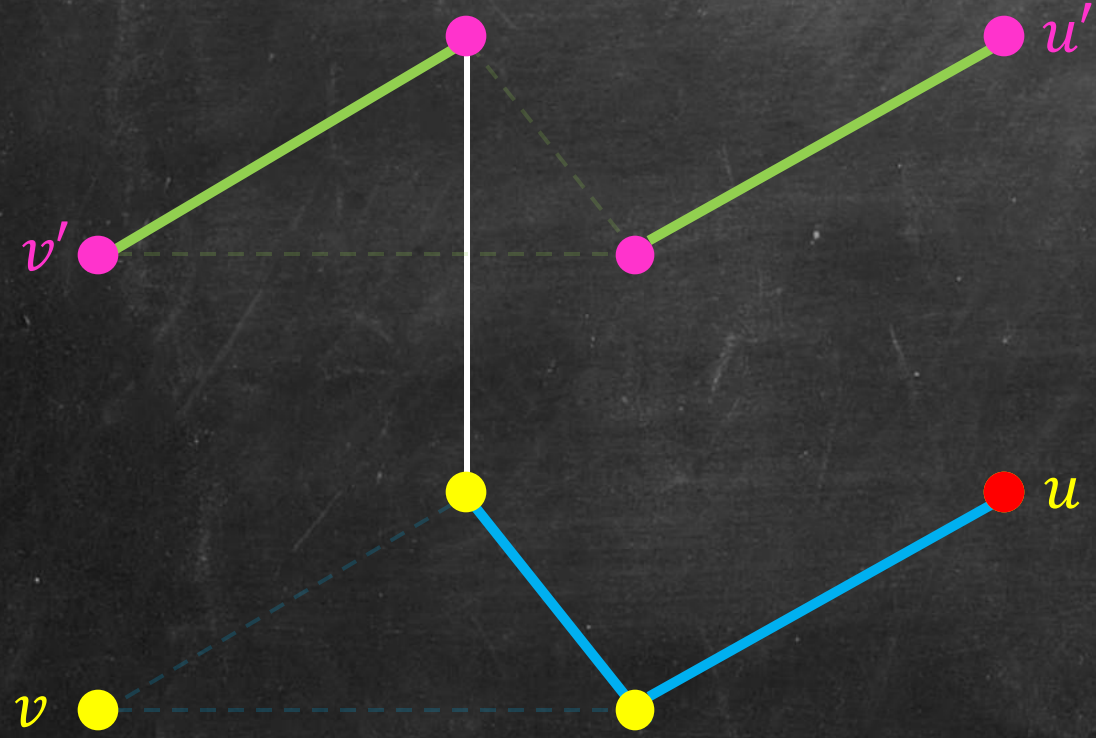
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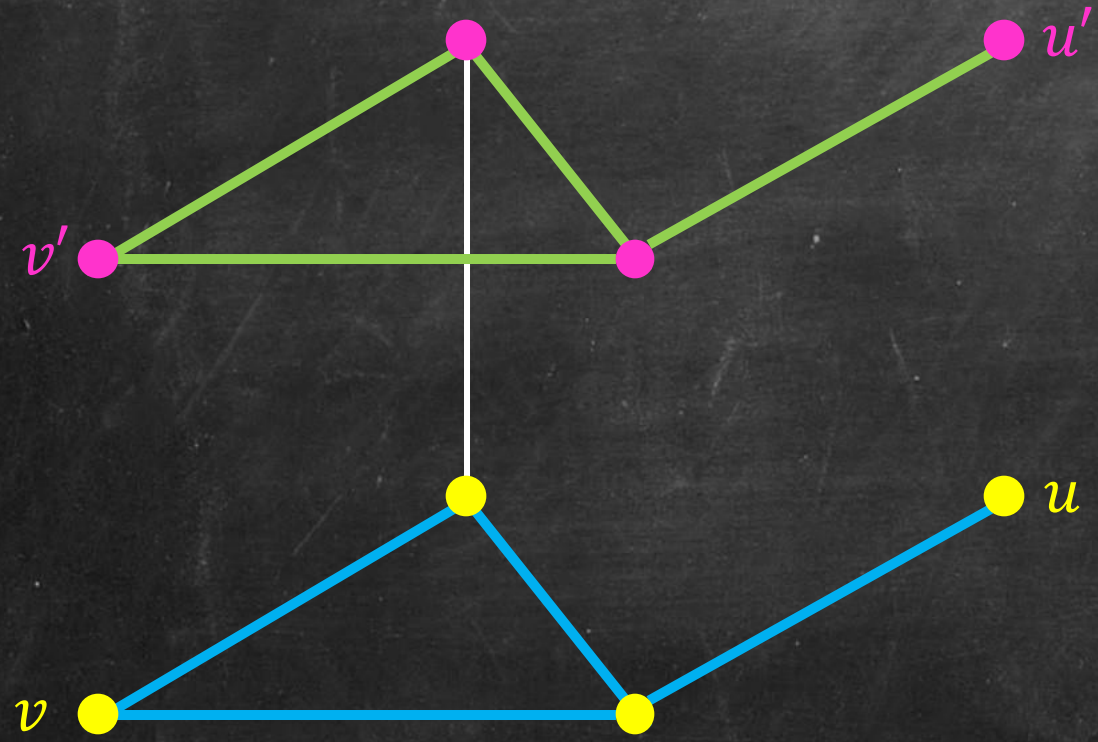
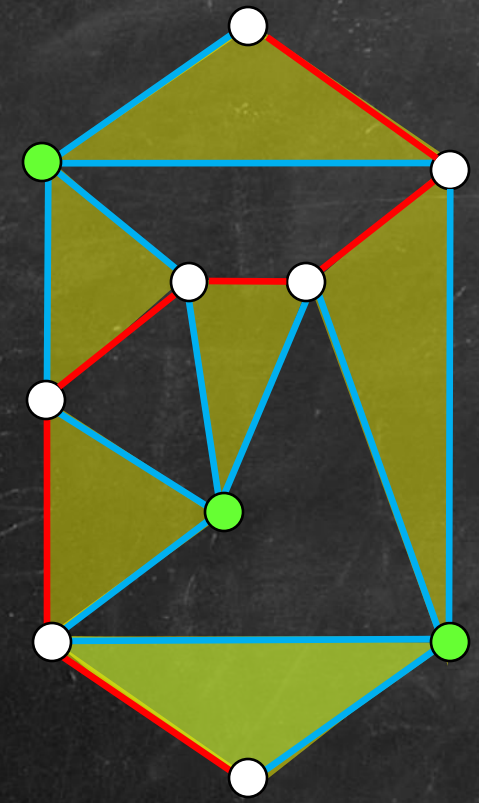
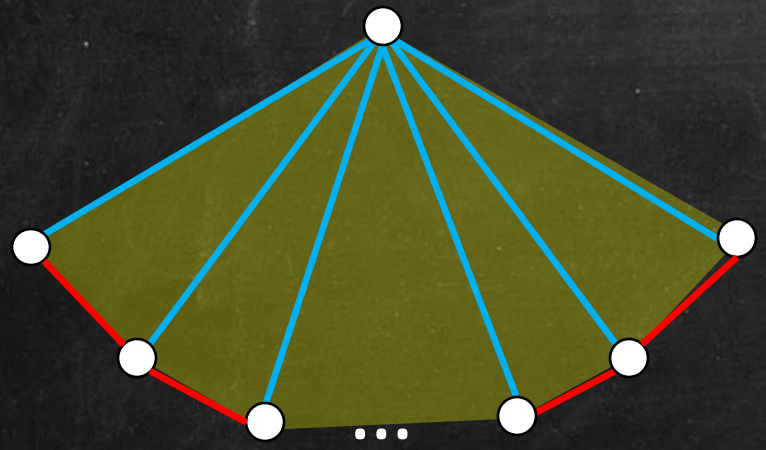
Bunkbed Conjecture: $P(u \leftrightarrow v) \geq P(u \leftrightarrow v')$

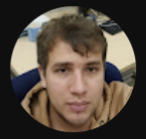




Vertices: $10 + 6 * 1202 = 7222$

Difference in probability less than 10^{-4331}





Pinned by @DrTrefor

@gladkovna 7 months ago (edited)

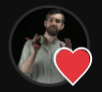
Hi everyone! I'm one of the authors of the paper being discussed.

Dr. Bazett, thank you so much for the fantastic video! It's as clear and thorough an explanation as we could've hoped for, and I really appreciate how quickly you put it together.

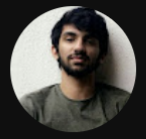
Just a small note: the author of the hypergraph paper's surname is Hollom.

P.S. We are not changing the title to "Debunking the bunkbed conjecture"!

Show less

2.6K  Reply

 • 60 replies



@TheMrbrayn 7 months ago

The fact that this paper isn't titled "Debunking the bunkbed conjecture" is such a huge miss

3.8K Reply

 • 36 replies

THANK YOU!!

Questions??

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Youtube.com/@DrTrefor
X.com/treforbazett