Finding Joy in Math

Presentation for Global Math Department 5/30/23

Howie Hua

Math Instructor at
California State University, Fresno

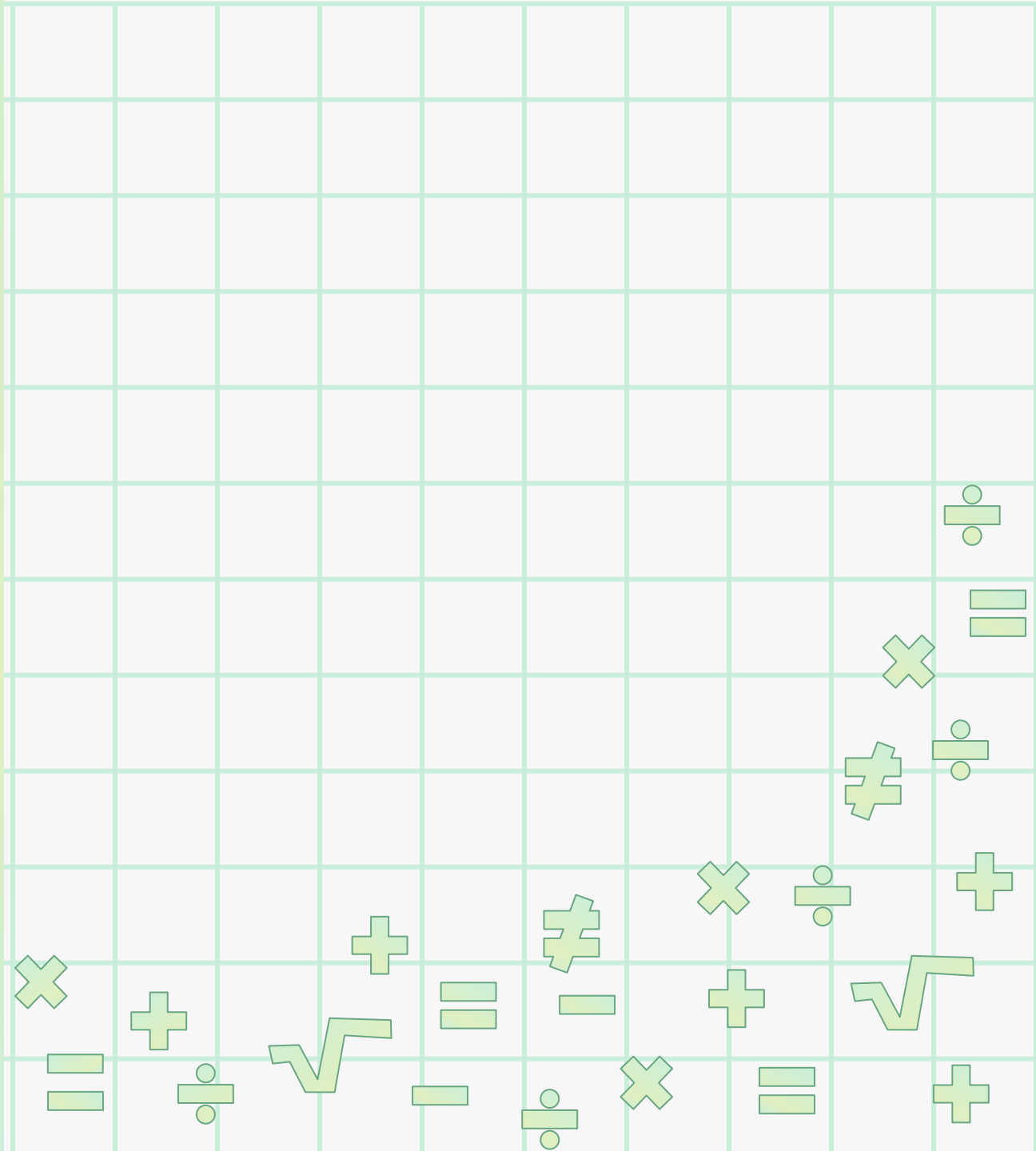
Twitter/TikTok: @howie_hua

howiehua.com

hhua@csufresno.edu

Finding Joy in Math

- “I hate math.”
- “Oh, I was never really good at math.”
- “What’s the point of _____?”
- (what else?)



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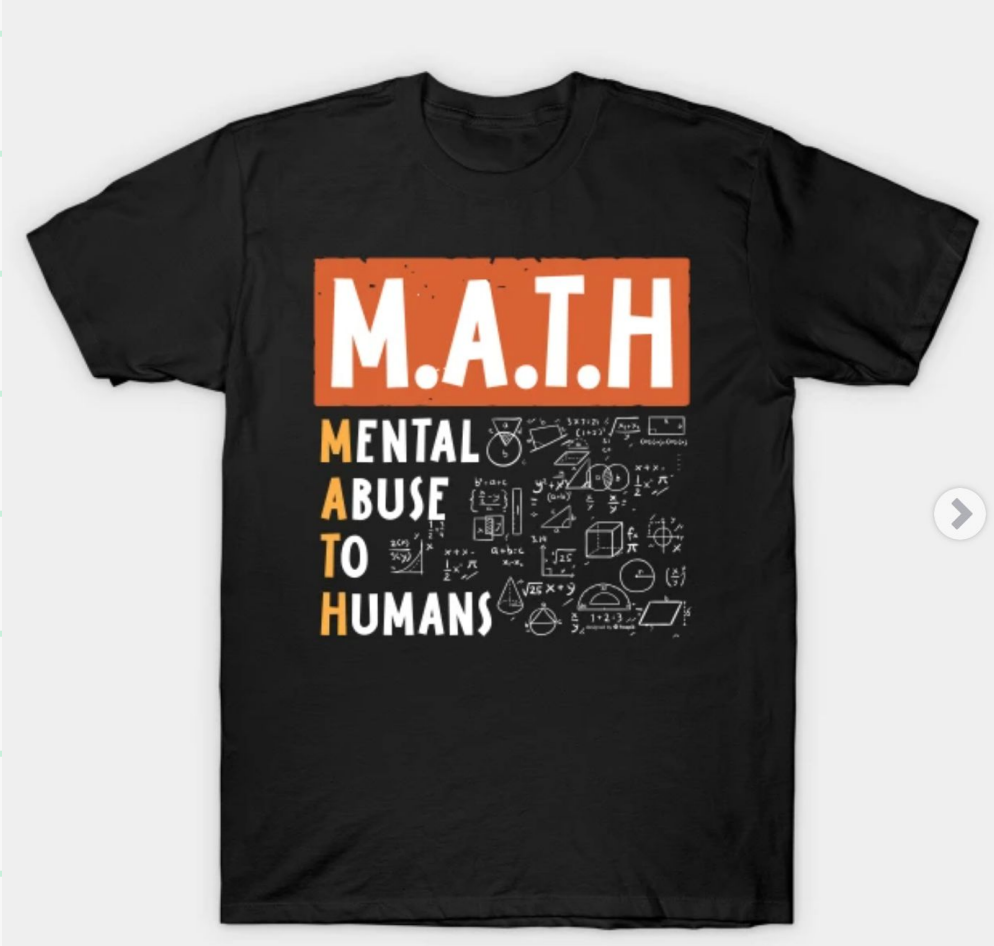
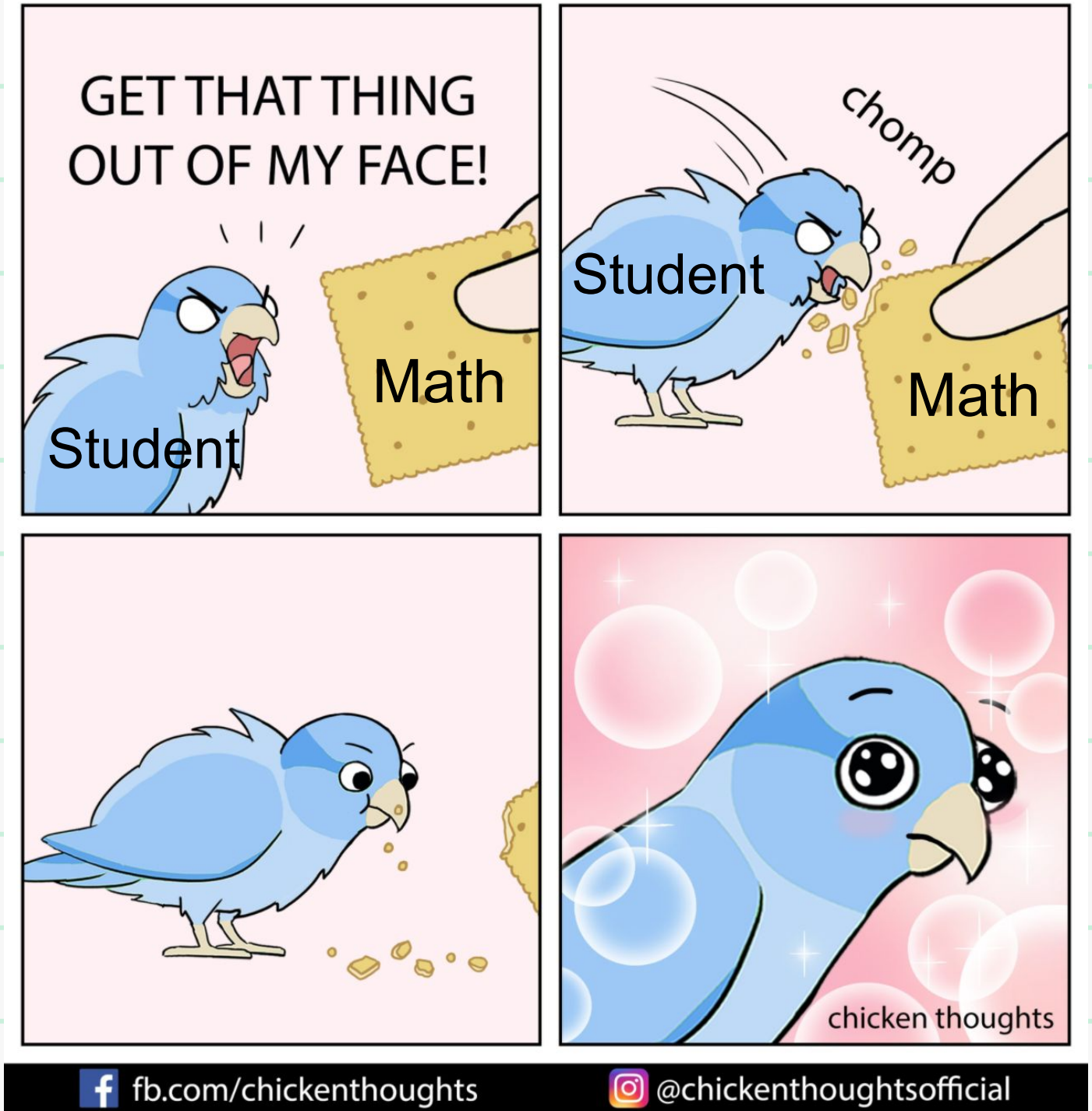


Source: teepublic.com



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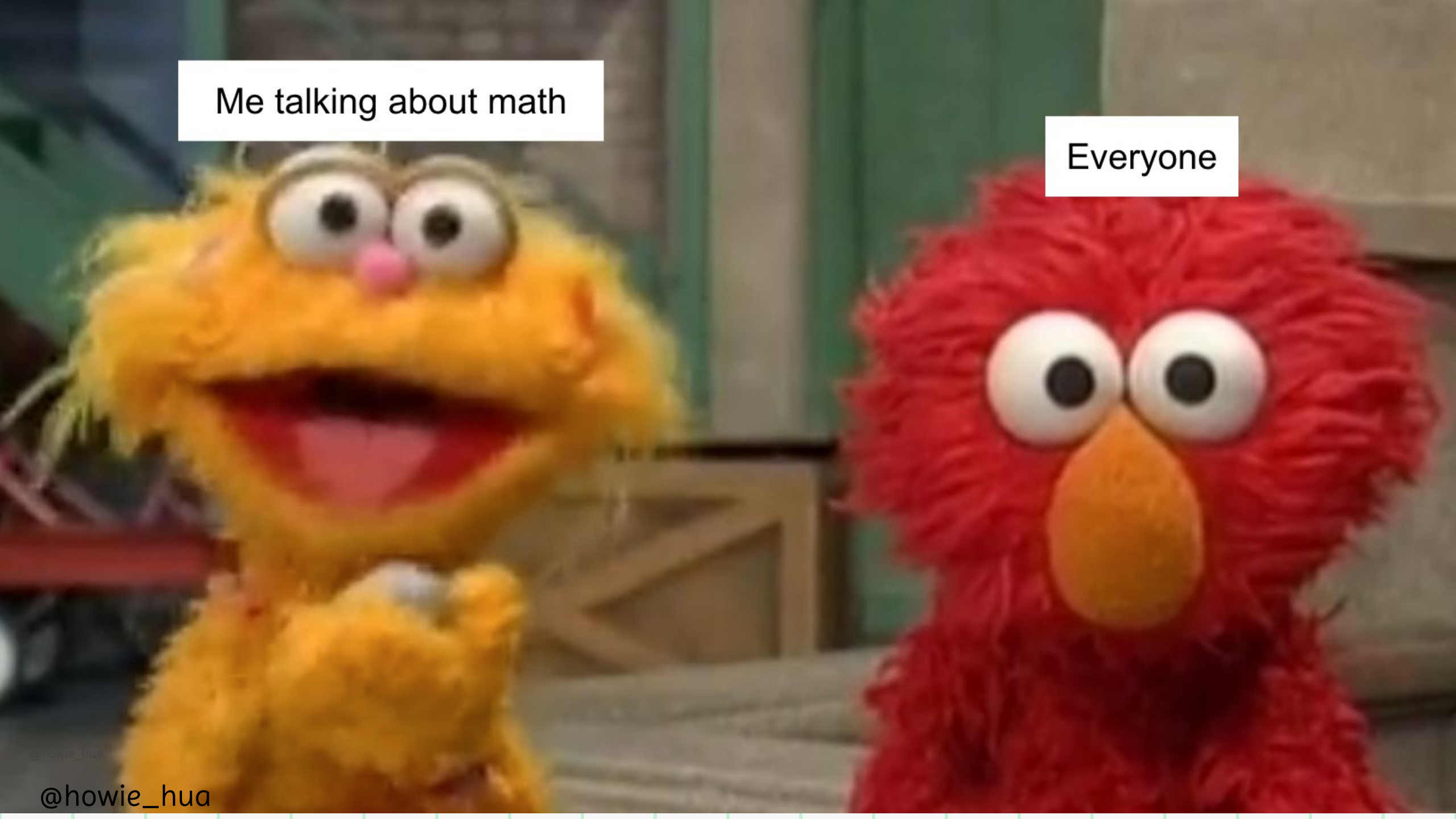
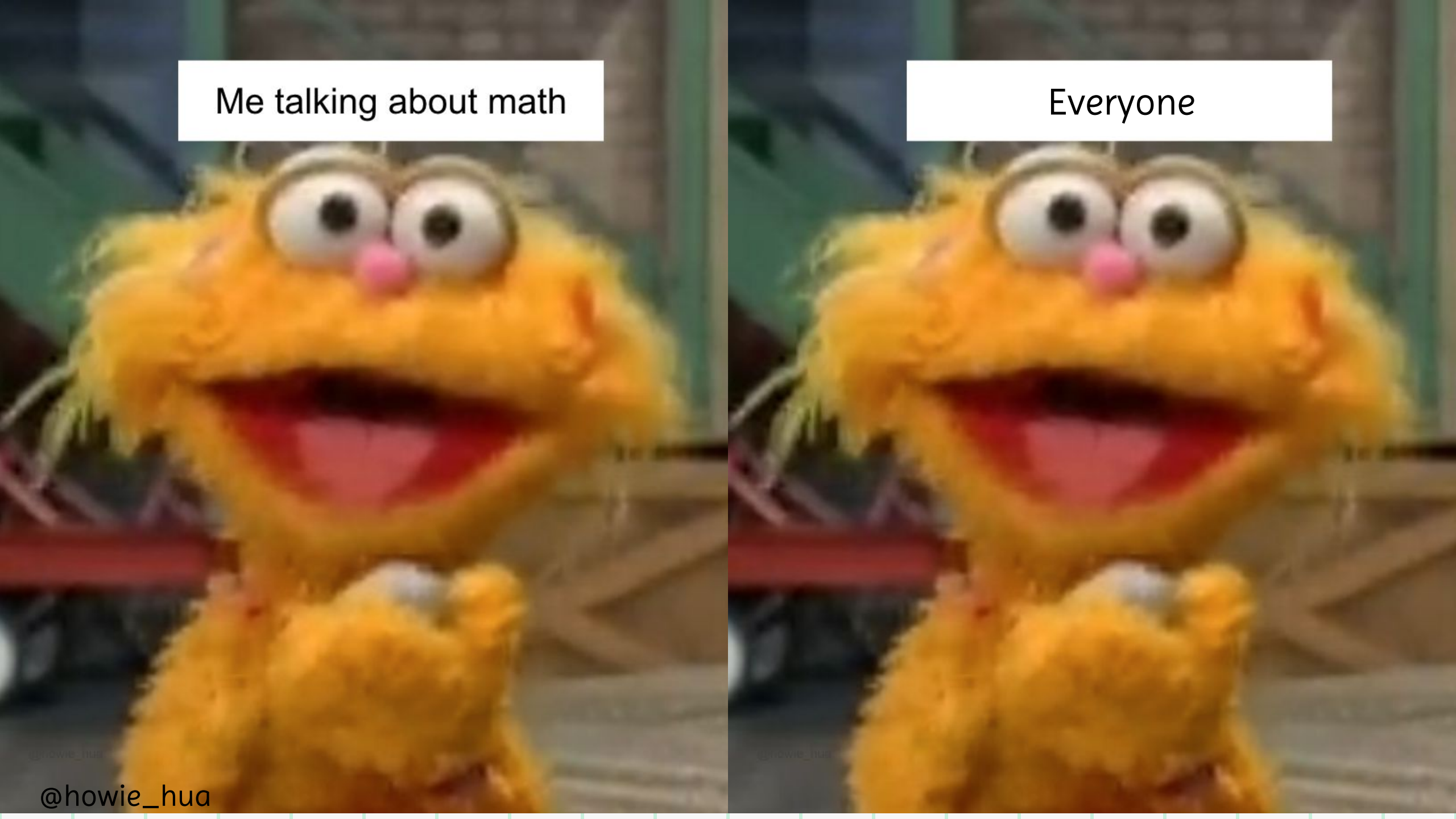

Me talking about math
Everyone
@howie_hua


Me talking about math
Everyone
@howie_hua

In this talk

- Finding joy in _____
- Share in our community slides

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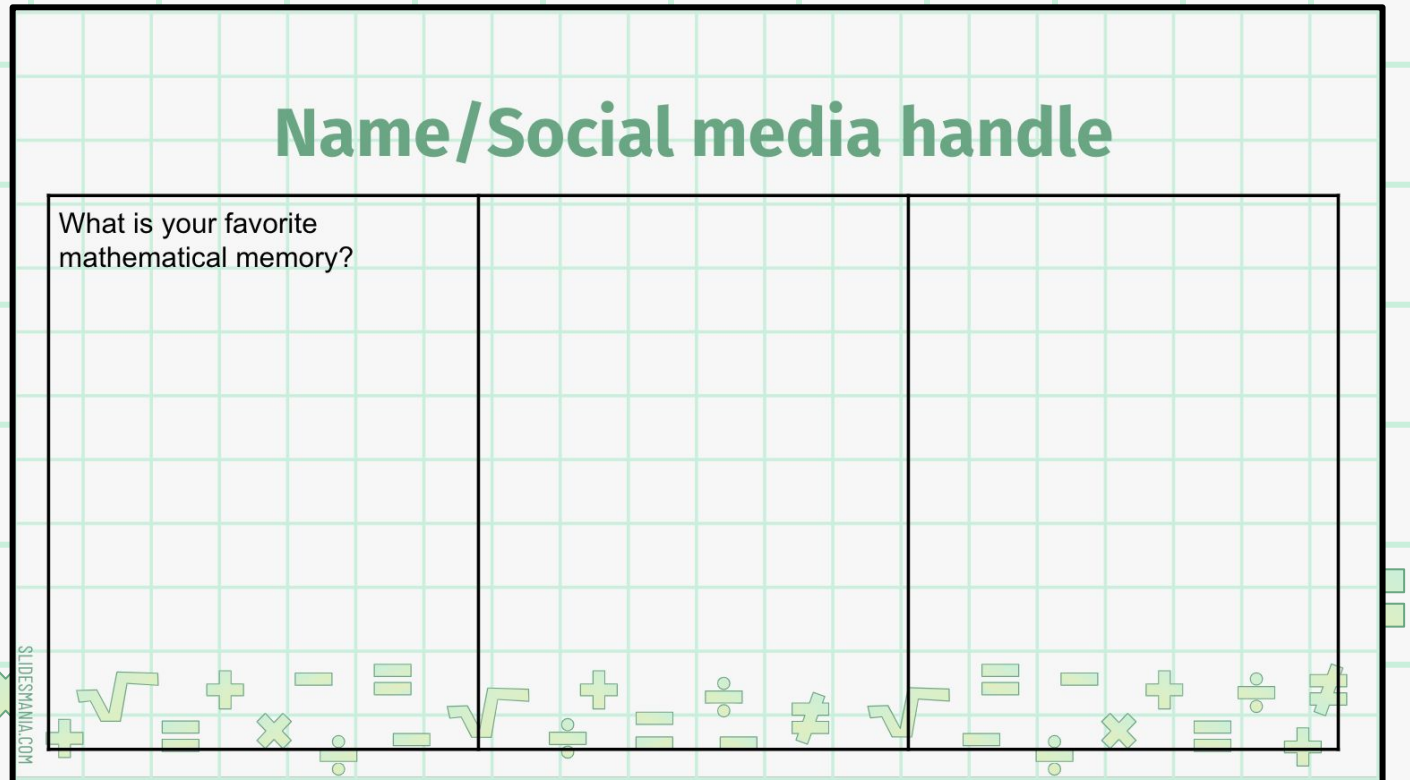
What is your favorite mathematical memory?

- Please share on the Google Slide on the leftmost box!



Finding joy in the beauty of patterns

$1/7 = 0.\overline{142857}$

$2/7 = 0.\overline{285714}$

$3/7 = 0.\overline{428571}$

$4/7 = 0.\overline{571428}$

$5/7 = 0.\overline{714285}$

$6/7 = 0.\overline{857142}$

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Finding joy in the beauty of patterns

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$1/3 = 1/4 + 1/12$

$1/4 = 1/5 + 1/20$

$1/5 = 1/6 + 1/30$

$1/6 = ?$

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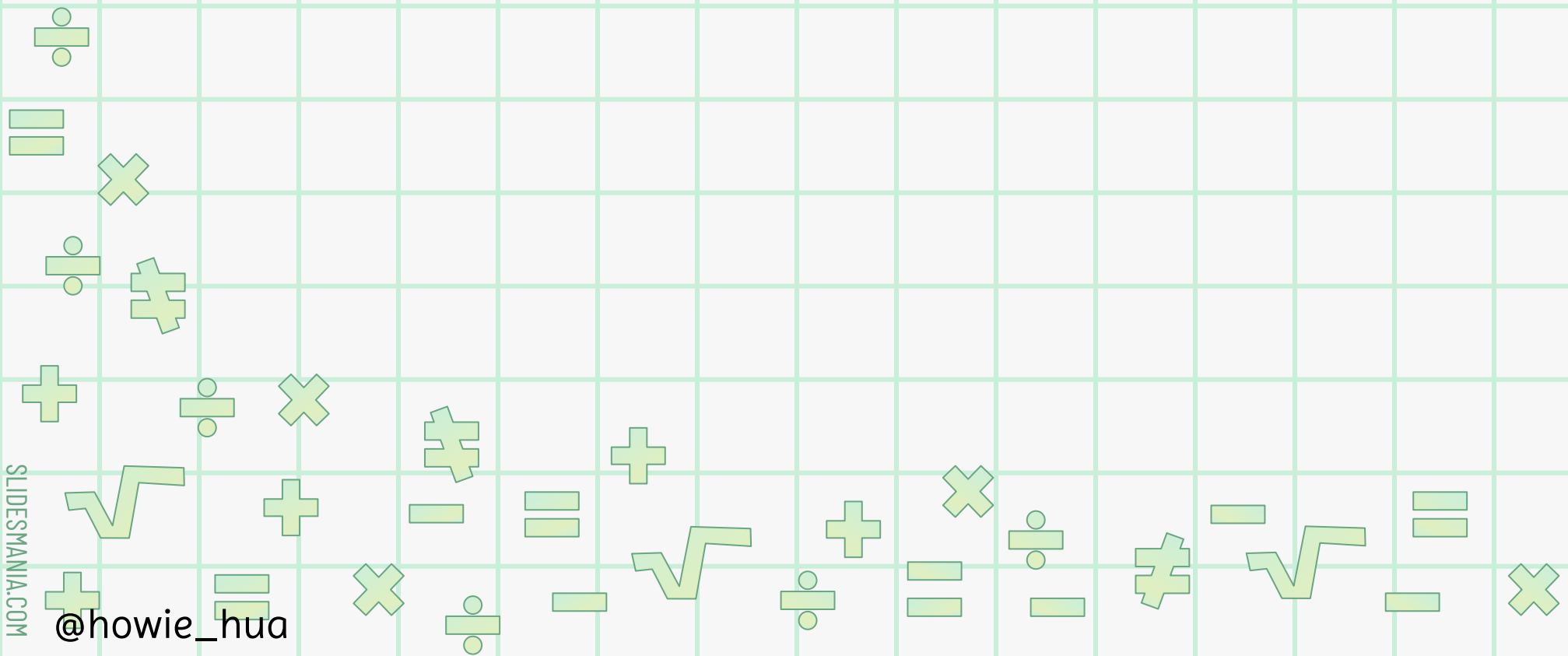
Finding joy in the beauty of patterns

What mathematical pattern do you appreciate?



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Finding joy in problem solving

- What is the point of math class knowing that almost everything is already online?

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The 4 Cs

- Communication
- Collaboration
  - “On the first day you mentioned someone inviting their group members to their wedding. I didn’t believe you then but I believe you now!”
- Critical Thinking
- Creativity

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Make six

(by @mathequalslove on Twitter)

Insert mathematical symbols (no digits) to make each equation equal to 6.

2	2	2	= 6
3	3	3	= 6
4	4	4	= 6
5	5	5	= 6
6	6	6	= 6
7	7	7	= 6
8	8	8	= 6
9	9	9	= 6

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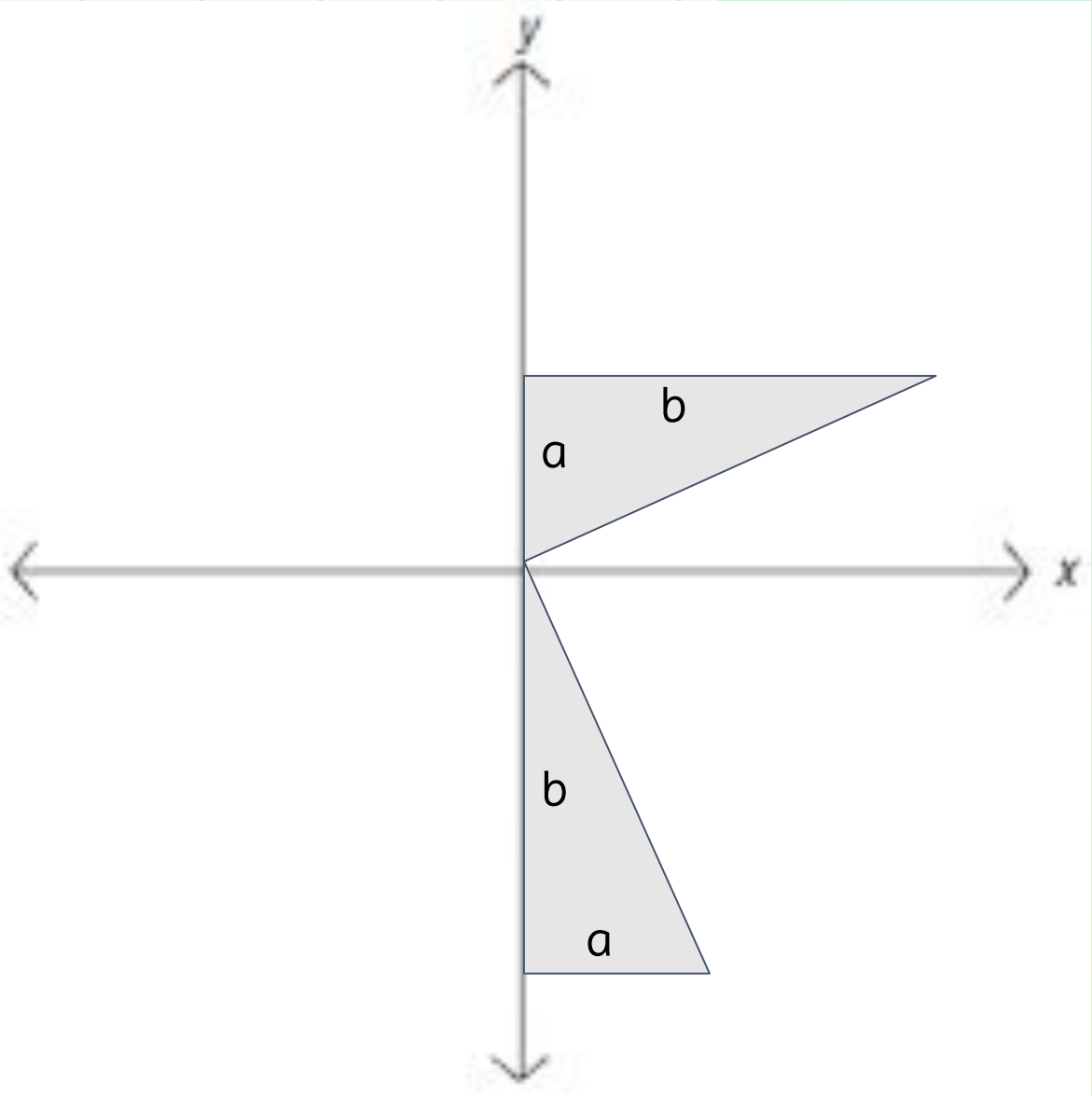
Finding joy in understanding

- Perpendicular lines -> slopes are opposite reciprocals of each other



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Finding joy in understanding

Visualizing WHY “keep-change-flip” works

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How can we visualize “keep change flip”?

How can we show visually that $8 \div \frac{2}{3} = 8 \times (3/2)$?

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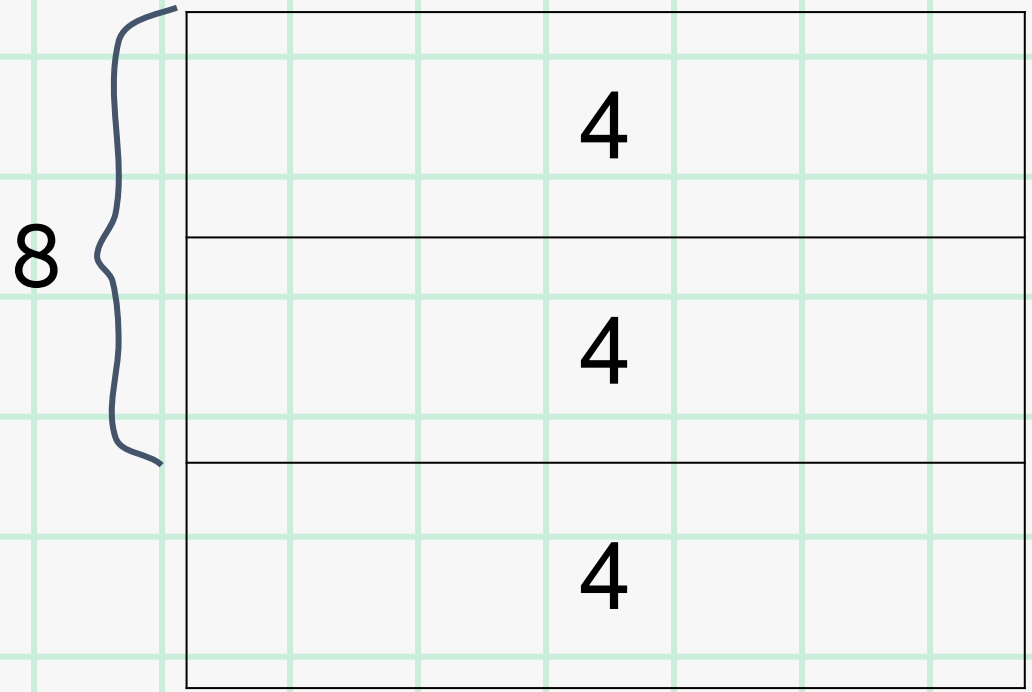

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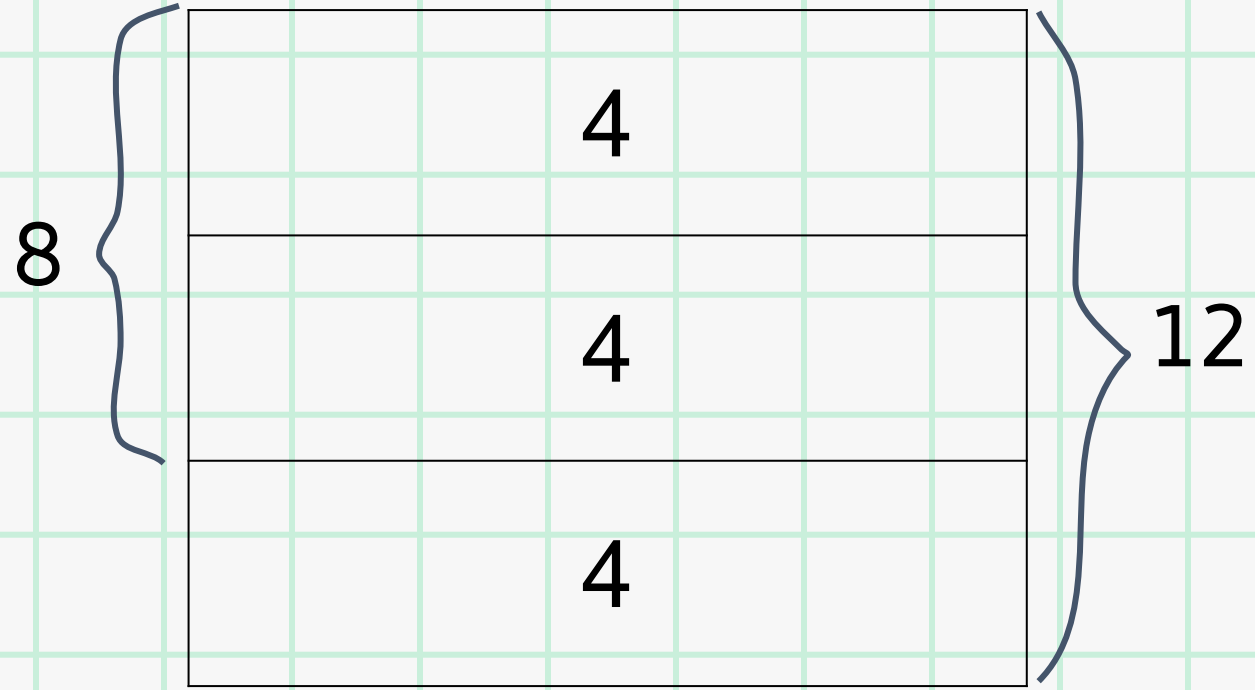
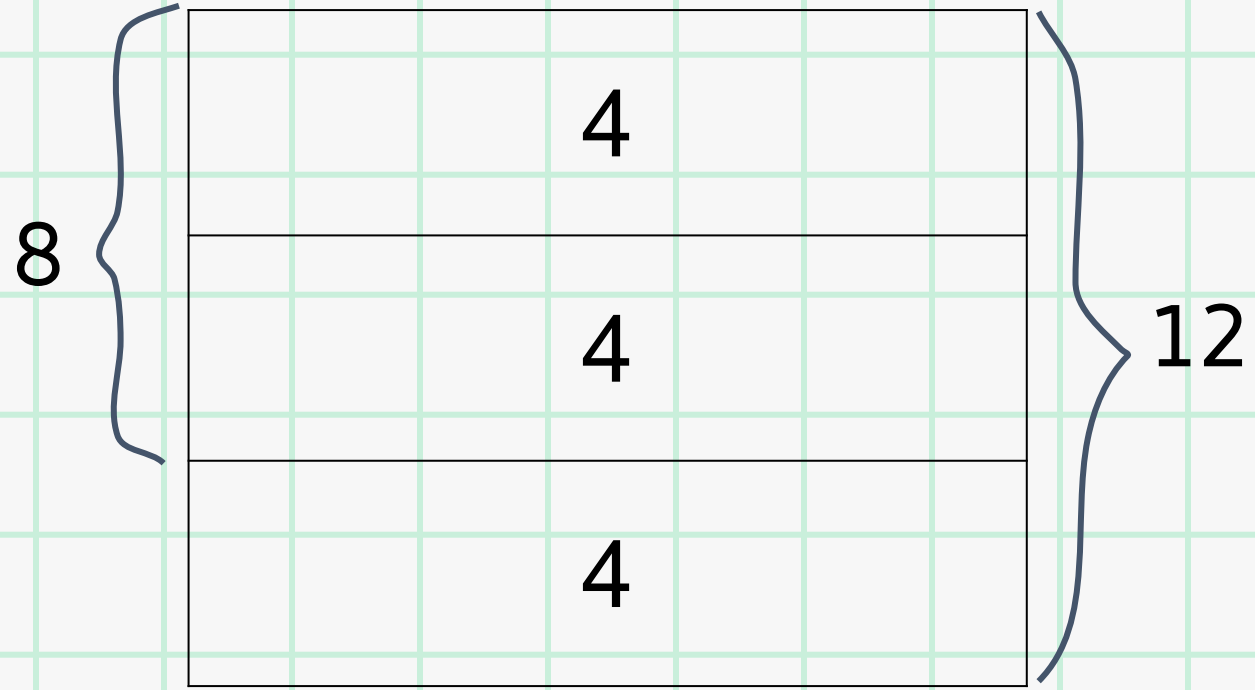


How can we visualize “keep change flip”?

How can we show visually that 8 ÷ ⅔ = 8 × (3/2) ?

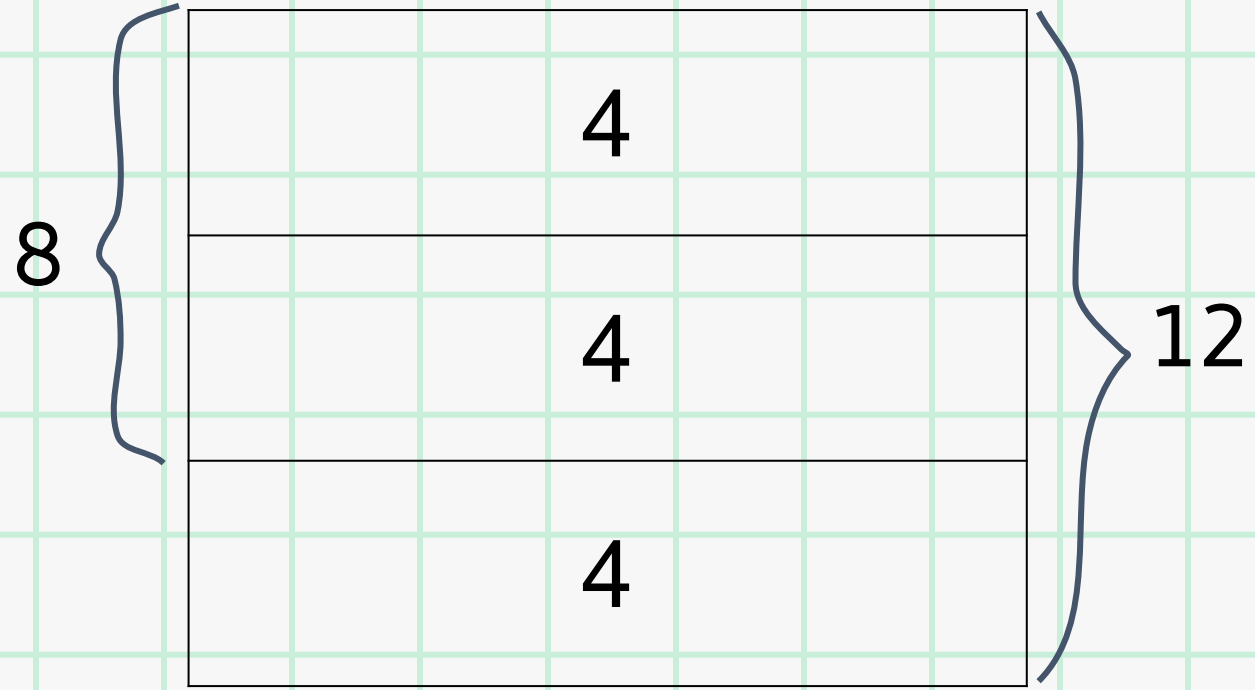


We wanted ½ of 8, then multiplied that by 3, which is equivalent to 8 x (3/2).

How can we visualize “keep change flip”?

How can we show visually that $8 \div \frac{2}{3} = 8 \times (3/2)$?

Try this out with $6 \div \frac{3}{4}$ or $\frac{1}{2} \div \frac{3}{4}$ or whatever you want to try!



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Finding joy in listening to other people's thinking

How many? How did you count?

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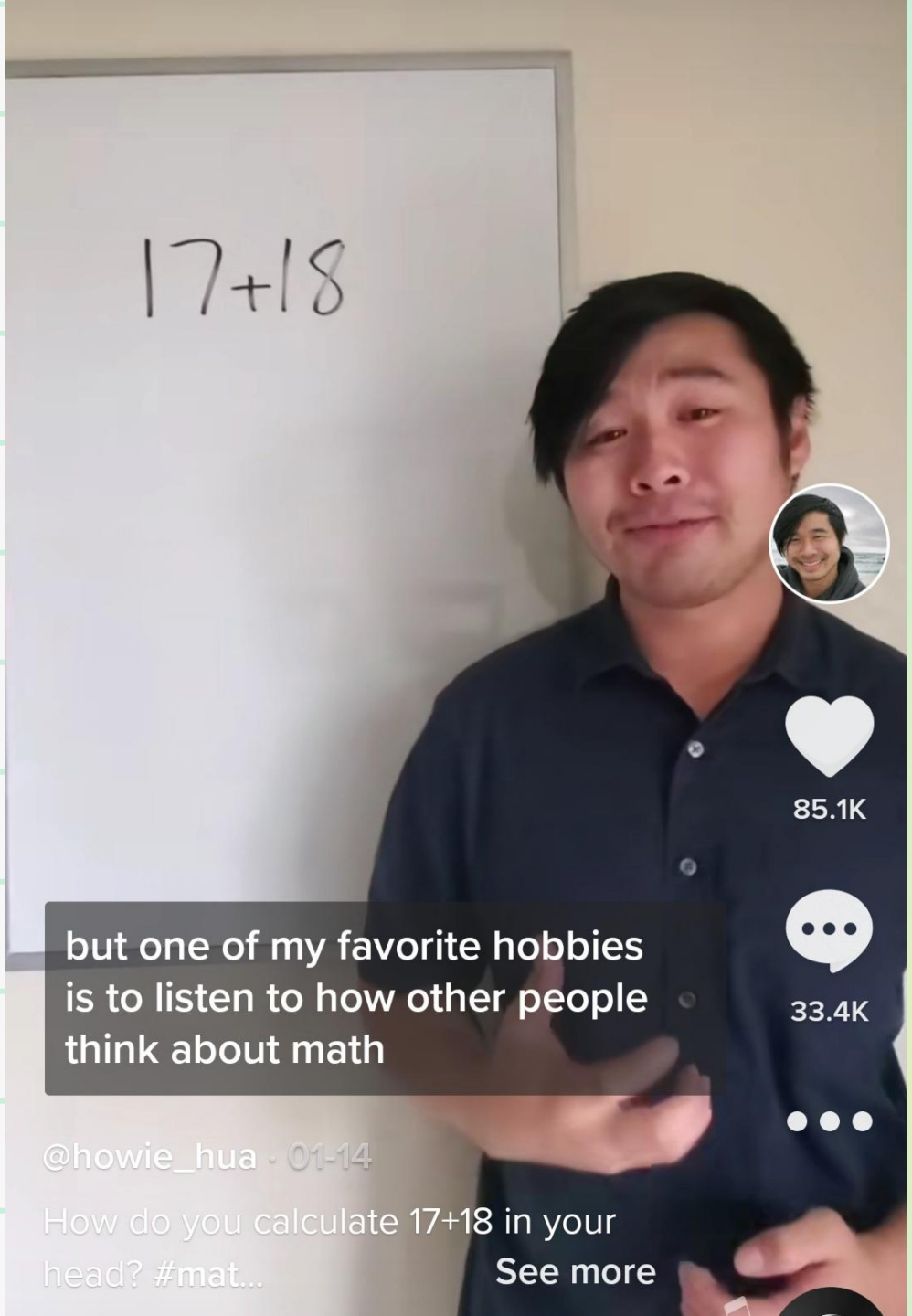
How would YOU mentally calculate 17+18?



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Finding joy in listening to other people's thinking

Visual Patterns

Would You Rather Math

ASKING STUDENTS TO CHOOSE A PATH AND JUSTIFY IT WITH MATH

Which One Doesn't Belong?

DebateMATH

3-act math tasks

FRACTION TALKS.com

Notice and Wonder

OPEN MIDDLE

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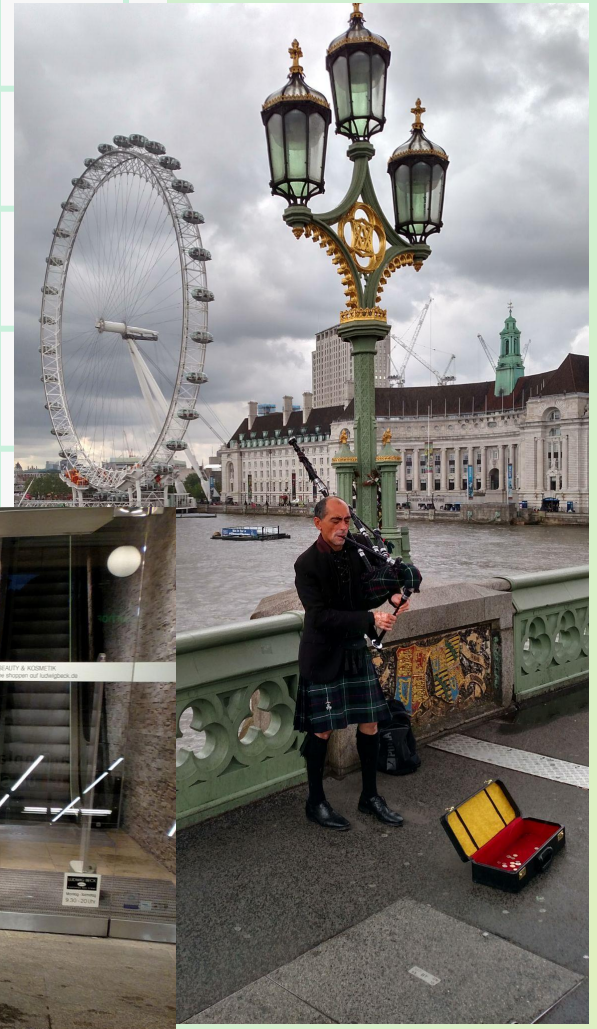
Finding joy in seeing math outside of the classroom



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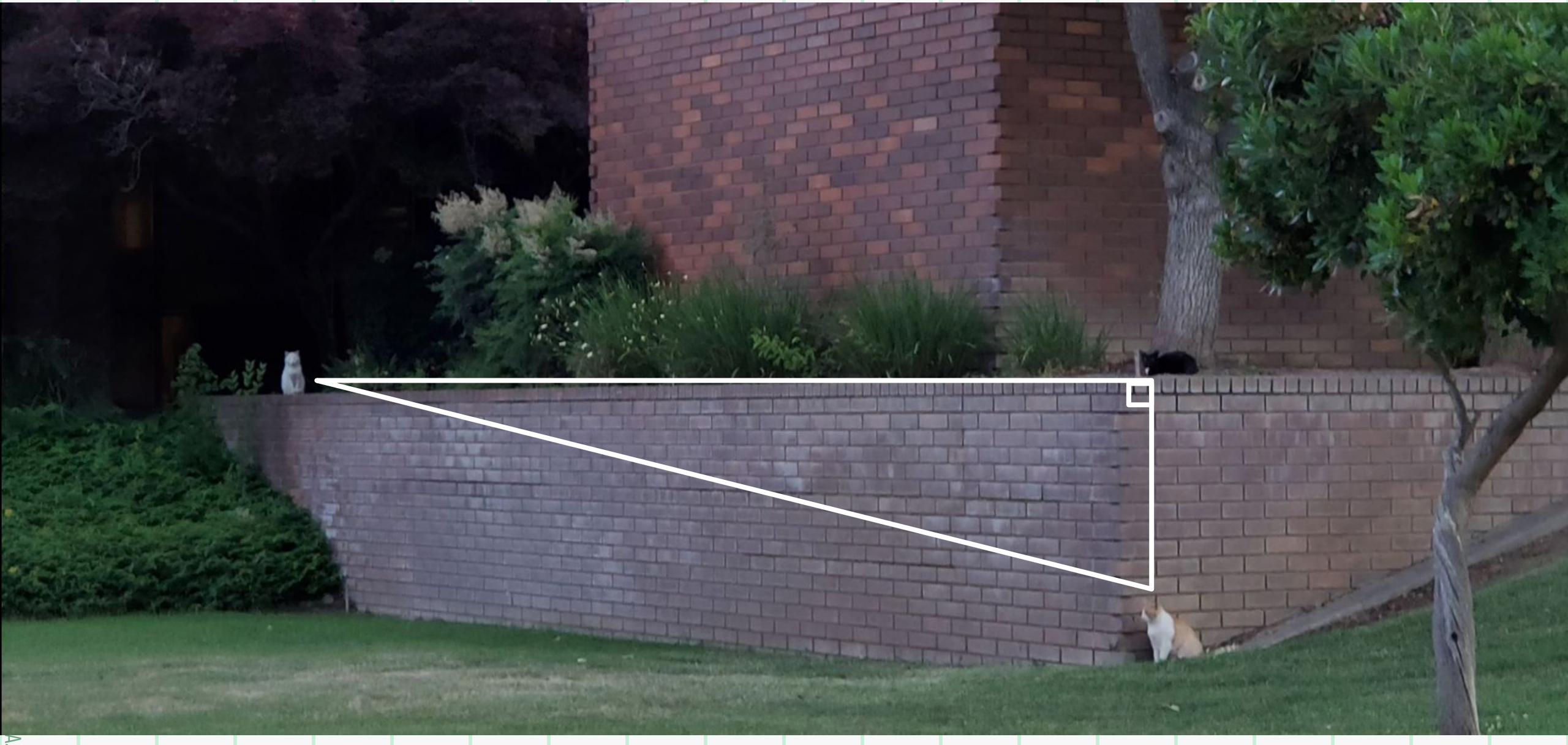

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My friend told me “You’re going to see a lot of street musicians. Buy their CDs so when you listen to them, you’ll be brought back to that place.”

My friend told me “You’re going to see a lot of

math Take pictures

~~street musicians~~. ~~Buy their CDs~~ so when you

see

~~listen to~~ them, you’ll be brought back to that

place.”

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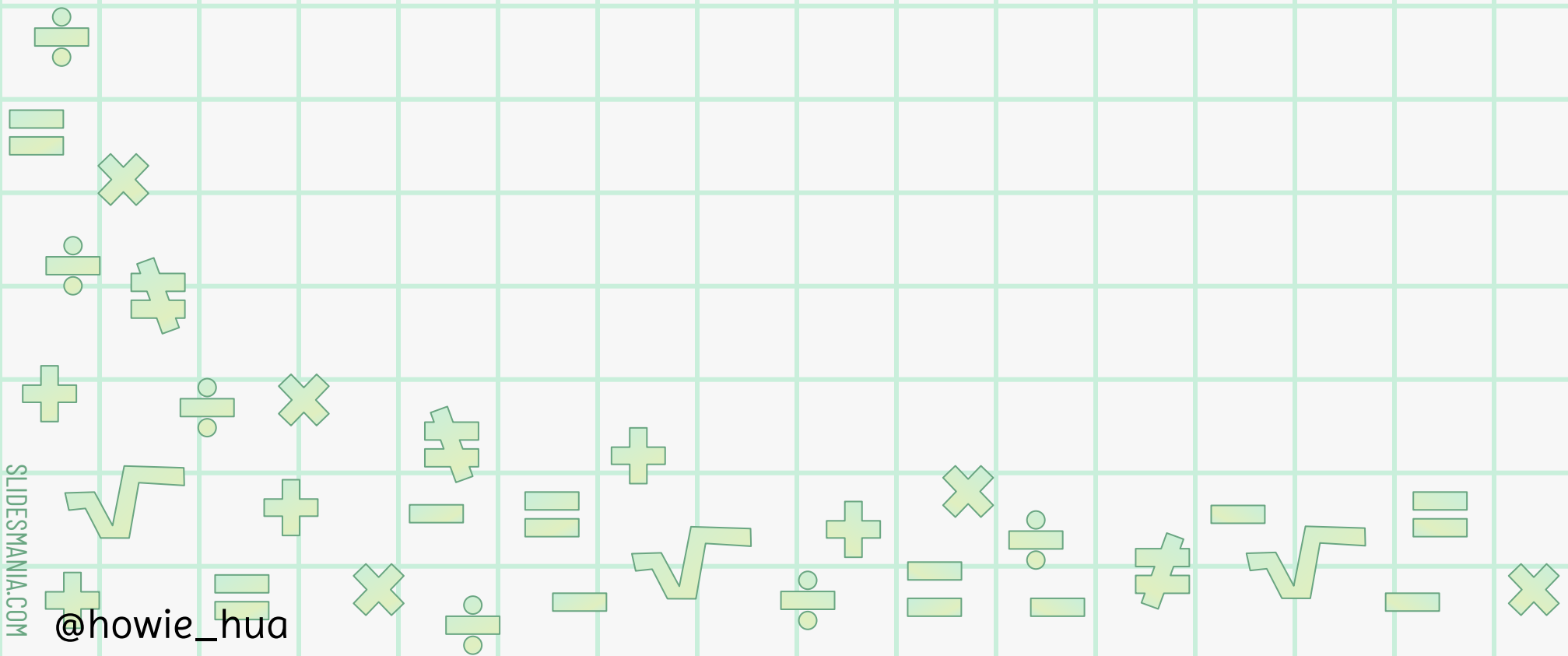
Finding joy in doing something that at first, seemed difficult



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The Cookie Jar Problem

There was a jar of cookies on the table. Gabby was hungry so she ate half the cookies. Then Castro ate a third of what was left in the jar. Ajiah came by and decided to take a fourth of the remaining cookies with her to her next class. Then Houa came up and took a cookie to munch on. When Meghan looked at the cookie jar, she saw that there were two cookies left. "How many cookies were there in the jar to begin with?" she asked.

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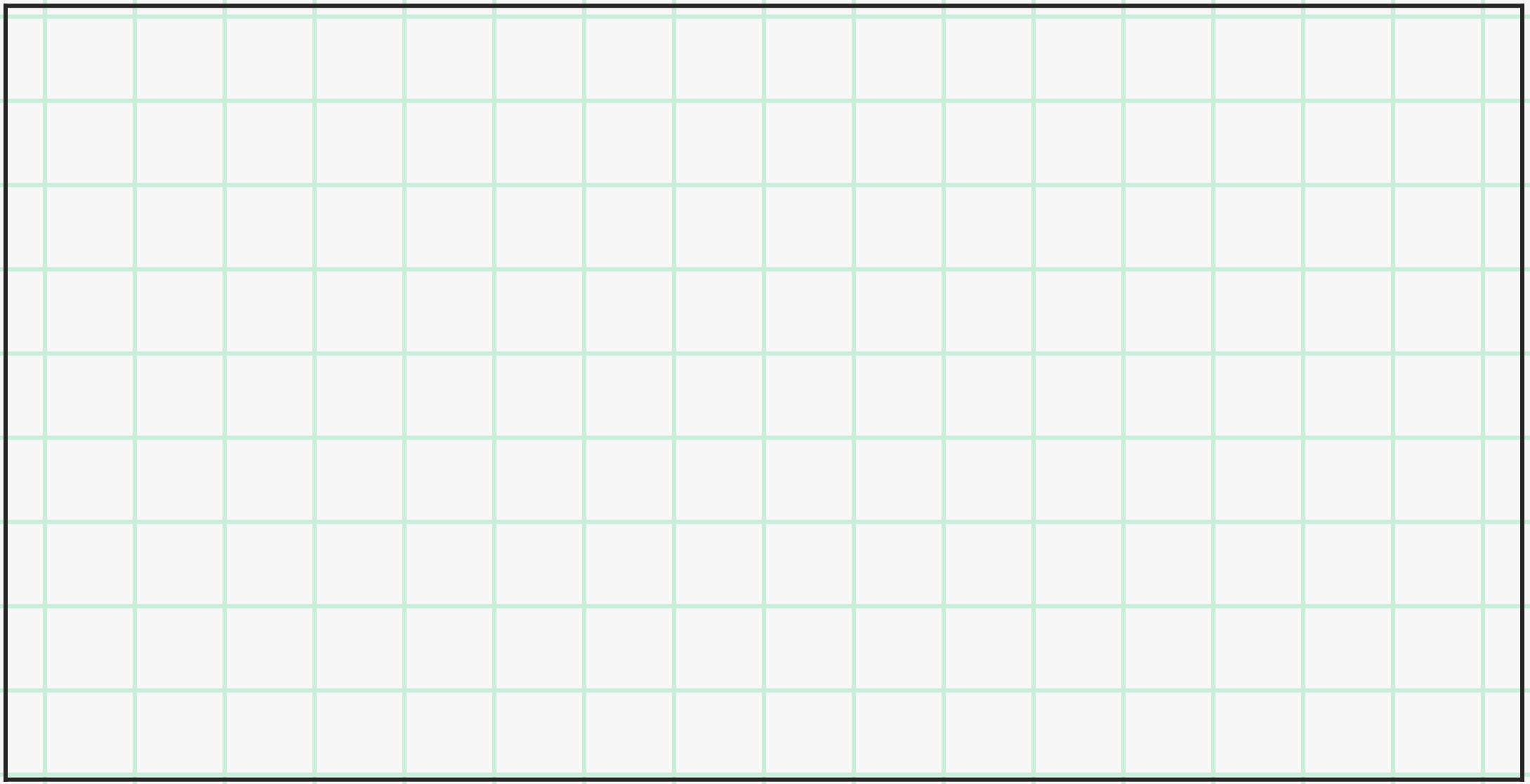

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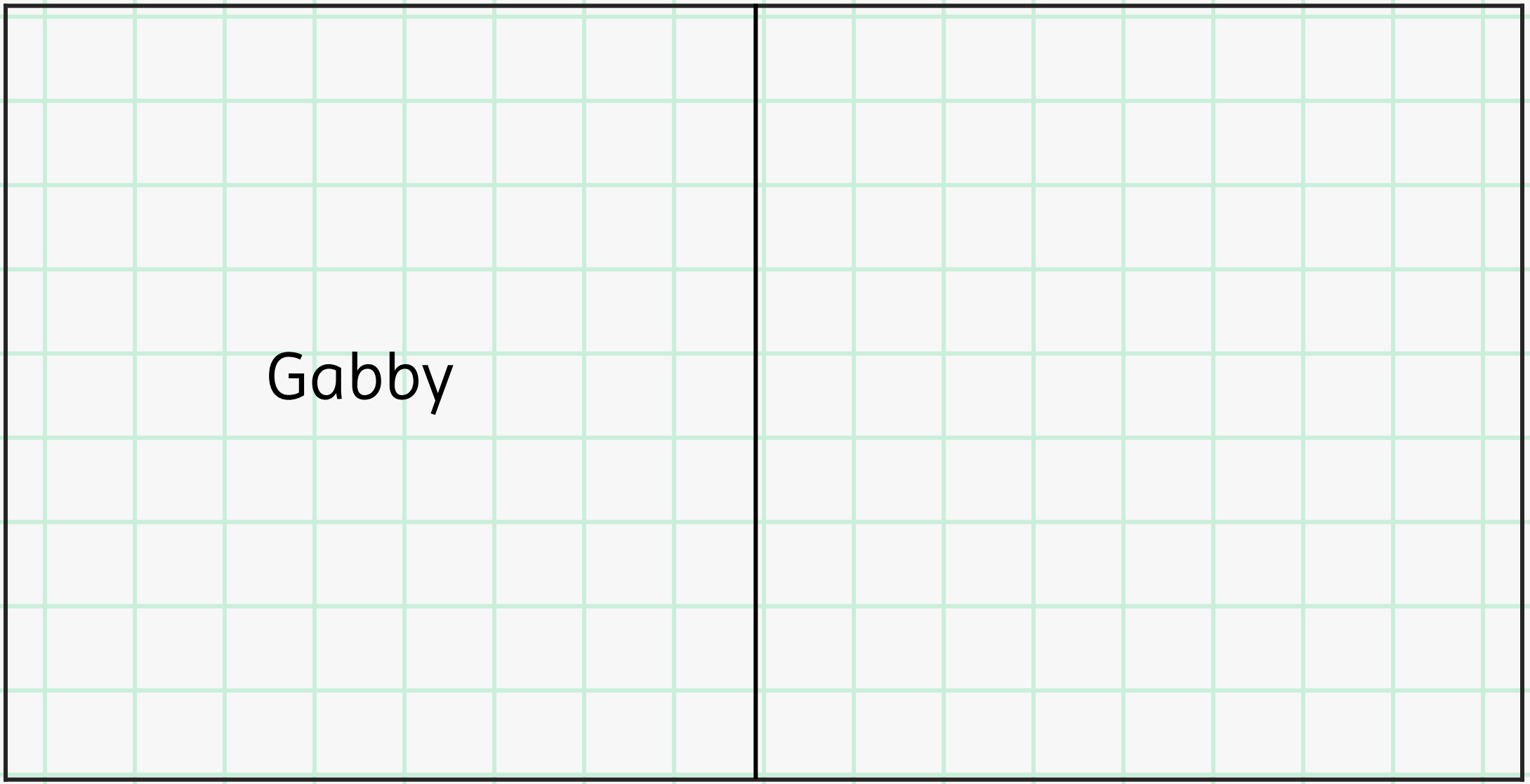

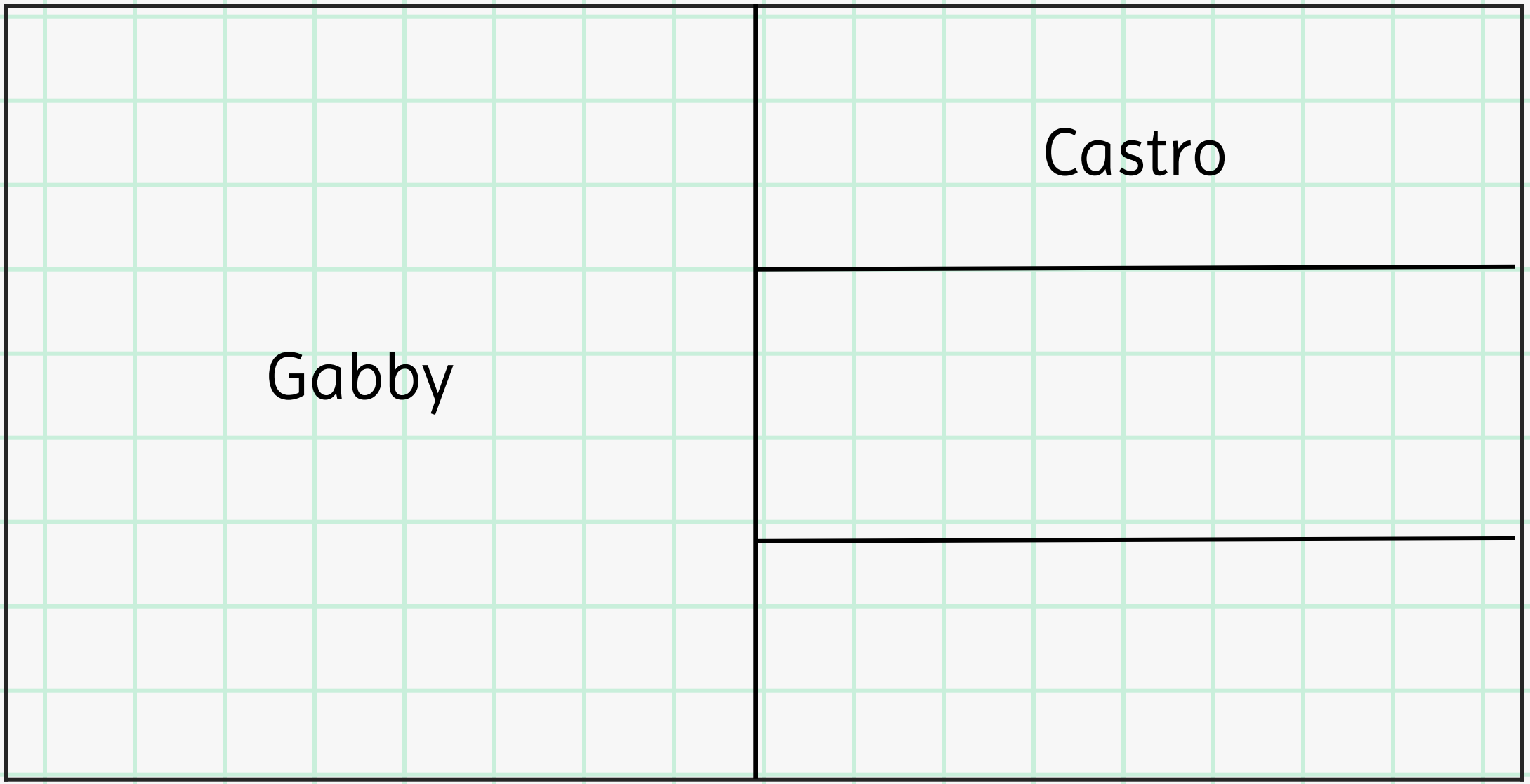

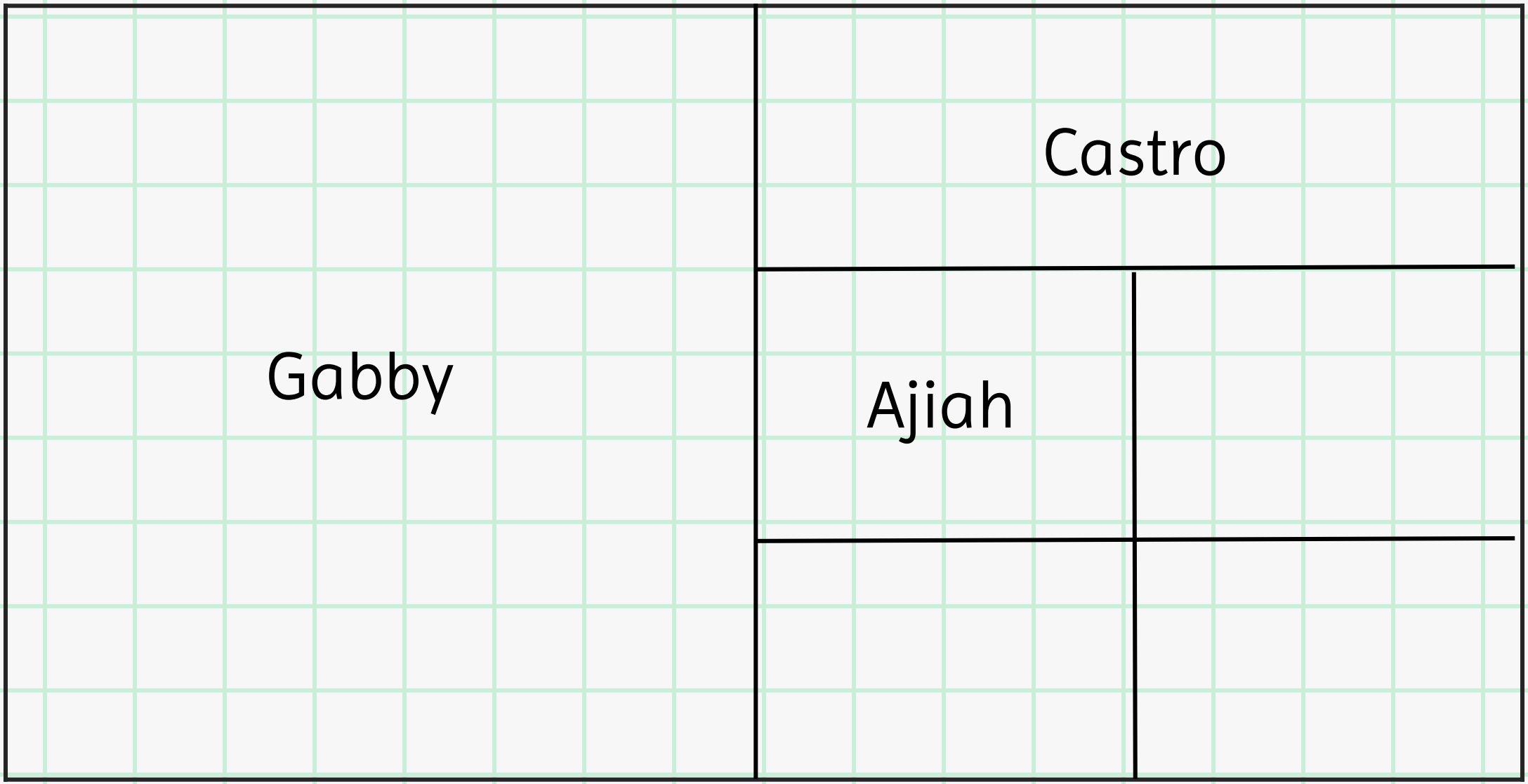

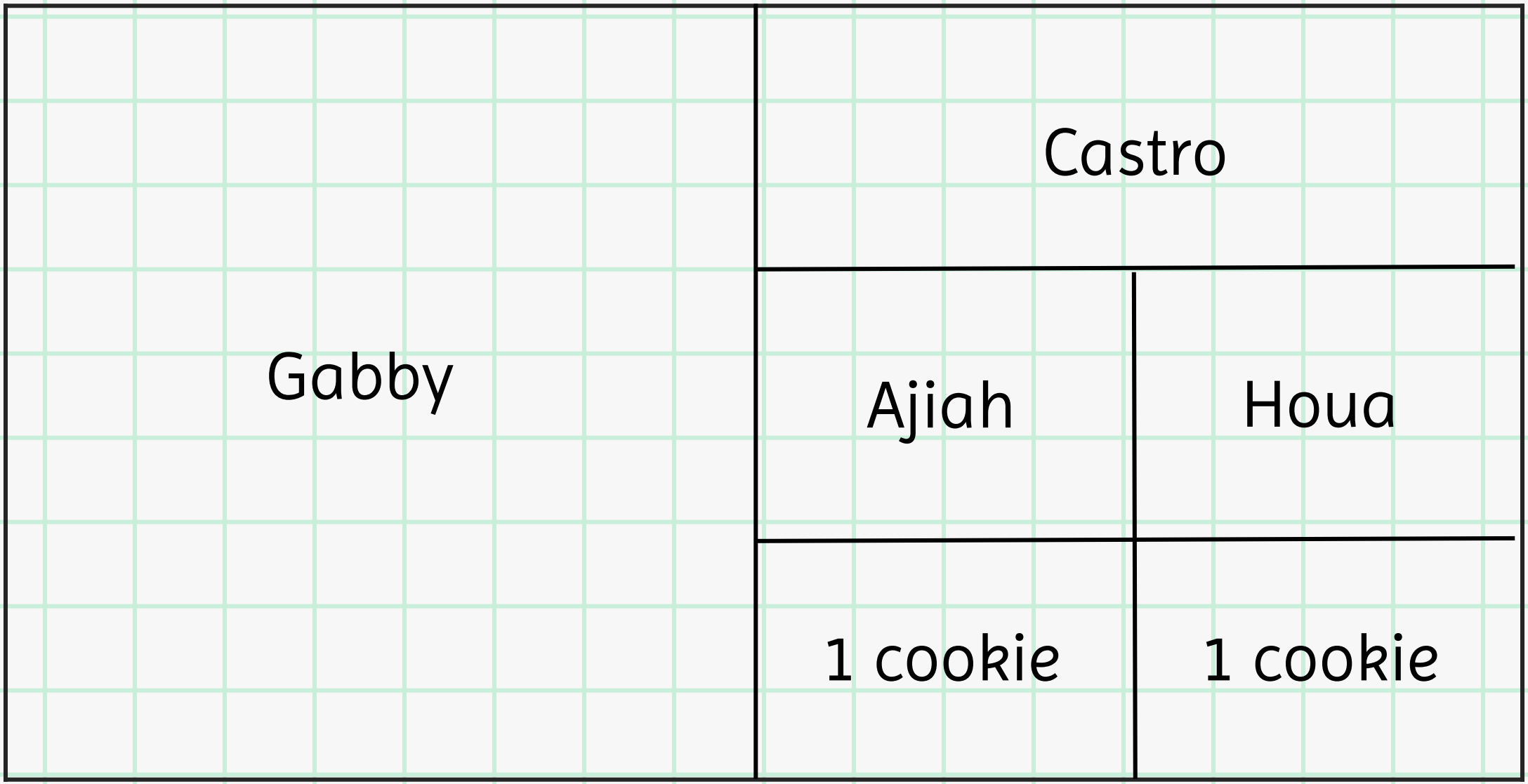

How can we mentally calculate this?

What is 534^2-533^2?

How can we mentally calculate this?

What is 534^2-533^2?

$$x^2-y^2=(x-y)(x+y)$$

$$534^2-533^2=(534-533)(534+533)$$

$$=(1)(534+533)$$

$$=1{,}067$$

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What's one more?

If you know $50^2=2{,}500$, what's 51^2?

What's one more?

If you know $50^2=2,500$, what's 51^2?

Just add double the base and add 1!

$$2,500 + 2(50) + 1 = 2,601$$

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But why does this work?

$$n^2=n^2$$

$$(n+1)^2=n^2+2n+1$$

But why does this work?

$$n^2=n^2$$

$$(n+1)^2=n^2+2n+1$$

$$50^2=2{,}500$$

$$(50+1)^2=50^2+2(50)+1$$

$$51^2=2{,}500+2(50)+1$$

$$51^2=2{,}601$$

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Try these out!

If you know $20^2=400$, what's 21^2?

If you know $35^2=1{,}225$, what's 36^2?

If you know $100^2=10{,}000$, what's 101^2?

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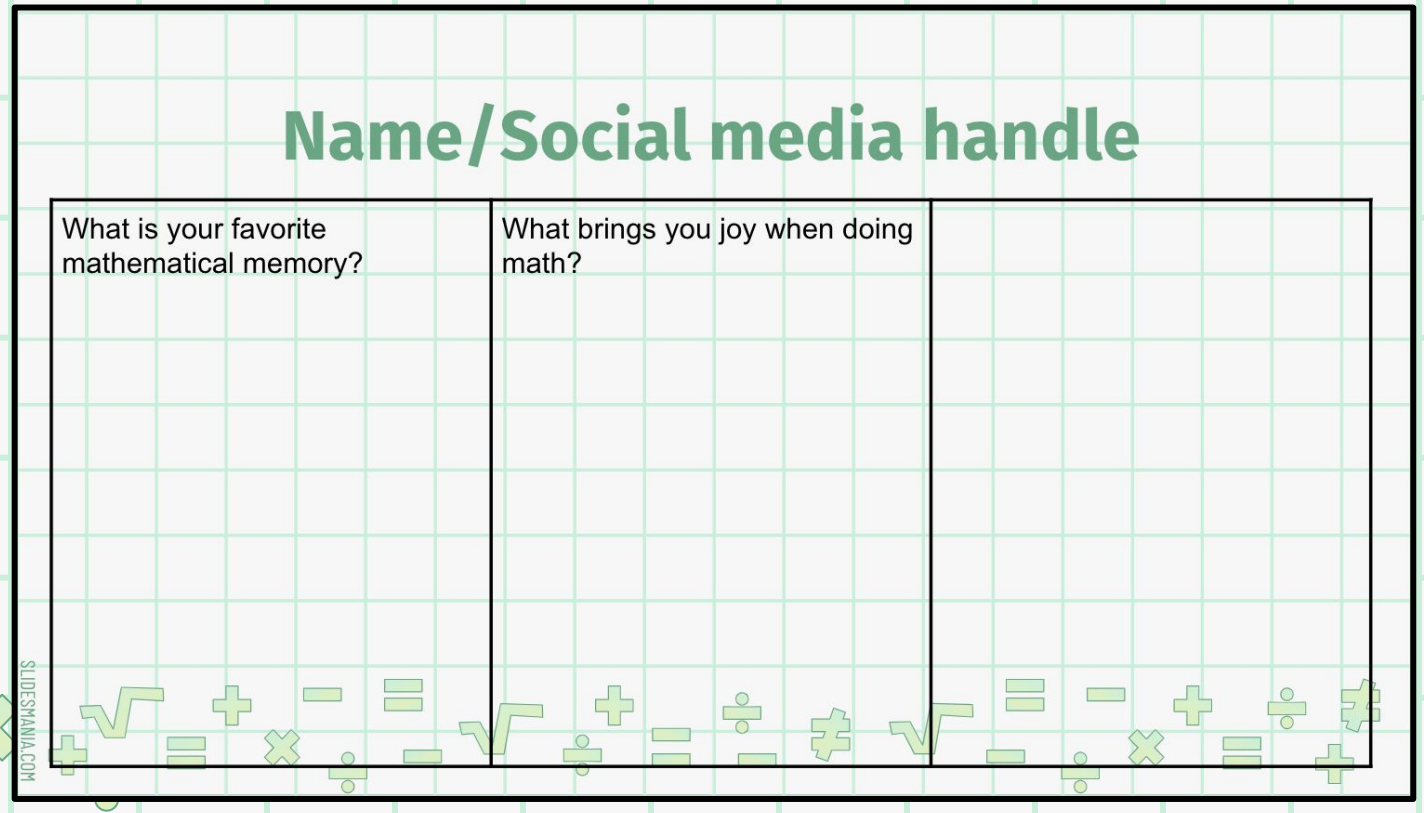
Google Slides time! What brings YOU joy when doing math?

- Write in the middle box of your Google slide.



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Words matter

- How can we make math a positive learning experience?

Turn it into a game

Let's play "Got it!" by @TomJolly19 on Twitter

Make 6

3	-	6	x	2	+
-	1	+	10	-	4
7	x	5	-	3	+
+	9	+	8	-	12
4	x	3	x	2	-
+	1	-	13	+	11

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Joy in math memes

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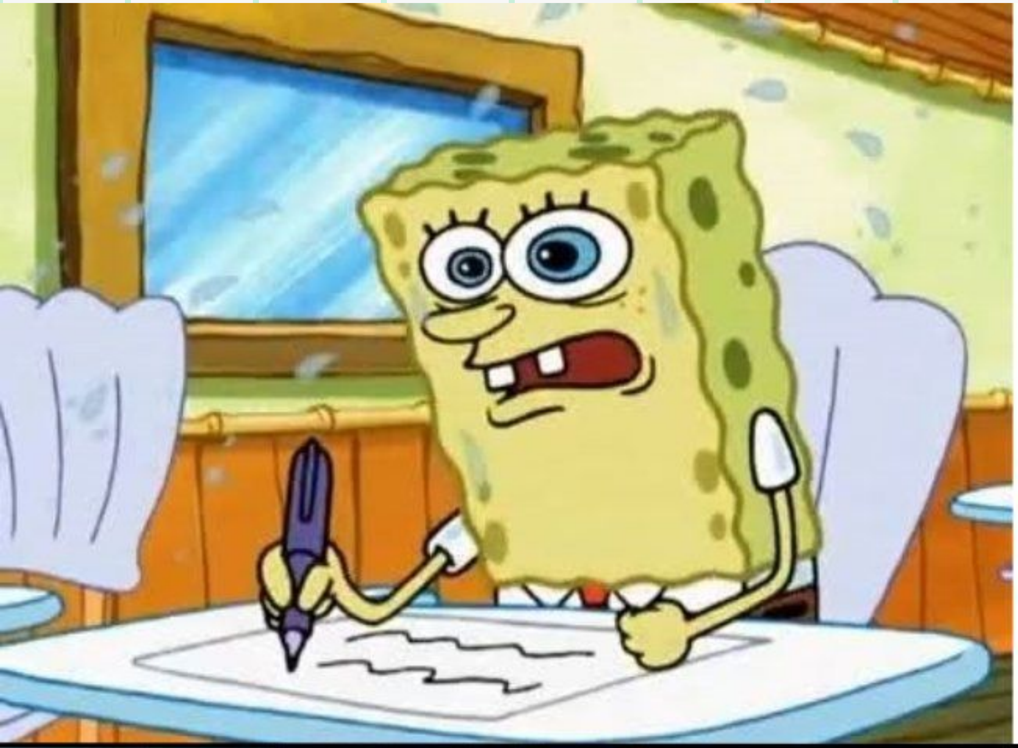
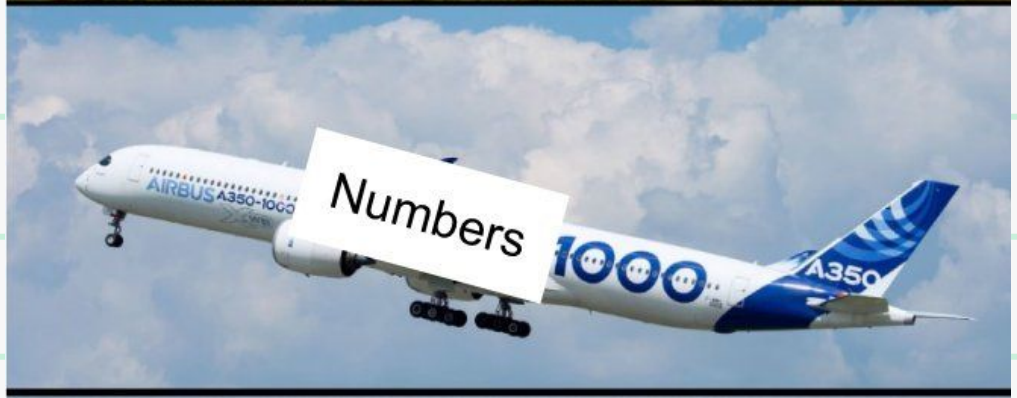


```
  9 9 9
 0 1 1 1 1
  10,000
-  4,289
  ------
   5,711
```


```
  10,000   -1          9,999
-  4,289   -1   →    - 4,288
                       -----
                       5,711
```

$$\begin{array}{r} {}^{1}\cancel{2}^{1}\cancel{0}^{9}\cancel{2}^{1}\cancel{2} \\ -1976 \\ \hline 46 \end{array}$$

1976 1980 2022



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Me, when I make a mistake

Me, when students make a mistake

$$2x - y + z = 30$$
$$x + y - 2z = 42$$
$$-x - y + 3z = -8$$

🍌🍌 - 🍎 + 🍇 = 30

🍌 + 🍎 - 🍇🍇 = 42

- 🍌 - 🍎 + 🍇🍇🍇 = -8

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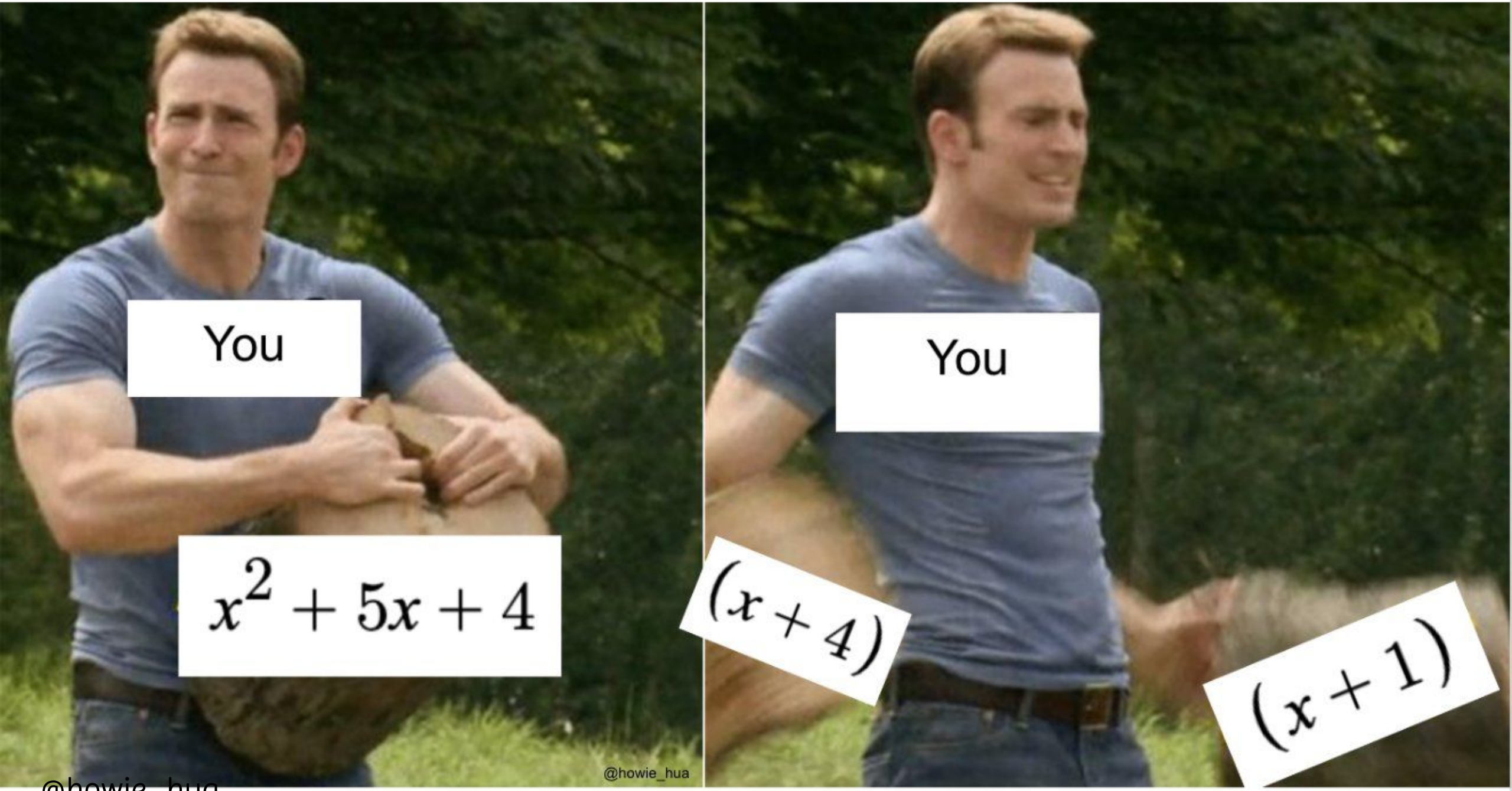

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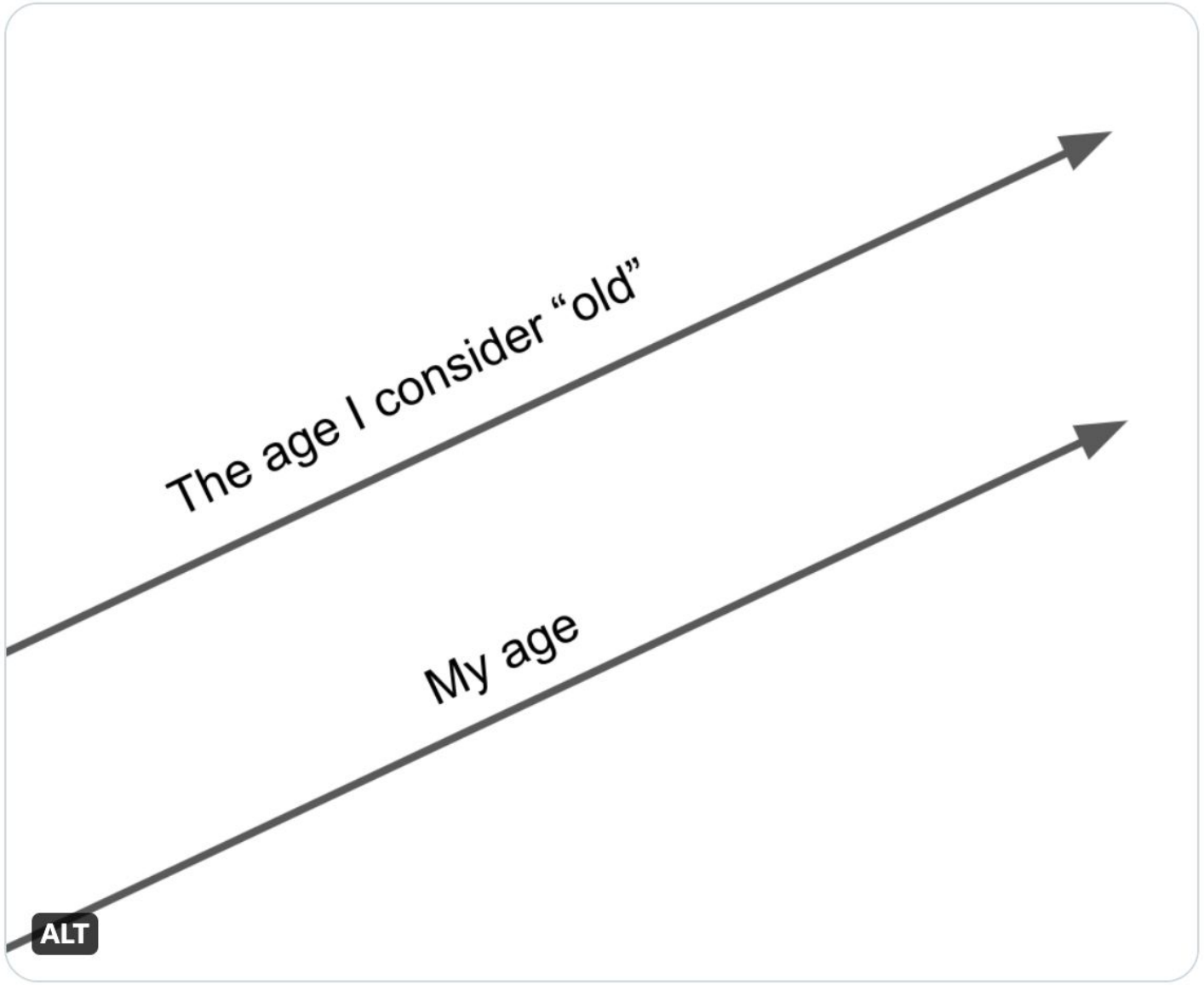
My best explanation of parallel lines



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Jokes about the distributive property aren't funny unless everyone gets it.

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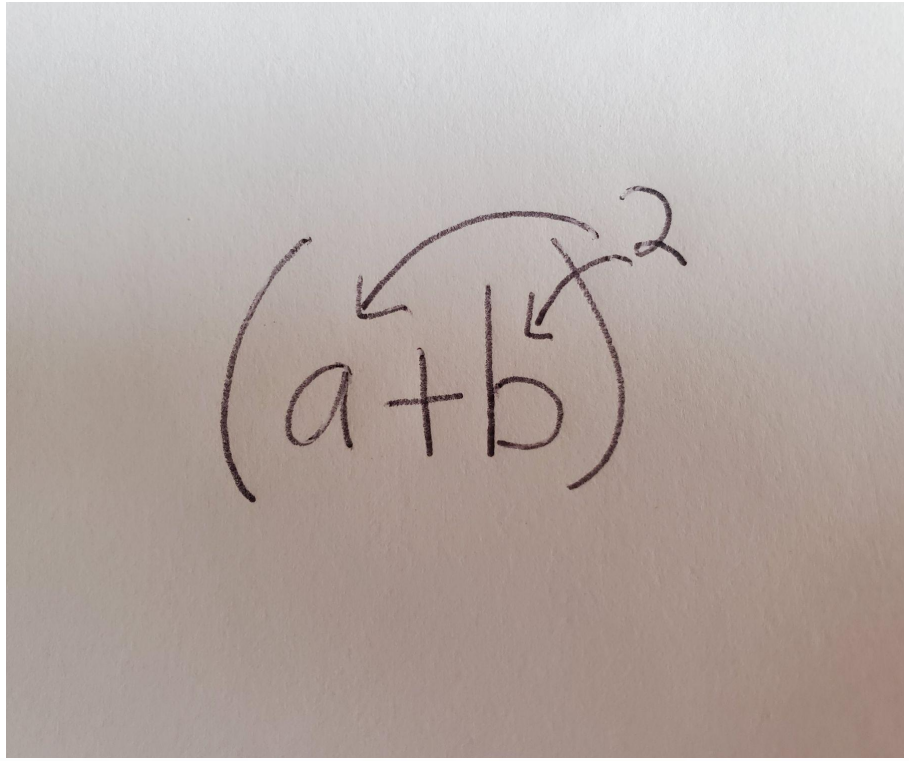
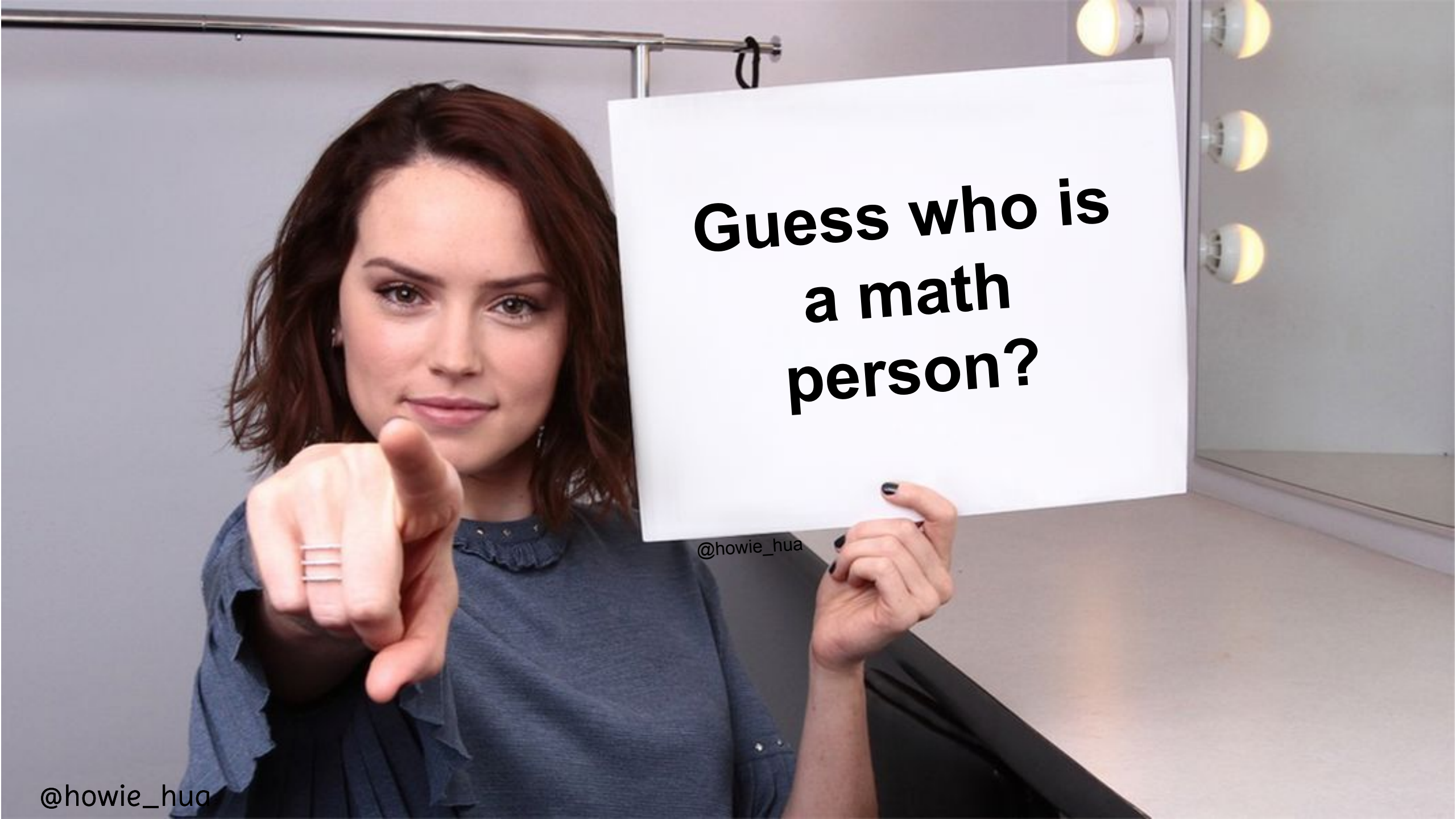


10 Haunting Photos Taken Moments Before Disaster

1,852,483 views

2K 610


Guess who is a math person?
@howie_hua
@howie_hua

Finding joy in knowing you make a difference

“My favorite math story would be when I was a junior in high school and I had the most amazing algebra teacher ever. He was kind, compassionate, and would always motivate me when I would get frustrated with math. He honestly taught me to love math in a way, changed my thinking perspective and motivated me to take Pre-Calc my senior year of high school.”

“My favorite math memory will have to be when I first learned how to multiply double digit numbers. This was in the 4th grade. Honestly it just felt very good and my teacher at that timed really complimented me with that and made it 100x better.”

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Finding joy in knowing you make a difference

“I want to become a teacher because when I was in second grade my teacher was always very helpful, and would always do everything for her students. I remember telling myself how I wanted to be just like her one day.”

When I think back to when I was in elementary school, I could find only pleasant and fond memories of my teachers that made my years fun and enjoyable. That is why I want to teach, to play a part in nurturing future generations.

I am so grateful to have the opportunity to get my Liberal Studies Degree and do what I love best, helping children reach their fullest potential. My biggest inspiration was my fourth grade teacher, and without his encouragement I would not be here today.

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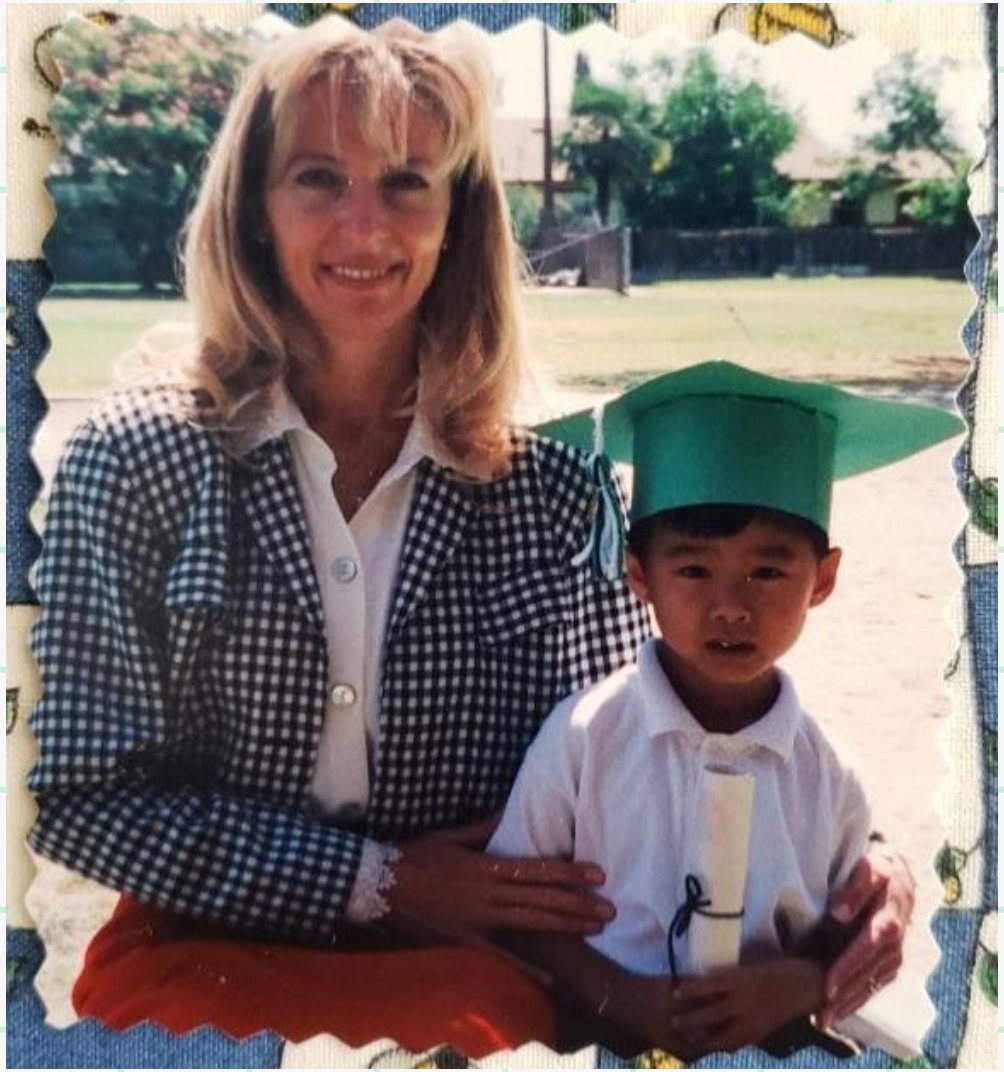
Who is a teacher that inspired you?



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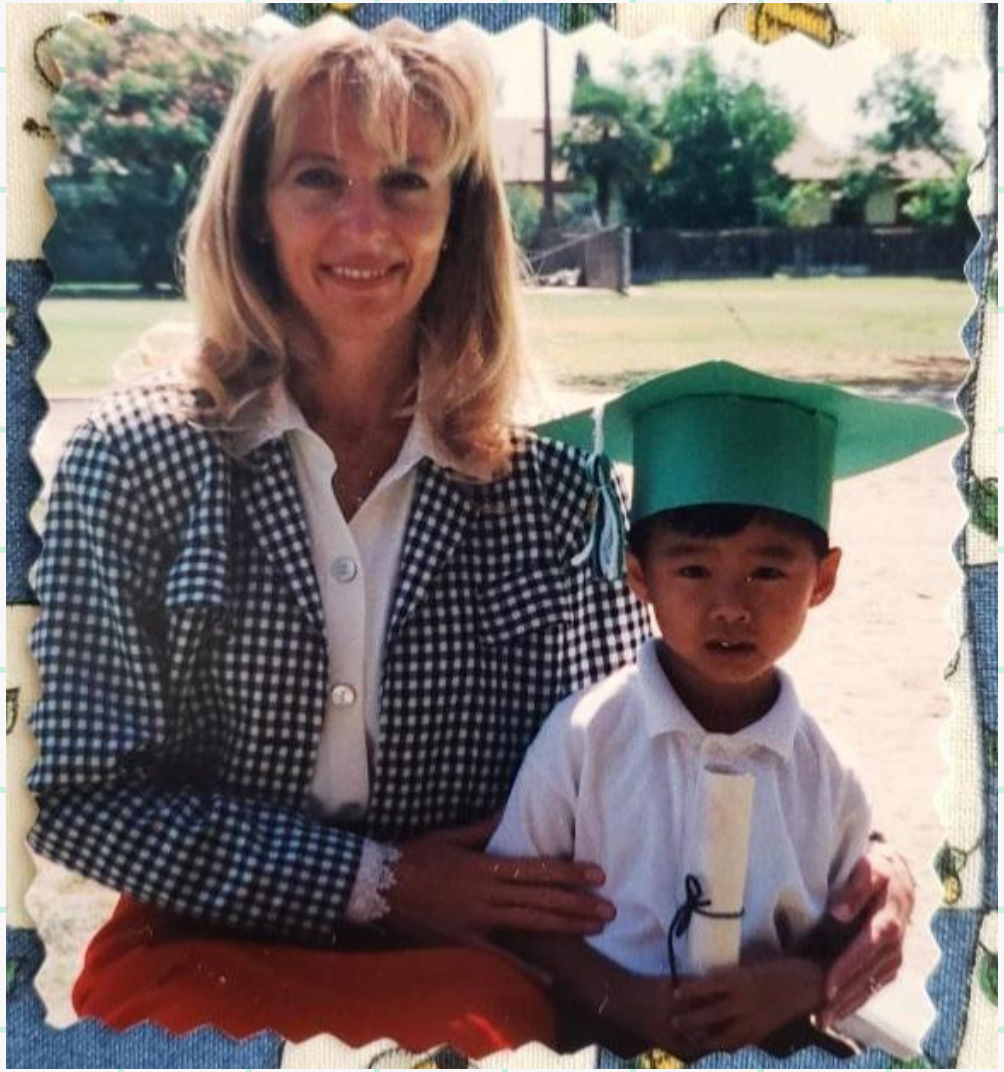
Google Slides time



Who helped you love math? How did they help you love math?

Write your response in the rightmost box.

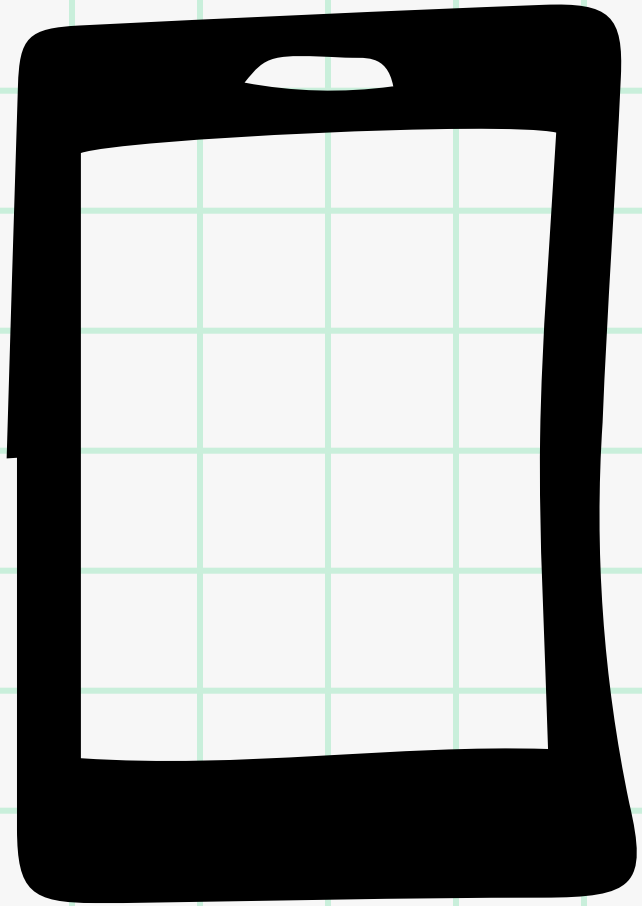
@howie_hua

Name/Social media handle

What is your favorite mathematical memory?	What brings you joy when doing math?	Who helped you love math? How did they help you love math?

Text yourself one thing you will take from this session.

Make things actionable!



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How many teachers does it take to do a subtraction problem?

One, because it only takes one teacher to make a difference.

Thank you Global Math Department!

And thank YOU for being here!

Twitter/TikTok: @howie_hua

hhua@csufresno.edu

howiehua.com