

# Practical Ideas To Bring Math History/Storytelling Inside Classrooms

Monday, September 21

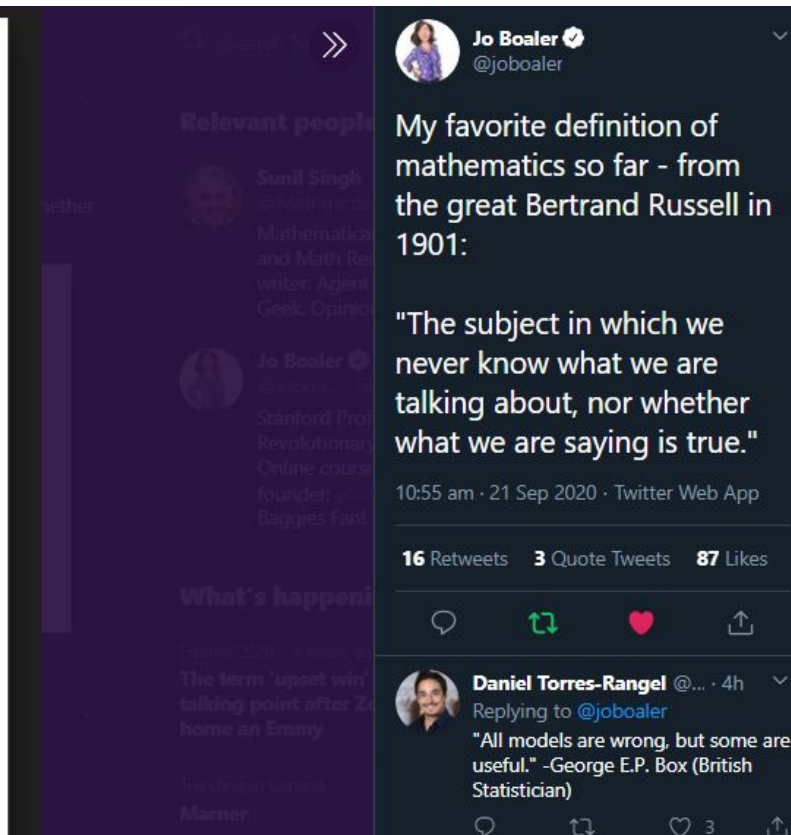
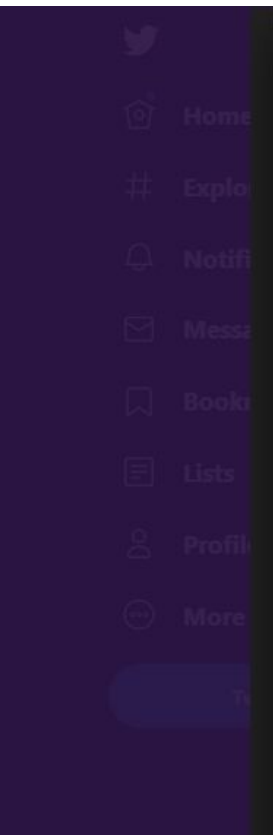
Time: 6:30–7:30 p.m. EDT / 3:30–4:30 p.m. PDT



**SUNIL SINGH**

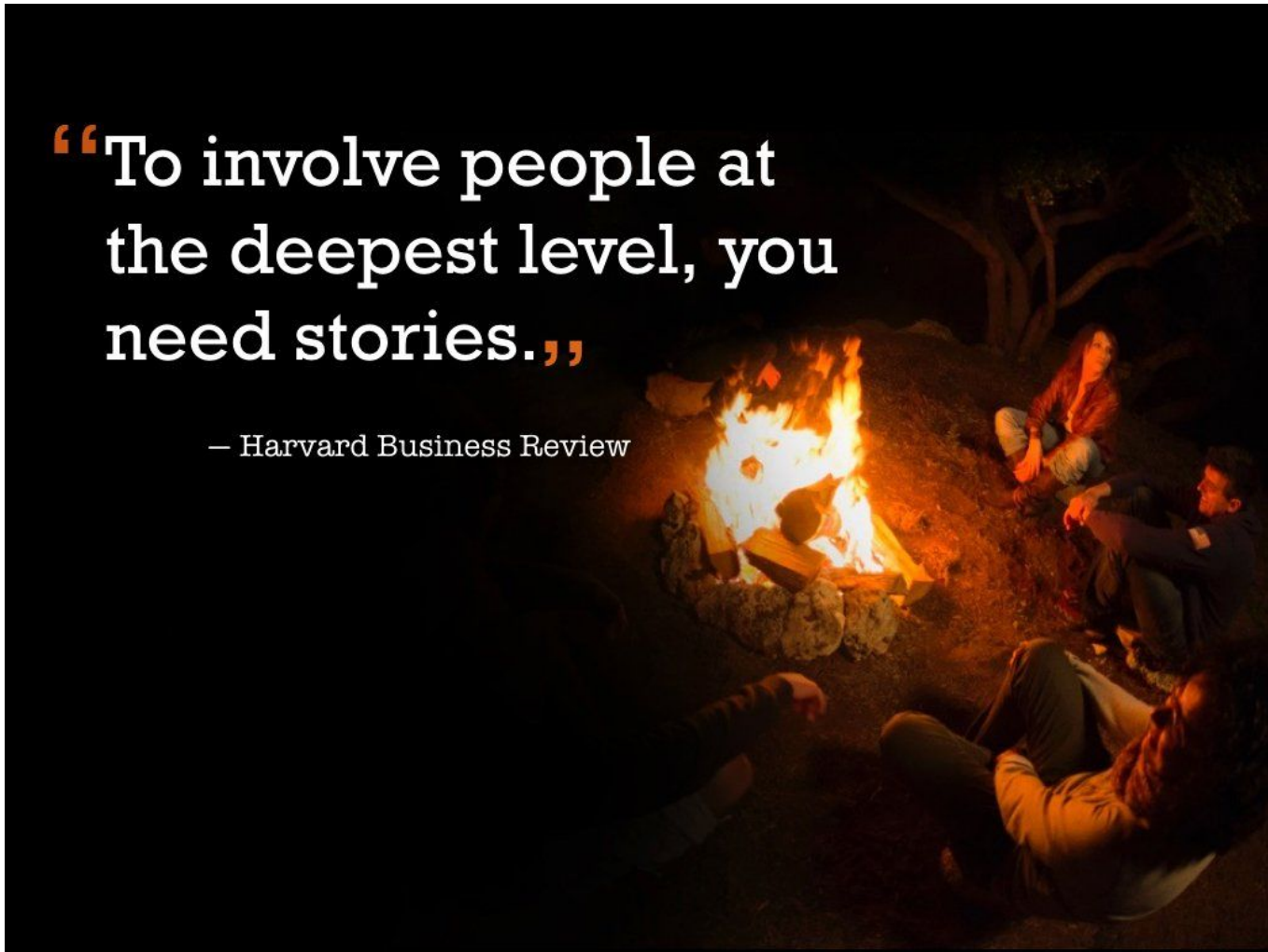
Author, storyteller, and  
Amplify consultant





“To involve people at  
the deepest level, you  
need stories.”

— Harvard Business Review



# What was your first BIG math story or memory?

Stories are memory aids, instruction manuals and moral compasses



Aleks Krotoski, The Guardian, 11 August 2011


The Story of You

The Story of Your Students



The Story of Math



A scenic landscape at sunset or sunrise. The sun is low on the horizon, casting a warm, golden glow over the scene. In the foreground, there's a dirt road with some puddles reflecting the light. To the left, there's a field of tall, dry grass. To the right, a hillside with bare trees rises up. The sky is filled with soft, orange-hued clouds.

I don't see how it's doing society any good to have so many members walking around with vague memories of algebraic formulas and geometric diagrams and clear memories of hating them.

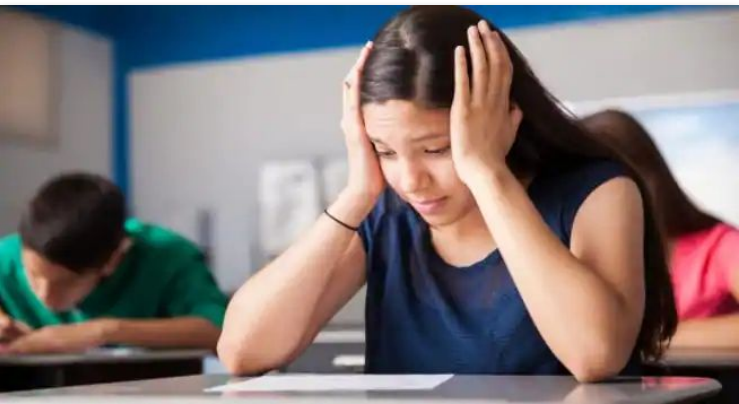
Paul Lockhart

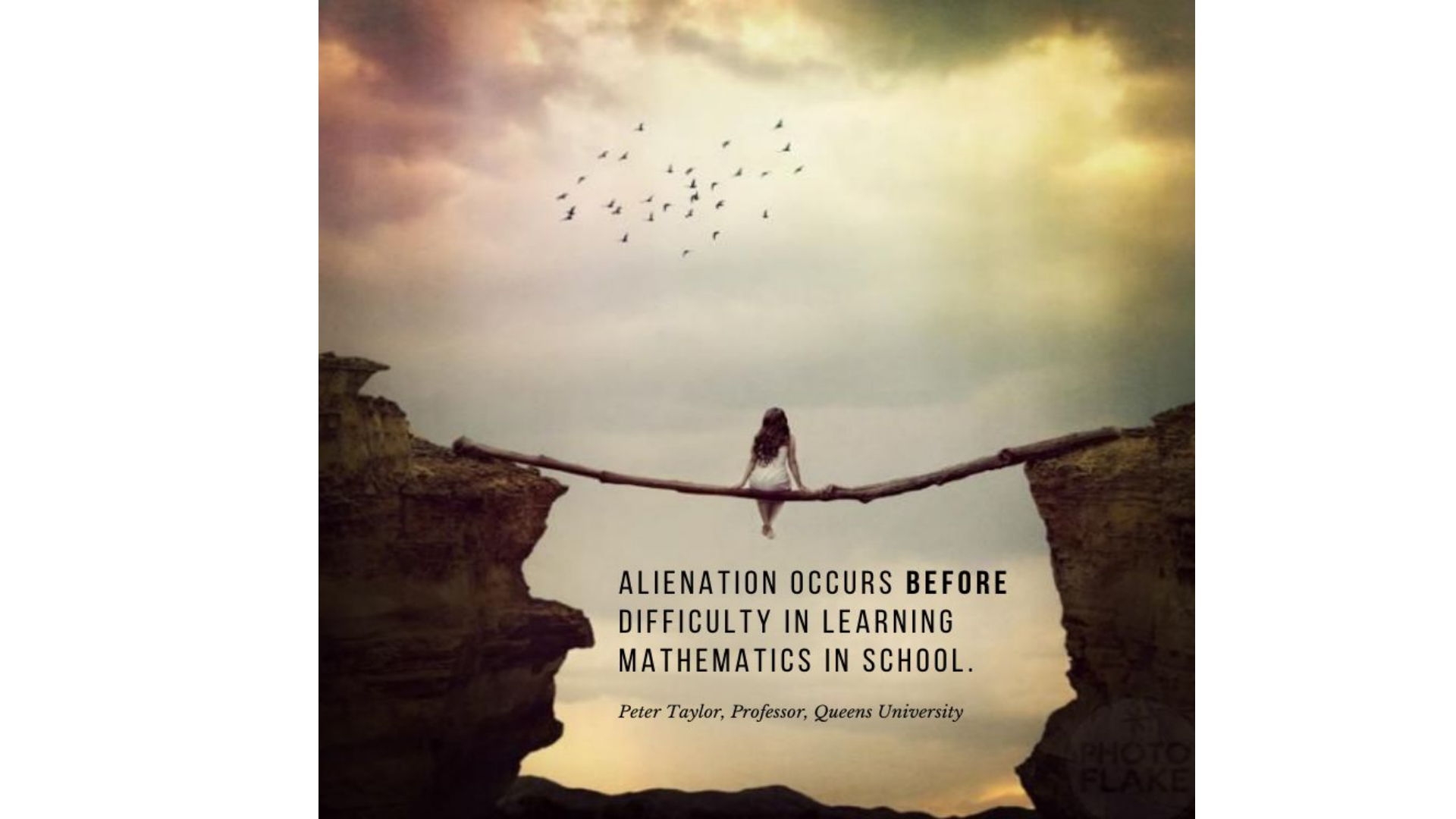
“ quote fancy ”





How do you address negative attitudes?



A woman with long dark hair, wearing a white dress, sits on a single log bridge spanning a deep chasm. The sky above is filled with a large flock of birds flying in a V-formation. The scene is set against a dramatic, cloudy sky with warm, golden light. The overall mood is one of isolation and contemplation.

ALIENATION OCCURS **BEFORE**  
DIFFICULTY IN LEARNING  
MATHEMATICS IN SCHOOL.

*Peter Taylor, Professor, Queens University*

PHOTO  
FLAKE

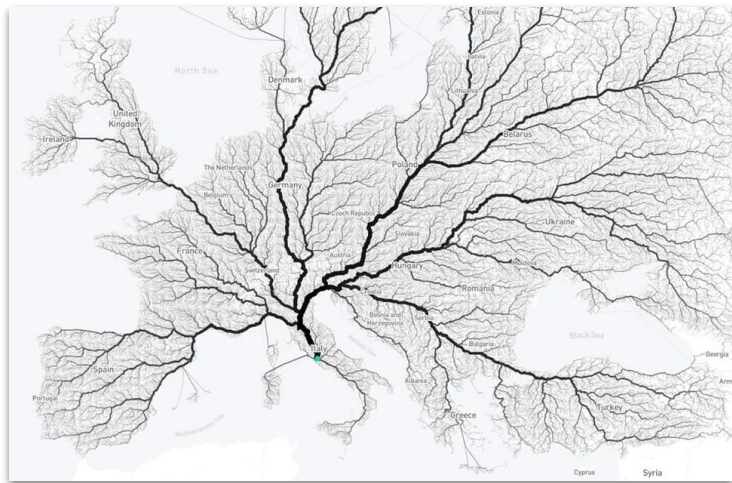
## *Chapter One* **The History of Mathematics: Alternative Perspectives**

### **A Justification for This Book**

An interest in history marks us for life. How we see ourselves and others is shaped by the history we absorb, not only in the classroom but also from the Internet, films, newspapers, television programs, novels, and even strip cartoons. From the time we first become aware of the past, it can fire our imagination and excite our curiosity: we ask questions and then seek an-



# All math roads lead to...



Storytelling > Humanization

Belonging

Curiosity



Kabuliwala(1892)

Rabindranath Tagore

Coco(2017)

Pixar



# We Have Over 100 Generations of Stories to Tell...

*Stories have to be told or they **die**, and when they **die**, we can't remember who we are or why we're here*

*Sue Monk Kidd*





# Adding Historical Color...

- Origin of Numerals
- Algebra Steps and Their Arabic Origins
- The History and Problems With Negative Numbers
- Africa: Birth of Fractal Design
- Wrong Attribution of a Famous Sequence
- Florence Nightingale and Statistics
- Short History of Fractions
- Infinity
- Ratio/Proportion and Liber Abaci
- The Problem with Zero(Brahmagupta's Lost Laws)
- Stories of Teenagers: al-Samaw'al, Leonardo of Pisa, Euler, and Germain
- Exponent Laws
- A Different Approach



## Should schools in America teach Arabic Numerals as part of their curriculum?

> All respondents in my account

> Weighted according to U.S. Census figures for gender and age, 18 and older



Margin +/- 3%    3,624 responses from 05/07/2019 to 05/11/2019

Generated by CivicScience® on May 11, 2019 at 14:45:45 EDT



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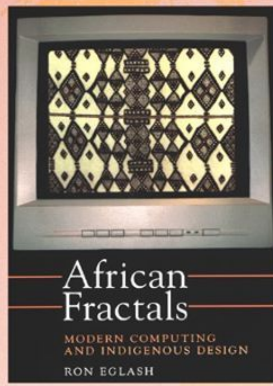
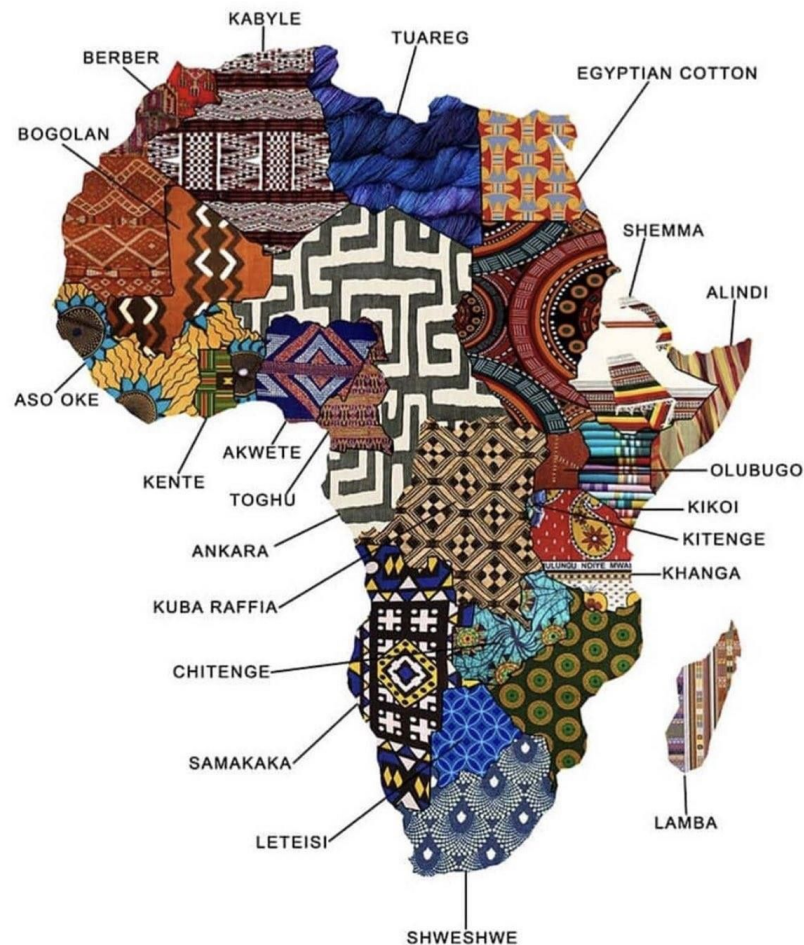
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Cellphones could not exist without the practical applications of fractals. Let's tell that story.

But, that story cannot be told without the mathematical stories, 500 years old, from Africa.

## FABRIC MAP OF AFRICA



A photograph taken from the perspective of someone inside a car, looking out the driver's side window. In the foreground, the black frame of the window and a portion of the side-view mirror are visible. The mirror reflects a clear blue sky. Outside the car, a man in a plaid shirt and dark pants is running away from the vehicle across a lush green field. He is carrying a young child with blonde hair on his shoulders. Both the man and the child have their arms raised in the air, suggesting a joyful or carefree moment. The background features a line of trees under a bright blue sky with scattered white clouds.

It ain't what you don't know that gets you into trouble.  
It's what you know for sure that just ain't so.

Mark Twain



How many different ways  
to get up these 8 steps?

- 1 1 1 1 1 1 1 1
- 1 1 1 1 1 1 2
- 2 2 2 2
- ???





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## Let's literally take baby steps

Steps	Number of ways	Total
1	1	1
2	(1, 1) (2)	2
3	(1, 1, 1) (1, 2) (2, 1)	3
4	(1, 1, 1, 1) (1, 1, 2) (1, 2, 1) (2, 1, 1) (2, 2)	5
5	(1, 1, 1, 1, 1) (2, 1, 1, 1) (1, 2, 1, 1) (1, 1, 2, 1) (1, 1, 1, 2) (1, 2, 2) (2, 1, 2) (2, 2, 1)	8

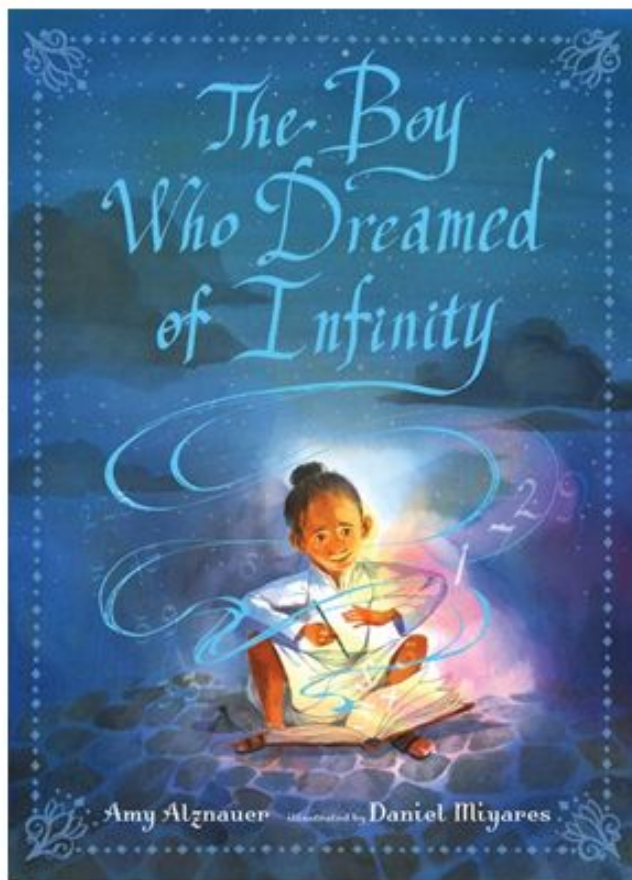
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# Pingala: Founder of the Binary System









Ideas for Opening  
or Unlocking  
*The Boy Who  
Dreamed of Infinity*

*A picture book biography can be a door  
that opens to a whole world of exploration.*

## 1. What is a genius? And/or what is a mathematician?

*"Ramanujan, are you a genius?"*

*"I don't know but if I am my elbow is making a genius of me."*

**Discover new words for "math person":** pattern-maker, dream-catcher, mistake-maker, game-player, question-asker, number-artist, ...

**Question who a math person is:** male/female/other, rich/poor, Black/brown/white, educated/uneducated, ...

## 2. How is math supposed to be done? What counts as *doing math*?

*"He didn't know how math was supposed to be done so he did it his own way."*

*"He made up his own symbols."*

Past

Present

Future



Dear educator,

We've set out to build a different kind of math program. As you might expect, we're developing high-quality, problem-based lessons that help teachers elicit and understand student thinking. But we're also doing more than that.

In Amplify Math, we're crafting units and lessons that surface compelling mathematical stories—from those that took place hundreds of years ago to those that are still happening today—to show students that math lives outside their classroom walls.





Grounding the unit in a  
compelling storyline



Situating problems in relevant and interesting contexts



Making space for connection and  
reflection

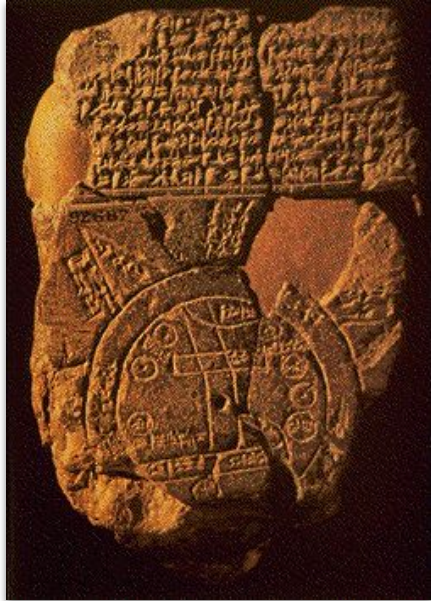


Sparking curiosity with tales and discoveries from math history

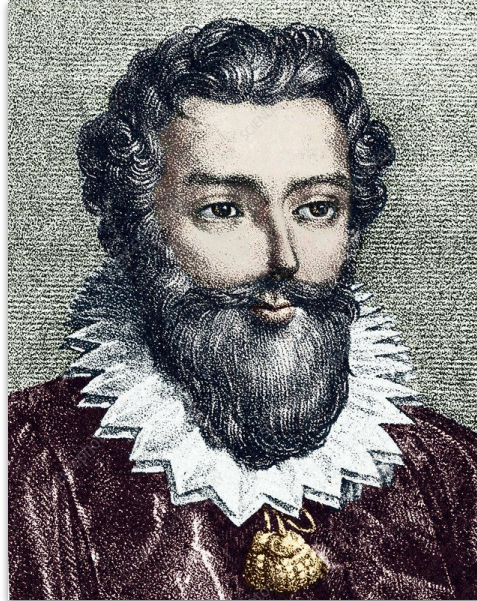


# Solving Quadratics: Past and Present

1700 BCE



1591



2019



# How To Begin Bringing Rich and Inclusive Math History Resources Inside K to 12 Classrooms



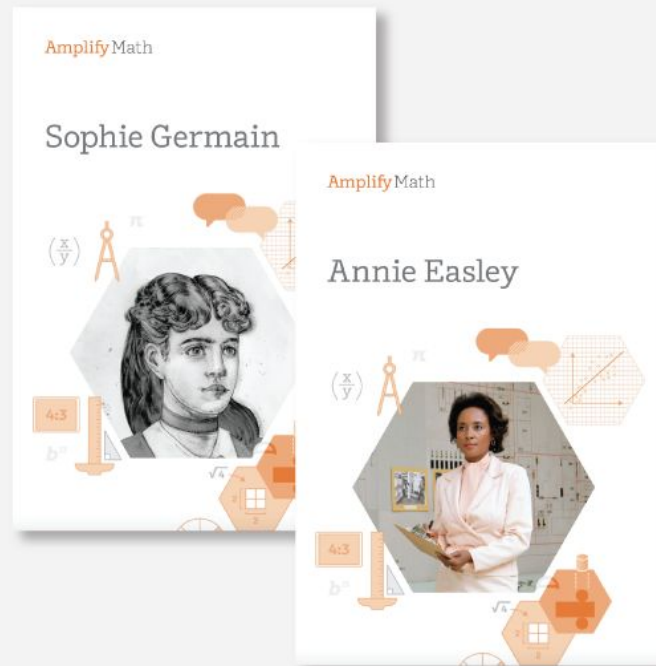
Sunil Singh

Jul 20 • 7 min read



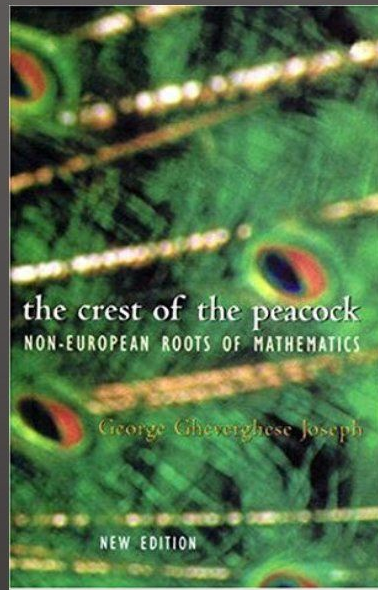
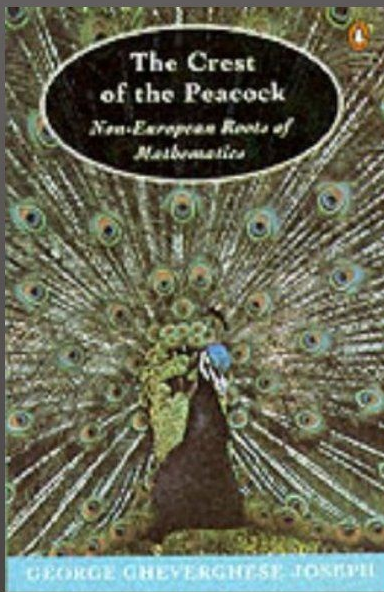
In Amplify Math, we're crafting units and lessons that surface **compelling mathematical stories**—from those that took place hundreds of years ago to those that are still happening today—to show students that math lives outside their classroom walls.

**Amplify.**



**[amplify.com/mathfieldtrials](https://amplify.com/mathfieldtrials)**





*"No society, however small or remote, has ever lacked the basic curiosity and 'number sense' that is part of the global mathematical experience."*

George Gheverghese Joseph

