

Mathematicians

Where the math
happens.



HOW TO FACILITATE MATH MAGIC

By

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Mentor

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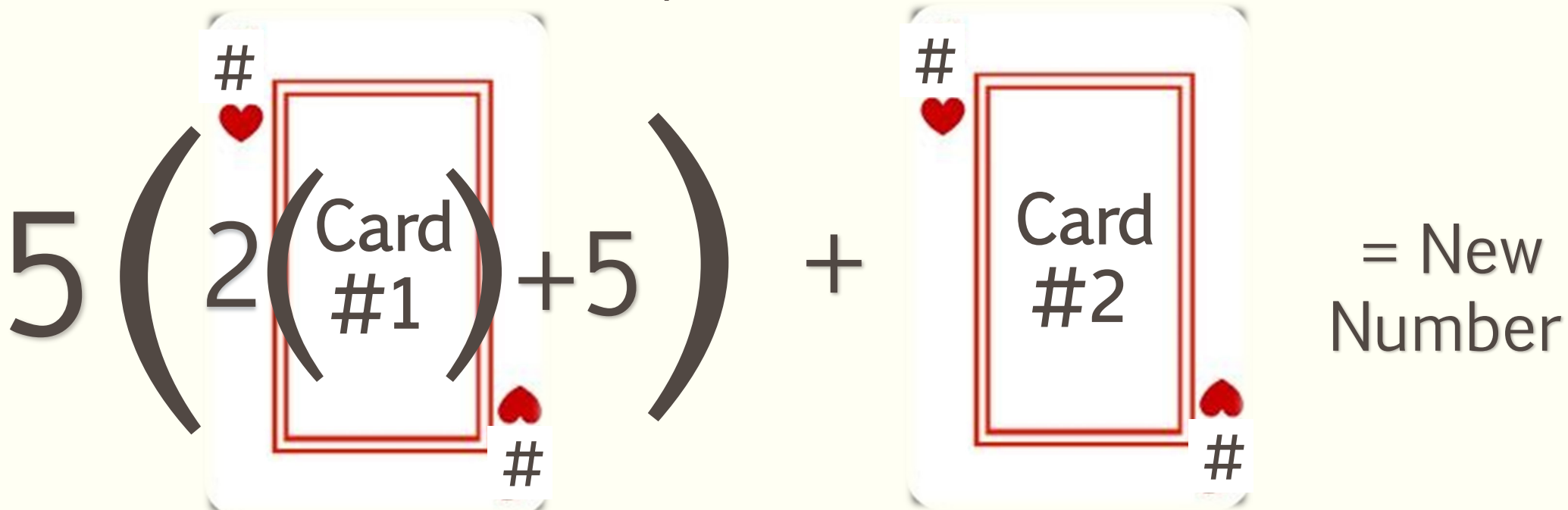


Magicians

Where the magic
happens.

The Guessing Game Trick

1. Select the 1st card
2. Multiply the number by 2
3. Add 5
4. Multiply by 5
5. Select the 2nd card
6. Add that card to the previous value



The diagram shows two playing cards, both hearts. The first card is labeled 'Card #1' and the second is labeled 'Card #2'. The cards are positioned behind a mathematical expression. The expression is: $5 \left(2 \left(\text{Card \#1} \right) + 5 \right) + \text{Card \#2} = \text{New Number}$. The cards have a red heart symbol and a '#' symbol at the top and bottom corners. The text 'Card #1' and 'Card #2' is centered on each card. The mathematical expression is written in large, bold, black font.

$$5 \left(2 \left(\text{Card \#1} \right) + 5 \right) + \text{Card \#2} = \text{New Number}$$



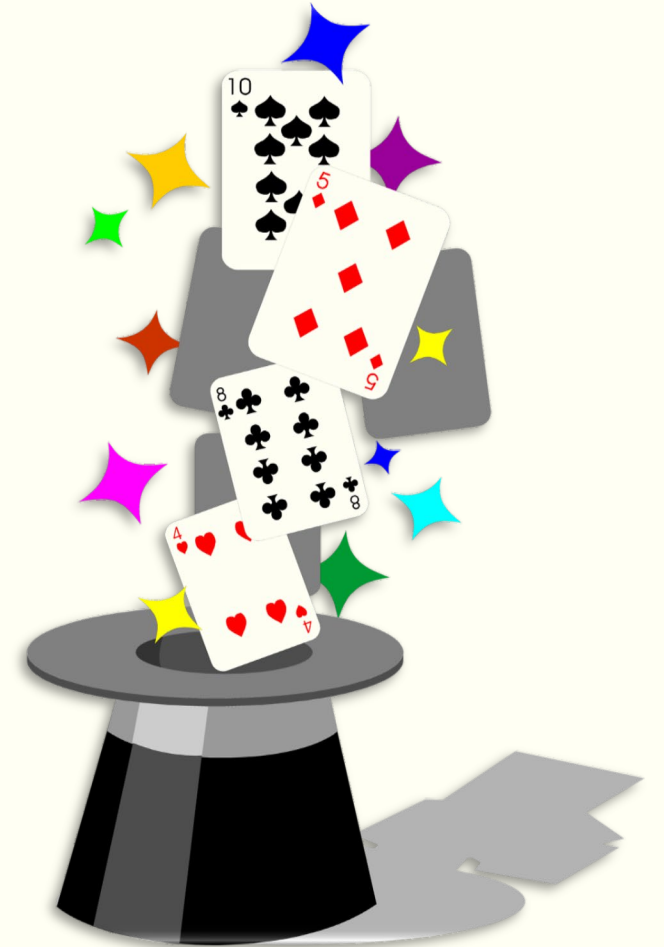
Why it Works:

Let the first card be A, multiply the value by 2.	$2A$
Add 5 to that value.	$2A+5$
Multiply by 5.	$5(2A+5)=10A+25.$
Choose another card, B, add the value of the new card to $10A + 25$.	$(10A + 25) + B = X$ X being the value the spectator says aloud
Solve for X.	$X - 25 = 10A + B$

Utilizes systems of equations and solving for variables.

Introduction

- Aim- give educators a way to facilitate magic math with students
- Why?
 - Engaging students
 - Reach a broader audience
 - Encourage thinking outside the box
 - Enjoyable way to experience math
 - Easily accessible



Literature Review

- Literature in math education
 - Self-efficacy, attitudes towards math, and math anxiety
 - Alleviating math anxiety
- General Education Literature
 - Using recreational math and its effects
- Magic Tricks

Contributing Factors

- **Self-efficacy:** a person's belief in their own ability
 - Young students are overconfident
 - Disappointments in math change self-efficacy (Erickson & Heit, 2015)
- **Attitudes towards math:** emotional response to math
 - Includes self-confidence, enjoyment, and perceived usefulness
 - Influenced in school and personal surroundings (Brand et al., 2006)
- **Math Anxiety:** physiological and psychological effects of math

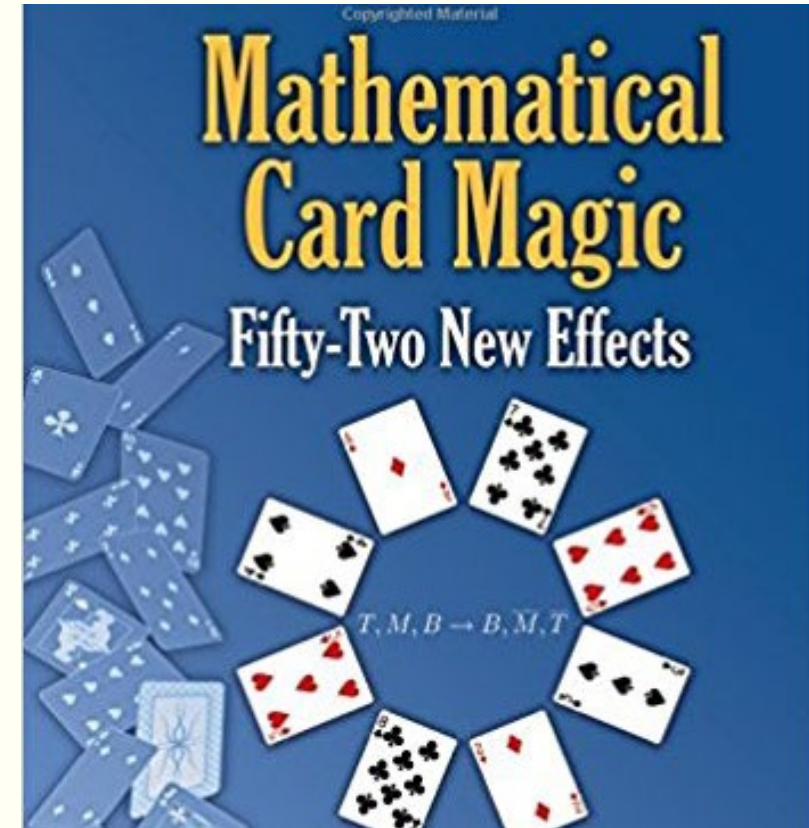
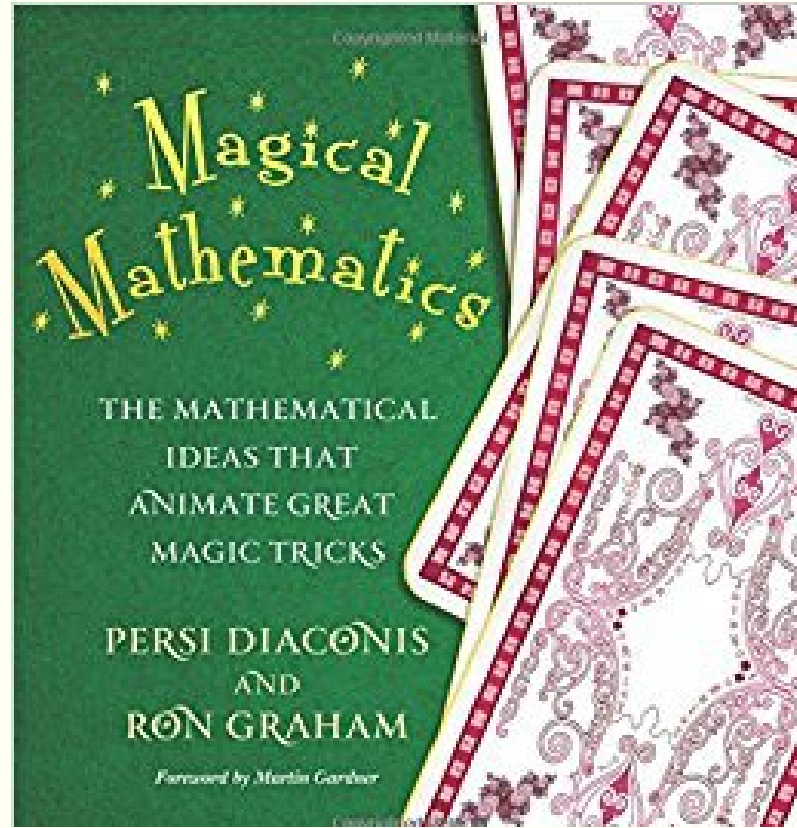
Alleviating Anxiety

- Pinpoint where anxiety begins
- Making connections
- Encourage communication and collaboration
- Using manipulatives (physical objects)

$$\text{Math Anxiety} = \text{Test Anxiety} \left(\text{Fear of numbers} + \text{Fear of unknown} \right)$$

Recreational Math in Classrooms

- Recreational Math
 - Use of puzzles, games, riddles, and other creative recreational activities that are based in mathematical principles.
- Usually gaming applications
 - Dragonbox 12 + (Siew et al., 2016).
 - Computer game for 4th-5th grade
 - Improved confidence
 - Mini Hari Mathematics (Mohd Nordin et al., 2013)
 - Andriod game for 8th grade
 - Improved algebraic thinking and attitudes



Math Magic in Literature

Concluding Model

Understand what deters
the participant

Create a thought-
provoking environment

Facilitate
Math Magic

Incorporate multiple
participants

Use as an introduction
and conclusion

Limitations and Future Research

- Time constraints, model was not tested
- Students from entry level math courses
- Quasi-Experimental Pretest Posttest
 - With a control group
 - Using Likert Scale

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How to Facilitate Math Magic

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Any questions?

